

KEYNOTE PAPER

EXTENSION AND THE FUTURE OF FAMILY FORESTS: MAKING CONNECTIONS

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Abstract

In this paper I address three questions: Why sustain family forests? What are the major challenges to sustaining family forests? and, What roles can extension forestry play in sustaining family forests? Family forests are critical components of forested landscapes around the world, providing a unique and valuable set of ecological, economic, and social values. Sustaining family forests is challenged by profound changes occurring in 1) environmental conditions, 2) land tenure patterns and institutions, 3) the globalization of markets, communications, and politics, and 4) changes in social demographics and values. I propose "sustaining family forests" as a worthy mission for extension forestry, and suggest that achieving this mission will require facilitating connections; 1) between forest owners and their neighbors across the landscape, 2) between forest owners and global markets, and, 3) between forest owners and the public.

About the Author

John Bliss holds the position of Starker Chair in Private and Family Forestry in the College of Forestry at Oregon State University, U.S.A. Dr. Bliss earned degrees in cultural anthropology and forestry from the University of Wisconsin – Madison. He has worked in the field of nonindustrial private forestry for 20 years, first as a private lands forester for the State of Wisconsin, then as an forestry extension specialist at Auburn University, Alabama. John has published extensively on forest-based rural development, private forest policy, public attitudes toward forest practices, and social science research applications in forestry. In his free time, John enjoys bicycling, backpacking, skiing, and playing jazz guitar.

Introduction

Corvallis, Oregon, where I live, is a college town of 50,000 souls at the feet of the Coast Range Mountains, about an hour's drive from the North Pacific. The Coast Range is a maze of narrow valleys and ridges scraped up from the ocean floor as two massive tectonic plates collided. The Douglas-fir forests that cover the slopes of these low mountains are among the most productive forests on the planet.

When I moved to Corvallis in 1998, I visited dozens of people with some sort of connection to the forests, trying to gain an understanding of the issues. One of my first conversations was with an environmental activist, Reid Behrens, who had moved to Oregon from San Francisco. Reid had been among the first citizens to contact me in my new capacity as manager of a 260-acre demonstration forest. Reid had organized neighbors of the forest in protest over the initial harvests on the property, and was anxious to check out the new manager. Over coffee at a local coffee shop, he told me how he had wept when he first drove north along the

Pacific Coast, and encountered Oregon's Coast Range forests. Instead of the vast, pristine old growth forests he envisioned, what he saw were great swaths of destruction: huge gaping scars of clearcuts torn out of the sides of the mountains. The spectacle of such wanton destruction, he said, brought him to tears, and fueled his zeal to bring a halt to it. Reid's Coast Range is a despoiled place, a raped place, a place begging for relief and protection from the insatiable hunger of humans.

Shortly after this conversation, I met with Thad Springer, a logger and forest owner from Harlan, a tiny logging and farming community snuggled in the Big Elk Creek Valley deep within the Coast Range. He'd agreed to drive me around the area in his pickup and show me his tree farm. As we bounced along on gravel and dirt roads, sometimes climbing steeply up the mountainside, then following the Big Elk Creek, Thad constantly pointed out places of significance to his life: the site of the one-room schoolhouse he attended as a child, a remnant snag from the Yaquina fire of the 1850's which reduced much of the Coast Range forest to ashes, the stand of fir that was "nothing but a fern patch" when he was a kid, the hillside he used to slide down on his way to school, the church where three generations of his family had been married, the church yard where family members are buried.

Thad's Coast Range has the familiarity of neighborhood. Its forest is a mosaic of stands - some harvested yesterday, some 50 years ago. The cut patches move across the landscape, but the forest endures. Each patch of timber is, in Thad's memory, attached to some individual who cut it, or planted it, or grazed it. Some farmer who cared for the forest, or didn't. Thad's landscape is a humanized landscape, in which natural and human resources are intertwined, inseparable.

But it is a landscape in the throes of major ecological, economic, and social change. Thad's hometown of Harlan is a ghost town; its once-thriving mills are closed, most of its residents have moved to the city to find work. Over the years, large portions of the patchwork of family-owned farms and forests have been transformed incrementally into a less diverse landscape of large, intensively managed corporate tree farms, and large, National Forest reserves. Local forest products mills have all but disappeared, and mergers and acquisitions have produced new, unfamiliar, distant companies competing in global markets.

The timber-based economy and culture, once so central to Oregon's identity, now seems a quaint historical relic to most Oregonians. Today's citizens are more likely to associate Oregon's economy with Nike and Intel, rather than with Willamette or Weyerhaeuser; with microchips rather than woodchips. Most fail to make the connection between their wood frame houses, log trucks in heavy interstate traffic, and clearcuts on the mountainsides. And very few realize that most of the timberland in the United States is owned by non-industrial, private owners.

Reid and Thad's competing views of the forest, and the ecological, economic, and social changes underway in the Oregon Coast Range, are illustrative of forces affecting family forests all around the globe. Although the circumstances vary with differences in culture, history, form of government, and land tenure relations, family forest owners everywhere share some common attributes. By referring to the Oregon situation, about which I know at least a little, I'll try to heed the advice

of that great American philosopher, Mark Twain, who admonished us that "It is better to know a few facts that is, than many that ain't."

My observations from Oregon present a context for considering three questions might be of some value to our discussions over the next few days:

1. Why sustain family forests in the landscape?
2. What are the major challenges to sustaining family forests?
3. What roles can extension forestry play in sustaining family forests?

Before proceeding with these questions, a definition is in order. I use the term "family forest" to emphasize the unique attributes of non-industrial private forests owned by families or individuals, and to distinguish them from other ownerships in the NIPF category such as banks, pension funds, real estate companies, and other corporate entities. The term "family forest" is somewhat imprecise, but it conveys the essence of a great many of these ownerships, namely, the centrality of family attachments, values, and objectives to management of the forest. Although I'll be speaking about family forests, my observations may be relevant to many other non-public, non-corporate ownerships such as community and tribal forests.

In the United States, family forests are tremendously important by virtue of their extent alone; non-industrial private forests comprise 59 percent of the nation's timberland, the bulk of that being held by individuals and families (Birch 1994). Even in a state such as Oregon, where public and industrial forests dominate, over 4 million acres of forestland are owned by families. Here in Australia over one quarter of the forest is privately owned (Dargavel 1995), much of it in the hands of family farmers and ranchers.

Now to the three questions I posed. I've organized my discussion of these questions around the familiar sustainability triad of social, economic, and ecological considerations, resulting in a three by three matrix (Table 1). This is certainly not the only way to approach the topic, but it has the advantages of simplicity and familiarity.

Why Sustain Family Forests in the Landscape?

Ecological Dimension

About three years ago I set out to test a hypothesis that I suspect many of you have intuitively assumed to be true, namely, that a diverse pattern of forestland ownership correspondingly supports a diverse forest. The Coast Range, with its large expanses of National Forest, vast industrial tree farms, and thousands of family forest ownerships, is an ideal test case. Using statistical spatial analysis, graduate student Brooks Stanfield and I systematically examined relationships between forest ownership patterns and patterns of forest habitat diversity in the Coast Range (Stanfield and Bliss, *In Press*).

What we found confirmed our hunch: the spatial arrangement of public, industrial, and non-industrial private forestlands has a huge impact on forest diversity. Where the ownership composition is diverse, the forest composition is diverse. Moreover, each ownership type contributes a different mix of forest conditions to the landscape. Non-industrial private ownerships, for example, provide a wild

mixture of young to medium aged conifer stands, extensive hardwood stands, as well as pasture, cultivated fields, abandoned cropland, and open woodland. This unique mixture contributes ecological diversity to landscapes otherwise dominated by the conifer plantations of industrial forestland, or the maturing stands of Douglas-fir found on public forests in the region.

So, why sustain family forests in the landscape? From an ecological point of view, family forests make a unique contribution to landscape diversity; one that is distinct from that made by other ownership categories. In contrast to industrial forests, which reflect the economic bottom-line focus of shareholders, and public forests, which adhere to national directives, family forests manifest the wide range of objectives, values, capabilities, and constraints of their diverse owners.

Table 1: Family forest goals and challenges, and corresponding roles for extension forestry.

GOALS	CHALLENGES	ROLES
<i>Why sustain family forests?</i>	<i>What are the challenges to sustaining family forests?</i>	<i>What role can extension play?</i>
<ul style="list-style-type: none"> • Healthy, diverse ecosystems • Clean water supply • Abundant habitat 	<ul style="list-style-type: none"> • Rapidly evolving science • Landscape health, diversity • Forest fragmentation, loss 	<ul style="list-style-type: none"> • Connect owners with each other • Connect owners with forest science
<ul style="list-style-type: none"> • Economically viable forestry • Healthy, diverse, resilient rural economy • Stable resource supply 	<ul style="list-style-type: none"> • Global competition • Ownership consolidation, fragmentation • Conversion to non-forest uses 	<ul style="list-style-type: none"> • Connect owners with markets
<ul style="list-style-type: none"> • Vibrant rural culture • Multiple social values • Strong social contract 	<ul style="list-style-type: none"> • Changing values • Consumption-production disconnect • Weak social contract 	<ul style="list-style-type: none"> • Connect owners with the public

Challenges to Ecological Sustainability

Challenges to the ecological sustainability of family forests exist at multiple levels, from the forest stand, to the landscape, and beyond.

Many family forests are models of resource stewardship, and others are not. Occasional financial contingencies, persistent rural poverty, short ownership tenure, and ignorance result in poor forest stocking, sub-optimal composition, and low productivity on some lands. Such conditions have always challenged extension foresters, and they probably always will.

Added to these perennial problems are challenges to family forest sustainability that span entire watersheds, landscapes, and eco regions. Water quality and quantity, loss of endangered species habitat, wildfire, and forest health concerns are prominent examples of landscape-level problems whose solutions require cooperation across ownership boundaries.

Moreover, major changes to the forestland base are occurring. In the United States, an estimated 150,000 new non-industrial private forest owners emerge each year, slicing the NIPF pie into smaller and smaller slices (Sampson and Decoster 2000, Birch 1996). At the urban fringe of many metropolitan areas, forestland is being subdivided, resulting in fragmented habitat, non-operable forest ownerships, and increased fire risk.

At the same time, in the major timber-growing regions of the United States, forest industry and other corporate forest owners, (principally banks, pension fund companies, and real estate firms), pushed by global competition to merge and grow, are expanding and consolidating their ownerships. This is resulting in an alarming conversion of family forestland to corporate ownership. In Oregon's Coast Range alone, some 20 thousand acres shift from non-industrial private to corporate ownership each year (Azuma et al. 1995). As corporate forests increasingly dominate the landscape, the ecological diversity associated with a mixed-ownership pattern vanishes.

What's worse is the conversion from forestland to non-forest uses: pavement is, as they say, the final rotation. The loss of productive forestland is not restricted to the urban fringe; forestland in some prime recreational areas is rapidly being developed -- in some cases by major industrial forestry companies - for vacation homes, recreation destinations, and retirement centers. Clearly, the forest land base is dynamic.

Extension foresters have long helped forest owners solve their individual management problems. We've been the "go to guys" for forest owners with questions from what's killing grandma's favorite shade tree to how to design a timber harvest. There will always be demand for this kind of one-on-one assistance, but it will become more and more difficult to provide it: first, due to growth in the number of forest owners, and second because of the rapid growth of ecological knowledge. As the half-life of forest science information diminishes, we will be increasingly challenged to keep up with and disseminate current management recommendations.

But we are all beginning to realize that the solutions to our most challenging ecological problems do not lend themselves to this assistance-by-request, one ownership at a time approach. Water quality, species habitat, forest health, and forest retention -- every major forestry issue we face today inescapably demands some degree of coordinated response across the landscape. Meeting this demand is especially challenging in the mixed-ownership landscapes with which we extension foresters typically deal.

I've recently completed a study of cooperative fire partnerships between ranchers and the U.S. Forest Service in the John Day Valley of Eastern Oregon (Bergmann 2001). Graduate student Stefan Bergmann and I wanted to understand the dynamics of cross-boundary cooperation, and fire partnerships seemed to be a

good case to explore. The Valley has serious forest health problems in part stemming from the long-term exclusion of fire. The Forest Service realizes that it cannot implement the use of prescribed fire without the cooperation of neighboring ranchers.

What we learned is that the term “partnership” has a nice ring to it, but achieving it is a complex, difficult, long-term process. Complicated land tenure arrangements, differences in political, economic, and social power, diverse ideologies about the purpose of forests, and an atmosphere of rapid social change are obstacles to developing the trust required for cooperation.

Where might extension forestry fit into this picture? In my view, helping forest owners connect with their neighbours to identify and work toward achieving shared landscape goals is a role for which extension is uniquely well positioned.

Economic Dimension

Economic Value: Worldwide, private participation in the forestry sector has expanded significantly in the past decade (Landell-Mills and Ford 2001). The global trend appears to be toward increased reliance on privately owned forests and market-based instruments to produce the forest products upon which society depends. In the United States, non-industrial private forests comprise 59% of all commercial timberland, and about one-half of the timber harvest (Powell et al. 1992). In Oregon, where national forests have practically ceased to contribute to the nation’s demand for wood, the increased reliance on private forests is even more striking: although non-industrial private forests make up only 17% of Oregon’s forestland, their annual timber production is roughly equal to that from the 61% of the forestland that is publicly owned (ODF 1995)!

Challenges to Economic Sustainability

The challenges of running a financially successful family forest operation have always been substantial. Cyclical patterns in housing markets, fickle changes in consumer demand, product substitution, complicated taxation schemes and a host of other uncontrollable economic factors have always filled family forestry with uncertainty.

We are entering a period, however, from which we will look back with nostalgia to the simplicity of the present. Robert Friedman, in his Pulitzer Prize-winning book, *The Lexus and the Olive Tree*, describes the process of globalization, which he defines as, “The inexorable integration of markets, nation-states and technologies to a degree never witnessed before” (p. 9). Friedman argues convincingly that, driven by the worldwide success of free market capitalism, “The traditional boundaries between politics, culture, technology, finance, national security and ecology are disappearing” (Friedman p. 20).

In contrast with the Cold War period, whose defining measurement was weight (particularly the throw weight of missiles), “the defining measurement of the globalization system is speed – speed of commerce, travel, communication and innovation” (p. 10).

Family forest owners everywhere sense that something fundamental has changed in the relationship between their forestry operation and the rest of the world. The lumber mill they used to sell logs to is no longer owned by a neighbor, but by a multi-national company. The price they receive no longer seems to reflect local market conditions, but instead hinges on markets half way around the globe. The forest management standards to which their performance is compared are no longer set exclusively by local foresters, but are influenced by international agreements and environmental organizations based in far off lands.

A clear example of how family forests are influenced by global forces is the movement toward adopting global standards for sustainable forest management. The process began at the 1992 Earth Summit in Rio de Janeiro, was further developed in Montreal in 1993, and adopted in Santiago in 1995. As a result, the United States, along with 11 other nations, has adopted the Montreal Process as a framework for measuring progress toward achieving sustainable forest management. In 1997 the National Association of State Foresters endorsed the Montreal Process as a framework for all forestlands in the United States, and in 1998 Oregon became the first state to formally adopt the criteria and indicators as the foundation for state forest planning. There is no question but what the Montreal Process will influence further development of the state's forest practices rules; the rules with which family forest owners must comply.

Closely related to, but distinct from the development of such international agreements is the emergence of forest certification and eco-labeling schemes. Though only in their infancy, such schemes are tangible evidence of the growing global influence of environmentalism on markets. Forest product certification is in such a state of flux that it is impossible to predict which schemes will prevail, but it is highly unlikely that the demand for environmental accountability will be reversed. Where once good forest stewardship meant whatever local foresters understood it to mean, today's measures of good stewardship are being hotly debated, formally codified, and adopted as official policy – and the debate is occurring simultaneously around the world.

Extension forestry can do much to help family forest owners navigate the uncharted waters of the global marketplace.

Social Dimension

Human Value: Perhaps the least recognized value that family forests bring to the landscape is human value. But it is this human quality that provides the foundation for the other values these forests contribute: the diversity of human aspirations, capabilities, values and knowledge drives the diversity in forest conditions that we observe among family forestlands. Family forest owners bring a human scale to the landscape, integrating elements of wildness and cultivation, protection and production, into management of their properties. They are also members of rural communities, contributing to rural vitality at a time when many rural areas are undergoing out-migration and decline. Family forest owners help maintain a connection between society and the resources upon which we are all dependent – a connection most in society have lost sight of.

Challenges to Social Sustainability

Social challenges to sustaining family forests are the most critical of all. In democratic nations, all natural resources, including private forests, are managed within the terms of a largely unwritten social contract. This agreement reflects society's values and expectations regarding forests, outlines the rights and responsibilities of resource owners, and defines, however imprecisely, what forestry behavior is acceptable and what is not. The contract is continually revised in response to demographic changes, changing social values, and our evolving understanding of ecosystem dynamics. Over the past three decades, as public concern over natural resources has grown, the terms of the social contract have undergone intense renegotiation, resulting in a total reversal in the direction of management on National Forests, and a proliferation of environmental protection legislation affecting private forest ownership.

In my judgment, family forest owners have been largely absent from and mostly ineffectual in negotiations over their contract with society. In the United States, most citizens are unaware that family forest owners even exist. Even my forestry graduate students are surprised to learn that most of the forestland in the country is held by non-industrial private forest owners. To the citizenry, family forest owners are invisible. Policy is made as if all the forest in the country were either public or industrial. There is not, and never has been, an integrated policy toward non-industrial private forests.

Is it surprising, then, that family forest owners feel ignored, misunderstood, or even vilified by society at large? How many of the forest owners you work with have expressed frustration over the lack of recognition they receive for their careful stewardship of the land?

In short, there is not a strong contract between family forest owners and society. A strong social contract requires two-way communication, some shared sense of purpose, and mutual trust. Building a strong social contract is, in my view, the principle challenge of sustaining family forests. It is a challenge to which extension forestry has much to contribute.

What Roles Can Extension Forestry Play?

Vision

So far I've tried to make two points; 1) that family forests should be sustained for the ecological, economic, and social values they bring to the landscape, and; 2) that sustaining family forests is fraught with daunting challenges. Now I take up the third question with which I began, "What role can extension forestry play?"

If you agree with my argument that family forests should be sustained, perhaps you'll take the next step with me and agree that sustaining family forests is a worthy and powerful vision for extension forestry. Articulating a clear vision is a first step toward developing an action plan that has some chance of achieving it. I want to use my remaining time to outline, in very broad-brush strokes, a role that extension forestry could, and, in my view, should play to work towards achieving this vision. I'll illustrate with a few examples of ongoing extension projects.

Facilitating connections

The role of extension forestry in meeting each of the ecological, economic, and social challenges I've outlined can be summed up as "facilitating connections;" between forest owners across ownership boundaries, between owners and global markets, and between owners and the public.

Connecting forest owners with each other

First, forest owners must connect with each other and their neighbors, if the ecological challenges to sustainability in mixed ownership landscapes are to be met. We're all hearing a great deal lately about the benefits of cross-boundary cooperation. But anyone who has worked in this arena knows that terms like "community forestry" or "conservation partnership" roll off the tongue much more easily than they are achieved. Family forest owners are notably absent in much of the current writing about cross-boundary cooperation, despite being critical to its success. Many family forest owners feel they have little to gain and much to lose by entering into any kind of cooperative relationship that might compromise their autonomy. In this politically charged, volatile arena, widely trusted, non-partisan facilitators are essential. Extension foresters have the credibility, the facilitation skills, and the knowledge of local society to facilitate making connections between family forest owners and their neighbors. Oregon's Watershed Councils and Landcare Australia are just two examples of cross-boundary cooperative efforts to which forestry extensionists are contributing.

Connecting forest owners with global markets

Second, if family forests are to be sustained, they must be economically sustainable, and today, this necessitates some degree of savvy in negotiating global markets. We are all engaged in a global system of markets where ideas, as well as goods and services, are exchanged. Global markets affect not only the mix of products family forest owners can sell and the price they receive, but, increasingly, the standards by which those products are produced. Global forest products markets are so dynamic that no individual forest owner can possibly keep up. Forest products certification injects a new degree of uncertainty into an already complex system. Family forest owners feel overwhelmed and at the mercy of distant, unseen powers.

Extension forestry can play a key role in helping forest owners identify, understand, and negotiate on favorable terms in these new markets. Perhaps the IUFRO Extension Working Party would be the logical organization to develop an initiative in this arena. Imagine what could be accomplished if family forest owners around the planet were to develop some sense of common purpose!

Connecting forest owners with the public

Finally, the social contract for family forest owners can only be strengthened through improved communication between forest owners and the public. Extension forestry, with its reputation for fairness and objectivity, can facilitate that communication. In my view, facilitating communication between forest owners and the public might be the single most important role extension can play, for without a robust social contract, family forestry cannot survive.

Recognizing this, forestry extension at my home institution, Oregon State University, played a pivotal role in educating the State Board of Forestry on the importance of family forests, and promoting creation of the Board's Committee for Family Forestlands. That committee's first priority has been to elevate the profile of family forest owners in the public eye, and to begin building constructive working relationships between forest owners and others with compatible goals.

Conclusion

Playing the role of facilitator is not new to extension forestry. We are all aware of extension programs around the world that have conducted effective public issues education programs, or facilitated dialogue between forest owners and others. Helping landowners connect with their neighbors is a role that many extension systems are already playing.

A few exemplars notwithstanding, my observation has been that such work is often done on time stolen from the more traditional extension programs that dominate job descriptions and evaluations. Most of us are hired to serve commodity producer groups, provide technical assistance, and respond to individual requests for information. Most of us are so swamped by these day-to-day demands that we seldom have the time or incentive to concentrate on the big picture.

Moreover, the very clientele we are attempting to serve are often more interested in receiving assistance with pruning trees than participating in tense dialogue with their urban neighbors. They would rather learn how to buck logs for maximum profit than negotiate watershed conservation plans with folks they don't even know. And how many of us extension foresters would willingly trade basking in the adoration of our forest-owning clients with standing in the crossfire of an open public meeting?

Don't get me wrong; I am *not* advocating that extension forestry abandon its historical role as a provider of education and information. To the contrary, forest owners need these services now more than ever. Especially in view of our rapidly evolving understanding of forest science, and the growing complexity of world markets, helping forest owners stay current is critical to their survival. But have we become so focused on individual forest owners' trees that we've lost sight of the forest of which they are a part? Have we been so busy planting seedlings in the countryside that we've neglected to sow seeds of understanding in the city?

Beyond the essential task of keeping family forest owners well informed, sustaining the family forest requires making connections:

- working connections between forest owners and their neighbors
- agile connections to global markets
- durable connections between forest owners and the public.

Extension forestry organizations around the world are uniquely suited to help create, strengthen, and maintain these connections. We have the expertise, we enjoy the trust of both forest owners and the public, and we care passionately about family forestry. If we embrace the mission of sustaining family forests, and

redirect the resources necessary to support this mission, we can play an important role in achieving it.

My first step on this mission is to help my activist friend from San Francisco and my logger friend from Harlan talk about one fundamental value they share; a deep love for the forests of home.

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USING FORESTRY TO REPAIR OUR DEGRADED LANDSCAPES: WHAT WILL IT TAKE?

Graeme Anderson

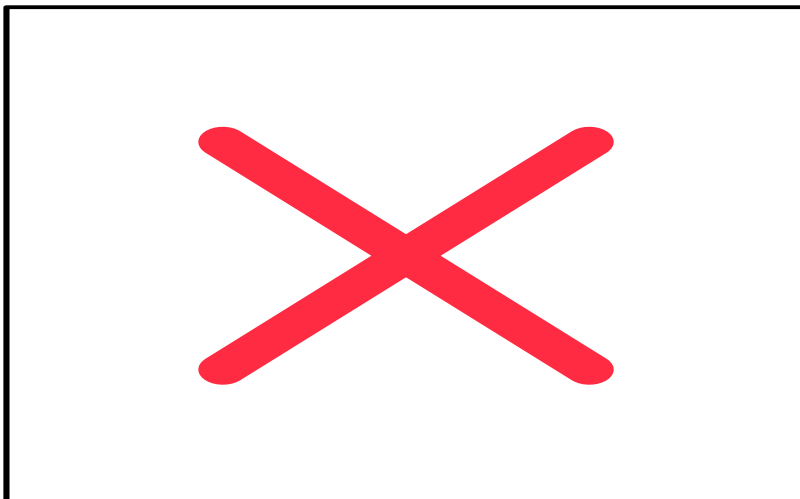
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Forestry prefers good country

Australian forestry has traditionally been concentrated on our best land – the deepest soil, the highest rainfall and the flattest land is best. The challenge we face environmentally is that our most degraded landscapes are urgently in need of reforestation – but with lower rainfall, shallow soils, steep or rocky terrain – this land is at the bottom of the forestry development list.

What's to be done with the land that agriculture has failed?

Drive around Victoria and it isn't difficult to spot the non-agricultural parts of our landscape. Some parts turn purple, others go yellow and some turn faded bronze – in other words Pattersons Curse (Salvation Jane), Ragwort and Serrated Tussock ... all noxious weeds (which cost our communities more than \$10 million annually) that love land that is not under intensive agricultural use (land too steep/rocky or unmanageable for traditional pastures and crops). Of course forestry is not to blame - but forestry is arguably the only commercial land use that can save these degraded portions of our landscape. Critically, it is often these same portions of our landscapes that are priority areas for salinity, nutrient, pest plant/animal and water quality strategies (few of which have ever considered funding farm forestry development).

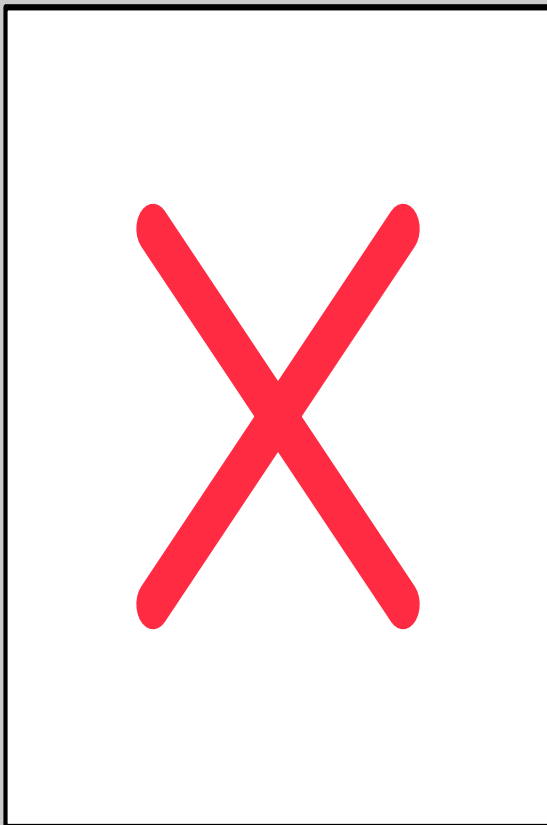


Weed infested land near Bacchus Marsh – traditional agriculture has failed the test. Can farm forestry provide the answer? ... or will traditional plantation paradigms restrict forestry's role in meeting the challenges these landscapes offer?

The Bacchus Marsh test case – a landscape that needs forestry

Fifty kilometres west of Melbourne is the Bacchus Marsh region, complete with a mix of rugged, wild and degraded landscapes. Landcare Foundation Victoria's Rob Youl describes the damaged part of this landscape as "probably the most degraded in Victoria. Poor soils, steep valleys and lower rainfall (450-600mm per annum) predominates – with subsequent land degradation issues such as major erosion, salinity, rabbits and a myriad of pest plants such as Serrated Tussock. All of these are symptoms of land screaming out for a new and sustainable landuse" – but it's not only the land that is screaming. Landholders in the area are desperately seeking support to help them cope with the huge Serrated Tussock problem. Many properties are spending from \$5000 - \$40,000 annually on Serrated Tussock weed control costs – only to turn around and do it again the following season. It is breaking them - economically and psychologically. These communities urgently want to see a light at the end of the tunnel – and landowners themselves have already identified at least 3000 hectares of infested/degraded land that they wish to revegetate – with either forestry or native vegetation - but can forestry solve their problems?

The role of Farm Forestry for long term control of Serrated Tussock



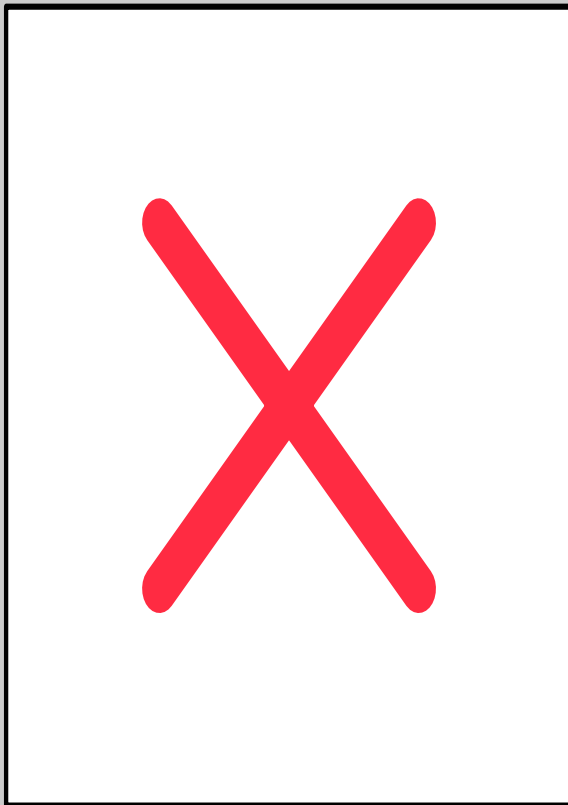
The weed - Serrated Tussock (a native to south America) is weed of national significance and currently infests 130,000 hectares in Victoria with the potential to spread to over 4.6 million hectares in this state alone. With single plants producing up to 100,000 viable seeds which can then be blown across farms downwind for many kilometres – Serrated Tussock is widely regarded as the greatest weed threat to grazing lands in Australia.

Serrated Tussock can generally be controlled on arable land. However, huge areas of non-arable land is being invaded by Serrated Tussock (valley slopes, stony areas). Landholders are desperately seeking a new land use for these non-arable landscapes which can provide long term control options.

What farm forestry can provide

Farmers within the worst affected areas have observed that farm forestry can assist in reducing the impact of Serrated Tussock. Examples include:

- **Radiata Pine (*Pinus radiata*)** - *Sites heavily infested with Serrated Tussock have previously been planted with Pine. Within only 5 years these sites have been successful in solving the Serrated Tussock problem. Whilst some Serrated Tussock plants are still found within the woodlot, these weed plants have restricted seedhead emergence and the lower pine foliage (and reduced windspeed) prevents these Serrated Tussock seedheads from escaping and blowing onto neighbouring land. As the pines get older, shading can remove remaining weed plants. Pine is better suited to >600mm annual rainfall zones—and as such, alternative species are needed for drier landscapes.*

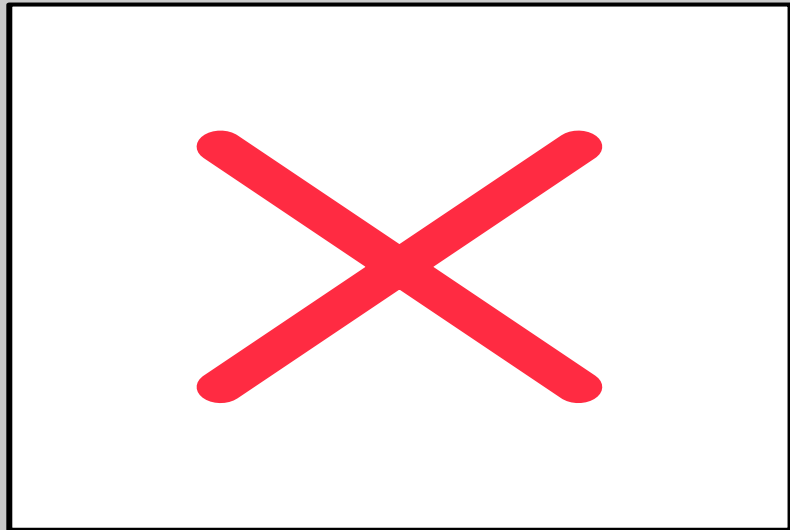


- **Sugar Gum (*Eucalyptus cladocalyx*)** - *Sugar Gum has long been observed by farmers as a strongly competitive and drought tolerant species which does not allow grass or crops to grow near existing stands of trees. This trait makes Sugar Gum an excellent species to plant on Serrated Tussock infestations within the drier areas (<600mm) of Victoria. Observations show that 10 year old Sugar Gum plantings located within the heart of Serrated Tussock infestations have drastically reduced the incidence and growth of Serrated Tussock underneath dense woodlots. The ability of Sugar Gum to produce high quality hardwood timber plus*

the potential use of thinnings for fuelwood/pulpwood is creating much renewed interest in this adaptable species.

- **Tree Belts as weed seed barriers** -

In early summer, billions of Serrated Tussock seed heads are blown from adult plants and proceed to spread for many kilometres downwind, infesting each farm along the way. Well designed and located farm forestry and revegetation belts



have been observed to effectively “catch” large amounts of Serrated Tussock seed-heads and prevent them from spreading. These “weed barriers” can work well if planted at the junction between heavily infested areas and adjoining improved agricultural lands.

Landholders driving the push for farm forestry

We keep hearing about all the great roles farm forestry can play in beating land degradation – often from those who are paid to do so. But in this case, it is landholders who are pushing for farm forestry. “It is the ability of forestry to provide longer term control of Serrated Tussock which is the greatest driver for farm forestry development and land use change in our area” says local land manager David Watson. “We have woodlot plantings of both Pine and Sugar Gum which have successfully replaced Serrated Tussock infestations on some of our sloping country – all in less than ten years!” he says. “We know forestry can fix it – we just need to work out how we get all the key ingredients together to make it happen on a larger scale”.

Forestry development can bring the missing ingredients

Forestry can offer so much for these landholders – by turning a degraded paddock (that is a liability on the farm from both a cashflow and asset value) into a venture that at least provides a commercial return in later years. The returns may not be huge – but even low returns are a better proposition for landholders than the annual losses that they currently experience from their degraded lands.

Forestry is a critical player for a number of reasons. Landholders explain that they lack the **funds**, **skills** and **experience** to successfully undertake the larger scale of planting that is now required on their farms. Farm forest industry development can potentially fill all of these gaps – forestry development is in itself a professional landscape change industry - but how do we make it happen within these degraded areas.

Grow West - growing the essential partnerships

The Bacchus Marsh region is currently the focus of a new and exciting approach which is aiming to coax forestry into the region as one of a number of longer term solutions to the regions environmental problems.

David Buntine of the Port Phillip Catchment & Land Protection Board explains "Grow West is all about developing a supportive framework to assist the Bacchus Marsh community to undertake a major landscape change program. It's only early days, but Grow West aims to develop improved links and partnerships between all stakeholders (all government agencies, local communities, business, corporates, investors, forest industries, etc) to build one of the largest integrated landscape restoration projects in Victoria – and private forestry development has a big role to play" David says. "The result will be a single landscape project that will deliver outcomes for pest, salinity, nutrient and water quality strategies – and giving landholders and the local community what they want at the same time!"

What's happening then?

The key is to develop new and innovative partnerships between all key players – and when issues approach a crisis level such as that in the Bacchus Marsh region – that is where we are possibly most likely to find a solution first.

The following details current thinking, activities and discussions within the project to date:

- some landholders are considering offering lease free land to anyone who could plant it with forestry. The investor can grow and harvest the plantation - but leave the regrowing (coppice) stumps to be owned by the landowner after 20 years. Landholders are seeking innovative forestry investors who can take up the offer. Some are even suggesting placing advertising in targeted newspapers with "Free land for forestry" adverts which may conjure up some investor interest;
- recent Victorian Government legislation now paves the way for forestry rights and carbon rights investment as vehicles to assist in forestry expansion. Basically the land, trees and carbon can now legally be owned by three separate parties. For example – landholders could provide the land (and continue to own it) whilst outside investment owns, establishes, manages and markets (at any age) the trees using forestry rights. Using carbon rights legislation they could also forward sell the carbon rights of their plantations to others seeking this product. At present these mechanisms are not fully appreciated or utilised by landowners, investors, forestry companies etc. but it is expected that it will allow greater flexibility in the way farm forestry business and investment expands over the coming decades;
- traditional type plantation species and establishment recipes need to be challenged. Innovators within the project are working towards reducing establishment costs for degraded lands – after all.....halve the establishment costs and you improve the economics considerably! Also, the majority of these areas are too drought prone for the two key plantation species used currently - Radiata Pine and Blue Gum – so new species are needed;
- future plantations need not be monocultures. Already one landholder has direct seeded a Sugar Gum woodlot with an understorey of Lightwood and Golden Wattles. The owner aims to use the wattles to increase nitrogen

fixation for the eucalypts, increase biodiversity within the plantation (important because the area is located between two major conservation reserves), provide lower vegetation to capture blowing weed seeds, and in future the Lightwood could be used for craftwood products;

- forestry can be mixed with conservation plantings – this is already occurring under a Victorian Government “Plantations for Greenhouse” initiative where a 60 hectare degraded and steep hillside has been planted with three zones of forest cover - (Radiata Pine, Sugar Gum/Black Wattle plantings on the accessible zones and a conservation zone on the steepest/rockier areas where indigenous species are replanted and where no harvest will occur. This has been joint funded by the landowner and the Victorian Government under a pilot program. Much can be learned from pilot projects such as this;
- accounting for the public benefits of a private plantation. Each year we get closer to the situation where government actually purchases the environmental benefit offered by a private forestry planting – and new mechanisms are being sought and investigated to enable this to occur. A new initiative under the Victorian Government’s Western Regional Forest Agreement is actively seeking to provide financial incentives to those farm forest plantings which aim to produce hardwood sawlogs in areas which provide a direct and proven environmental benefit to the wider community;
- bringing all players together – the project is actively seeking to accelerate the linkages and interactions between landholders, government & public investors, the timber industry, forestry and carbon investors, plus conservation and corporate sponsors – get the right people together and the who knows what might happen!

It is this type of thinking, discussion and compromise that if matched by all stakeholders will see some major changes in how we restore landscapes. Grow West could be a pilot for the nation – where forestry becomes the environmental saviour – only time will tell!

Where do we want to be?

So ... will future generations inherit a landscape where forestry and agriculture have battled to secure their rights over our best and most productive land ... meanwhile vast areas of low productivity & increasingly degraded landscapes remain untouched, unwanted and not contributing to our communities? Many would argue that is where we could be heading ...

OR

... will innovative use and development of forestry systems and partnerships enable large areas of degraded landscapes to once again contribute to our triple bottom lines. Here lies the challenge ... and it’s up to us - foresters, landowners, investors and governments - to collectively and cooperatively make it happen.

A RESEARCH-BASED EXTENSION PROGRAM TO FACILITATE THE DEVELOPMENT OF COMMERCIAL FARM FORESTRY INDUSTRIES IN QUEENSLAND

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Abstract

In South-east QLD, high value, hardwood timbers have traditionally been harvested from native forest but this source will be replaced by private plantation grown hardwoods over 25 years. The challenge to forest growers in Queensland is to develop viable plantations using new taxa in non-traditional environments which are regionally diverse with respect to rainfall, temperature and soils. QFRI has developed a research-based extension program for hardwood forestry, driven by the projected needs of the value-added timber industry, private forest growers and farm forestry initiatives. The extension arm communicates research outcomes that demonstrate the impact of taxa selection, site matching, silvicultural prescriptions, and pest and disease management on end product quality.

The project maintains a web site, providing current information and advice on research results, enhanced with advisory leaflets, research papers and reports. Opportunities for review and dialogue are also created through field tours and discussion forums for stakeholders. The combination of field-based and information extension activities has resulted in considerable improvements in the perception of hardwood plantation viability and the quality and success of new private plantation establishment, particularly in regions targeted by the RD&E program.

Introduction

The Hardwoods Queensland R&D project is developing Queensland's potential for growing high value hardwoods in plantations in 25-year rotations. The experimental science is being conducted simultaneously with the rapid development of Queensland's hardwood industry and the clear community perception of the need to replace the native forest resource with value-added environmental management. It is essential, therefore, that the outcomes of the research program are communicated in ways that inform and advise stakeholders, create opportunities for review and dialogue and promote confidence that the research is delivering the knowledge required to expand hardwoods production and use in Queensland as a sustainable, value-added industry.

The project comprises research into the challenges of improving silvicultural practices, genetic resources, pest and disease management, and timber utilisation with outcomes being progressed through high levels of interaction between these challenge programs. The extension arm of the project has a dual role in extending information and advice as well as promoting the hardwoods industry to timber processors, growers, land owners, prospectus companies, R&D organisations, community groups and regional councils. From an extensive and highly integrated research base, the stakeholders are being informed about the

availability of seed and planting stock, which taxa to plant where, how to establish and manage hardwood plantations under Queensland conditions, risks from damage due to diseases and invertebrate and vertebrate pests, timber properties, potential product end uses and technologies for processing. This is achieved through a variety of face to face learning events as well as electronic and hard-copy publishing.

Promoting plantation hardwoods as a viable investment and a value-added industry.

The potential for developing hardwood plantations and products in Queensland and the expertise of QFRI in hardwoods research is promoted through a variety of media. Through electronic publishing, brochures, promotional events, invited presentations and media, the Hardwoods Queensland team is delivering the message of the commercial possibilities of working with QFRI's hardwoods R&D to potential investors, growers and processors.

Informing through field extension

Demonstration plantings and research trials have been established to test recommended taxa and silvicultural techniques in strategic locations of the target plantation regions. These, together with older, well-established private plantations are used for promotional field days and skills-based workshops to demonstrate the local potential of hardwood plantations and the importance of adopting appropriate silvicultural prescriptions. Regular contact with community groups also increases awareness among growers of the information resource associated with the project. One aim of these promotions is to encourage the formation of regional farm forestry groups and cooperatives.

Informing through workshops

Plantation growers, managers and community groups are invited to participate in workshops demonstrating specific techniques for growing hardwoods and managing stands with, for example, thinning and pruning prescriptions for a range of forest products over the length of a rotation. Skills based workshops have been conducted in strategic regional locations in order to provide private growers with a working knowledge of plantation management. These workshops are generally delivered from a silvicultural perspective, dealing with such issues as site assessment and preparation, planting techniques, weed control, pruning and thinning. However, issues such as species selection, genetic improvement, pest and disease management and timber quality are intrinsically linked to quality timber production and so are integrated with the practical adult learning activities.

Informing through field tours and forums

Field tours of a representative selection of research trials are held regularly. These cover a range of climatic and edaphic conditions and demonstrate taxa trials, site variability, taxa-site matching, effects of silviculture practices and identify which taxa and growth stages are potentially vulnerable to pests and diseases. Representatives from across the plantation timber industry are invited to attend and participate in on-site discussions and presentations. Forums are run annually where industry representatives are invited to discuss the

progress and direction of the Hardwoods Queensland project with the research teams. The forum also fosters the collaborative development of ideas.

Plantation tours for small private growers are held regularly to promote current developments and to foster a 'best practice' approach to plantation management. Efforts are made to include a diverse range of expertise and plantation types in order to give a holistic view of the industry. An awareness is growing amongst industry stakeholders for the need to interact and participate in development activities (Gillard 2000). Sites visited usually include a combination of QFRI trials, DPI Forestry plantations, private landholder plantations and amenity plantings possessing older material with indicative demonstration value. Attendance from potential growers has ranged from eight to fifty people, with an average attendance being around twenty five landholders. Lower interest has generally been achieved where tours were held in areas with a large agricultural community and a low population of small landholders. However, the interest from the agricultural sector does appear to be on the increase.

Informing through conferences, seminars and invited presentations

Scientists take opportunities to present hardwood research directions and results to relevant conference venues. For example, the Managing and Growing Trees Training Conference held at Beaudesert (1998) and the Australian Forest Growers conference held at Cairns (2000) provided a valuable assessment of Hardwoods Queensland R&D in Queensland (Dickinson et al, 1998). Conferences provide the opportunity to present the project in the context of similar research and gain feedback from highly motivated groups with similar objectives. Members of research teams are often invited to address a variety of groups with interests in plantation management. Seminars presented to other research units serve to disseminate information and prompt discussion. Industry representatives are encouraged to attend seminars running with topical themes, an example is the discussion on the status of hardwood plantation pest and disease management held in Gympie in 2000. Presentations have also been made to a diverse range of interest groups including Rotary clubs, Landcare groups, farm forestry groups, shire councils, schools and the Department of State Development. Presentations and displays conducted at rural and regional shows have resulted in excellent responses from prospective growers.

Informing through electronic and mainstream publishing

The focus of Hardwoods Queensland's integrated information tool is a web site, which provides information for investors, growers and processors on the potential for hardwood plantation development in Queensland and the R&D project. The 'Getting Results' section gives current, research-based information and advice on the practical side of developing hardwood, timber properties, technologies and the market opportunities for different timber trees. In addition, a regional perspective for research results and industry issues are given for each of the regions targeted for hardwood plantation development. The calendar of SEQ private forestry events is a quick reference for hardwood field days and workshops presented by QFRI staff as well as other organisations. Other sections present details of the R&D program, outcomes, publications and a news page, summarising recent achievements, events and with links to associated media releases. Regular output from the project includes scientific journal articles, conference papers, information packages, advisory material and reports to funding agencies, clients and

collaborators. Enterprise profiles of hardwood plantation development have been produced for three major geographical regions in lower rainfall zone of South East Queensland detailing current status of the industry for these regions. These profiles are intended to be an important reference point to local government, grower groups and other stakeholders in the local area.

Collaboration and networking

The project has developed an extensive network with other industry stakeholders. This has enabled active collaboration with community based farm forestry groups such as the Forest Farmers Association based in Brisbane, the Scenic Rim Farm Forestry group based in Boonah and the Dawson Agroforestry group based in Theodore. Other collaborators in research, promotion and extension have included large commercial forestry companies, DPI Forestry, Landcare groups, forestry consultants, community development organisations, DPI's Rural Industries Business Services, Greening Australia, shire councils, and the University of Southern Queensland. Industry stakeholders are increasingly becoming aware of the need for collaboration and forming supportive networks (Crisp and Sheldon 1995). Collaboration has also assisted in the fostering of a more broad minded appreciation of other stakeholders' perspectives regarding their objectives and plantation management regimes (Sher and Sher 1994).

Media relationships

Enthusiastic responses from local media to the emerging hardwoods industry have provided a great boost to the extension program. Background information regarding field tour and skills workshops have regularly been promoted by local newspapers and radio stations as community interest stories. A significant number of field extension activities have resulted in radio stations contacting the organisers for interviews on the events. Relationships with one prominent regional newspaper has developed to the extent where its editor has become a joint venture collaborator in a taxa trial.

Responding to feedback

The DPI Call Centre relays requests from the public concerning hardwoods to relevant project personnel. Formal feedback is requested from hardwoods tour participants and their responses are addressed as subsequent events are organised. A subscriber facility on the web site gives an indication of how the site is used and ensures interested stakeholders receive updated material as it is presented.

Grower responses to extension

The extension program has made a significant contribution to the adoption of hardwood plantation forestry by private landholders. A number of the plantations on private land being established by the DPI Forestry's South East Queensland Hardwoods program have resulted from field extension of Hardwoods Queensland research. The extension program has resulted in a data base of approximately four hundred landholders with an interest in establishing hardwood

plantations. The project has resulted in the formation of two community based farm forestry groups, namely the Lockyer and West Morton Farm Forestry group based in Forest Hills, and the South Burnett Future Forests group based in Kingaroy. Additionally, around one hundred and fifty private forest growers have given their permission to be included in a directory which includes details of plantation size, location and species used. This publication is designed to be updated periodically and will encourage networking between forest managers.

A survey of private foresters within South East Queensland was conducted in July 2000, with responses being received from approximately eighty people. The survey revealed that fifty nine percent of those surveyed were not deriving their income from agriculture. Of the forty one percent who responded, most were managing their naturally grown forest timber rather than growing plantation hardwoods. Most plantation growers appear to be middle aged people with an average age of around fifty years. Although most interest is coming from professional people with off farm incomes, the number of full time farmers showing an interest in plantation hardwoods appears to be on the increase. The timing of extension and promotional events to meet the increasing appreciation of landowners to industry developments is a key factor in successfully promoting interest and delivering information (Sneath 1999).

Integrated research program

The Hardwoods Queensland project has a field based research component comprising approximately two hundred hardwood plantations throughout Queensland. These are strategically located to encompass a representative range of soil and climatic conditions. Experimentation includes the testing of silvicultural techniques, taxa selection and improvement experiments, and tree breeding facilities. The following case study of trials in the Lockyer Valley provides examples of five such plantations.

Case Study: Farm Forestry research and demonstration in the Lockyer Valley, Queensland.

Background

In 1998, the QFRI and QDPI-Forestry established a series of farm forestry research and demonstration plantings on 3 representative private properties in the Lockyer Valley region. Funding for this project was sourced from the Commonwealth Department of Agriculture Fisheries and Forestry, the Natural Heritage Trust and from the Queensland State Government. The three sites (identified by the property owner's names) represent the main soil/site types in the Lockyer Valley with details as follows;

1. John & Jo Hudson. Marburg forest soil/site type (grey clays and duplex soils)
2. Brian & Pam Davis. Fine-textured alluvial plains soil/site type (black Vertosols)
3. Lionel & Diane Broad. Mixed alluvial plains soil/site type (earthy sands and duplex soils).

Approximate plantations areas for each of these sites was 4 ha, 3 ha and 5 ha respectively. On each site, the property owner was an important collaborator, who not only provided the land area for the demonstration planting but also contributed with the plantation establishment and maintenance operations.

Each site consisted of an experimental component with a species x provenance experiment and a farm forestry demonstration component where a limited number of best-bet native plantation species were planted in a mixed species configuration. On sites 2 & 3, a basic establishment silviculture experiment was also established to demonstrate the positive benefits to early tree survival and growth through the use of optimum silvicultural practices.

Treatments

Species selection for both the experimental and demonstration plantings was made based on past QFRI research results. The species tested were developed on a site-specific basis and included different combinations of the main species *Eucalyptus argophloia*, *E. longirostrata*, *E. moluccana*, *E. tereticornis*, the *E. grandis* x *E. tereticornis* hybrid, the *E. grandis* x *E. camaldulensis* hybrid, *Corymbia citriodora* subsp. *variegata* and *C. henryi*. In the species evaluation experiments, most species were represented by a minimum of two provenances, in order to give a good indication of any location differences between seed sources of the same species.

The standard silvicultural practices utilised for these plantations was developed from the limited research information available at the time and from the standard techniques utilised by the new DPI-Forestry Hardwood Plantation Joint Venture Program. Silvicultural management involved the use of deep-ripping and mounding site preparation practices, weed control along tree rows for up to 12 months and a split fertiliser prescription with multiple fertiliser applications over a 12 month period.

In the basic establishment silviculture experiments, two species were trialed to quantify and demonstrate the negative impacts if plantation establishment and maintenance was not conducted to these levels. The species used in these silviculture experiments were *Eucalyptus argophloia* and *E. tereticornis* on site 2 and *E. argophloia* and *Corymbia citriodora* subsp. *variegata* on site 3. In the minimum treatments, site preparation was conducted which included mounding but without deep ripping, weed control was only performed for the first 3 months after tree establishment and a single small dose of fertiliser was applied at planting only. Optimum stand management practices were uniformly applied across all treatments and included form and branch pruning as well as heavy pre-commercial thinning to reduce the tree stocking from 1000 to 400 trees/ha at age 3.5 years.

Results

At age 3 years these 3 demonstration plantings have established well and are a fine example of the early potential productivity and economic viability of farm forestry activities on these site types. In the species evaluation experiments, there have been substantial variations in species and provenance rankings over this period (See Figure 1). Certain taxa which grew rapidly to age 12 months (eg. the two *E. grandis* hybrids) have now stalled, whereas other species which were slow to establish (eg. *E. argophloia*) are now exhibiting good growth rates after age 2 years. These results clearly emphasise the importance of longer-term growth information to enable more reliable species to site matching selections. In this

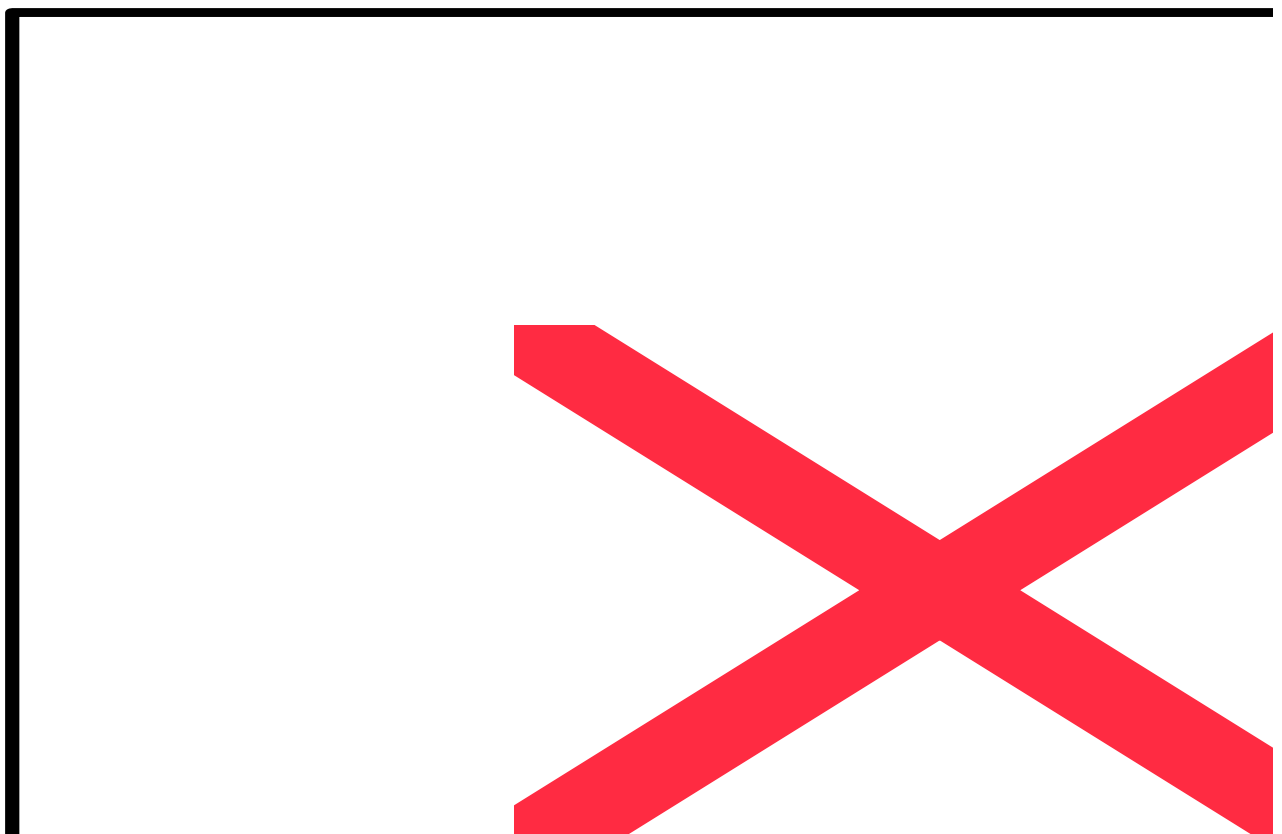
case, the information from trees at age 3 years is very useful, however the reliability of this information will be progressively improved with continued monitoring over forthcoming years, until these trees have achieved maturity.

The importance of adopting good silvicultural practices for tree establishment and management was confirmed from the results obtained in the two basic establishment silviculture experiments at age 3 years. On both sites and for all species, maintaining weed control for a minimum period of 12 months resulted in improvements in survival, height and diameter growth of up to 12%, 24% and 49% respectively, over treatments where weed control was only maintained for the first 3 months. On these ex-agricultural soils, the different fertiliser treatments had less effect on tree growth rates (particularly height) although trees were up to 20% greater in diameter in the maximum fertiliser treatments. For site preparation, there was no differences observed for survival, height or diameter growth between the ripped/mounded and mounded only treatments.

Extension Outcomes

The successful establishment of these 3 research and demonstration plantings in the Lockyer Valley is largely attributed to a combination of good initial planning and species selection, excellent land-holder collaboration and the adoption and continuation of optimum silvicultural practices over a sustained period of 3.5 years. As a result, these plantings have been extensively used as important farm forestry extension examples for both the Lockyer Valley and neighbouring regions, by both government and private forestry groups. These have included regular promotional field days, hardwood plantations industry tours and skill based workshops, involving close collaboration with local community organisations such as Landcare and the Lockyer and West Moreton Farm Forestry Group.

Figure 1: Cumulative tree heights for Lockyer Valley Experiments to age 3 years.



Conclusion

The monitoring of well-designed and maintained research experiments within the Hardwoods Queensland plantations provides a valuable source of growth and productivity data which is regularly summarised and communicated through field extension activities, as well as through conferences, seminars, invited presentations and electronic and mainstream publishing. The highly integrated and comprehensive approach to utilising these trials for the development of optimal silviculture, genetics, pests and diseases and wood products related prescriptions provides a unique opportunity for sustaining a viable hardwood plantation industry. Through continued maintenance and monitoring of these plantings over a long and sustained period, the QFRI will be able to deliver highly accurate longer-term productivity and economic viability estimates for farm forestry ventures in this and similar regions throughout Queensland (Leggate et al. 2000).

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MOTIVATING FOREST LANDOWNERS IN THE NORTH CENTRAL UNITED STATES

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Introduction

A wide variety of incentives are offered to nonindustrial private forest landowners in the United States to influence their forest land management. Such incentives include income tax deductions, property tax reductions, cost-sharing, free or low cost technical assistance, conservation easements, and educational programs. In the north central United States these incentives are used in lieu of government regulations to influence forest management for timber, wildlife, soil and water conservation, and other forest products and values. To determine the relative value of these different incentives and to improve effectiveness of Extension forestry programs, several landowner surveys have been conducted recently in the north central United States. This paper summarizes survey results with an emphasis on their implications for Extension forestry programs.

Recent survey

A forest stewardship plan provides a comprehensive analysis of a landowner's forest resources as well as management options for each stand or other management unit according to the owner's objectives. Plans are provided free or at low cost by foresters working for public agencies or private companies, depending on the state. Obtaining a management plan is considered by many foresters to be the first step toward implementing more specific management practices and this plan is required before landowners are eligible for some government financial incentives such as cost-sharing and property tax reductions. A random sample of 3,000 landowners that obtained forest stewardship plans over the past 10 years in six north central states were surveyed by mail (Baughman and Updegraff 2001). This survey will be compared and contrasted with a survey of a randomized sample of all private forest landowners in the United States (Birch 1996), and with two large-scale surveys of a randomized sample (approximately 1,000 landowners in each survey) of all Minnesota forest landowners (Rathke 1993, Cervantes 2001). In the Birch (1996) survey, 5% of the owners had management plans, whereas in the Minnesota surveys 14% (Cervantes 2001) to 15% (Rathke 1993) had management plans. These comparisons will provide a clearer understanding of factors that motivate landowners with and without forest stewardship plans.

Survey results

Landowners with forest stewardship plans in the north central states had a mean age of 55 (Baughman and Updegraff 2001). This is very close to the 54-year mean age of all Minnesota forest landowners (Cervantes 2001), indicating that landowners with and without forest stewardship plans are similar in age.

Landowners in the north central states with forest stewardship plans had owned their land an average of 18 years, suggesting that many had acquired forest land when they were in their late 30s (Baughman and Updegraff 2001). This tenure was similar to the 19-year average in Minnesota, again indicating similar tenures for landowners with and without forest stewardship plans (Cervantes 2001 and Rathke 1993). Educational programs that target these younger landowners when they first acquire forest land may have more influence on long term land management.

Owners in the north central states with forest stewardship plans were well-educated; 98% had graduated from high school while 49% had a college degree (Baughman and Updegraff 2001). A wide variety of educational materials and methods can be used with these educated landowners.

There was not much racial or gender diversity; 99% were white and 89% were male.

Educators should take into consideration that 7% were disabled, although we did not obtain information on their specific disabilities. This has implications for such factors as print size on publications, Web page design for easy searching with a keyboard, and access to meeting sites.

The average land ownership size was 246 acres, but this included 123 acres of natural forest, 27 acres of tree plantation, 102 acres of active crop land, 34 acres of idle crop, 23 acres of water and wetland, and 17 acres of developed and other uses. Forestry education programs should cover a range of land uses to influence management on more acres. The 150 acres of natural forest and plantations owned by these forest stewardship plan holders is substantially larger than the 50 acres owned by average individual landowners with more than 10 acres of forest across the whole northern region of the U.S. (Birch 1996) and larger than the 64-acre average ownership in Minnesota (Cervantes 2001). This comparison suggests that landowners with forest stewardship plans are likely to own more forest acres than those without such plans.

In the north central states, 48% of the owners lived on their forest land while 52% were nonresidents living a median distance of 30 miles from their forest land (Baughman and Updegraff 2001). In the Minnesota study, landowners lived a mean distance of 78 miles from their forest land and only 37% lived within 50 miles (Cervantes 2001). This comparison indicates that landowners with forest stewardship plans are more likely to live closer to their forest land than

landowners without such plans. Educational programs for both residents and nonresidents are needed to affect a large percentage of owners and acres.

Educational programs will appeal to more landowners when such programs address landowner objectives. The most common reasons for forest stewardship plan holders to own forest land were for recreation and scenic enjoyment and part of home/cabin site (Table 1a). An open-ended question that asked about their most important reason for owning forest land gave the highest ratings to aesthetics/general recreation; hunting, fishing and other consumptive recreation; environmental/stewardship concerns, e.g., conservation, stewardship or restoration of forest, soil, water; and family land/heritage preservation. Growing wood for sale and personal use rated very low (Baughman and Updegraff 2001). This ranking of reasons for ownership is similar to results from Birch (1996) (Table 1b) and Cervantes (2001) (Table 1c).

Table 1a: Reasons for owning forest land among forest stewardship plan holders in north central states. (Baughman and Updegraff 2001)

Mean Rating (1-7)	Reasons
6.2	Recreation, scenic enjoyment
5.5	Other
4.7	Part of home/cabin site
4.4	Land investment
3.8	Part of farm
3.7	Income from timber or other forest products
3.4	Growing wood or other forest products for farm or personal use

Table 1b: Primary reasons for owning forest land in the northern region. (Birch 1996)

%	Reasons
27	Part of residence
16	Esthetic enjoyment
15	Part of farm
13	Recreation
10	Farm and domestic use
6	Land investment
4	Estate
4	Other
4	No answer
1	Timber production

Table 1c: Reasons for owning forest land in Minnesota. (Cervantes 2001)

Mean Rating (1-5)	Reasons
4.30	Wildlife habitat
4.13	Recreation
3.64	Hunting/fishing
3.46	Green space around home
2.55	Part of farm
2.43	Wood products for personal use
2.21	Land investment
1.83	Timber income
1.35	Mineral value
1.17	Christmas tree income

Although harvesting timber was not a principal objective for most landowners in the north central survey of landowners with Forest Stewardship plans, our respondents had harvested a mean of 80 acres of timber before receiving a forest stewardship plan and 68 acres after receiving a plan. Birch (1996) found that among all forest landowners in the U.S., 46% had already cut timber; only 34% never intended to harvest and they owned just 12% of the private acreage. In Minnesota, Cervantes (2001) learned that 50% of all owners had harvested wood. These surveys all point out the need for educational programs to address timber harvest strategies since so many landowners will eventually harvest timber regardless of their principal objectives.

Our federal and state governments financially support development of forest stewardship plans with the expectation that landowners will accomplish more and better forest management after they get a plan. The survey by Baughman and Updegraff (2001) supports this statement. Landowners accomplished more acres in each of 10 management activities after receiving their plans than before. If the acres on which landowners still plan to implement more management are added to those acres already under management, then the acres to be accomplished are greater for 12 management activities after receiving a forest stewardship plan. Fencing livestock out of forest land was the only management activity for which more acres were accomplished before getting a forest stewardship plan than after getting such a plan. Rathke's (1993) survey of Minnesota forest landowners also found that the presence of a management plan had a significantly positive effect on an owner's timber management investment. The presence of a management plan was a more significant predictor of most forest management activities than the property tax classification. The odds of getting a management plan increased significantly for landowners that received cost-share funds and those that received educational assistance.

There is a multiplier affect among landowners that get a forest stewardship plan. Among those with a forest stewardship plan, 53% had already recommended to a friend or neighbor that they get a plan and another 18% thought that neighbors

and friends would benefit from such a plan (Baughman and Updegraff 2001). The Minnesota landowner survey by Cervantes (2001) found that among 10 sources of forestry information, those used most often, in descending order of frequency were: Minnesota Department of Natural Resources, another landowner or neighbor, logger or timber buyer, and publications/books/videos. Educational programs should focus on logger and landowner education because of their multiplier effect.

Another indication of the value landowners placed on their forest stewardship plans came from the question, "If there were no free or low cost planning assistance available, how much would you expect to pay a natural resource professional to prepare a forest stewardship plan?" The median amount was \$200 and the expected payment per acre was \$8.40.

There is room for improvement in these forest stewardship plans, however. Among seven features of the plan and planning process, landowners gave their lowest ratings to descriptions of management options and maps. Educators should teach forest planners how to better articulate management options and produce better maps.

To accomplish more of the recommendations in their plans, landowners rated cost-sharing and technical advice as the types of help they needed most. Educators don't provide those types of assistance, but we do provide the other types of assistance the landowners recommended: more information and training to do specific practices, help locating supplies, and help locating contractors.

From a list of incentives, landowners rated property tax reductions, income tax credits, free management assistance, and educational materials as the most valuable (Table 2). Lower on the rating scale were cost-sharing, higher product prices, conservation easements, annual rental payments, and loans. Landowners with higher than average acreage placed high value on educational materials and events and financial incentives (income tax deductions, property tax reductions, cost-sharing, and higher product prices). Landowners with lower than average acreage placed higher value on free/low cost management assistance, low interest loans, and conservation easements.

Table 2: Value of incentives among forest stewardship plan holders in north central states. (Baughman and Updegraff 2001)

Mean Rating (1-10) ¹	Incentives
9.10 ^a	Property tax reductions for managed forest lands
8.72 ^b	Income tax deductions or credits for management expenses
8.61 ^b	Free/low cost on-the-ground management assistance or advice from a natural resource professional
8.16 ^c	Free/low cost educational materials or events on forest management
7.93 ^d	Cost-sharing for forest management
7.27 ^e	Higher forest product prices
7.10 ^e	Conservation easements to permanently protect land from housing/business development
6.40 ^f	Annual rent to provide income while trees mature
6.08 ^g	Low interest loans to help pay for forest management expenses until forestry income is received

¹ = Ratings with different superscripts are significantly different.

Cervantes (2001) found a similar ranking of incentives for a cross-section of all Minnesota forest landowners indicating that those with stewardship plans rate incentives in about the same order as those without stewardship plans. The top three incentives were property tax reductions for managed forest lands, free or low cost management assistance or advice from a forester or natural resource professional, and free or low cost educational materials or events on forest management (Table 3).

Table 3: Value of incentives in Minnesota. (Cervantes 2001)

Mean Rating (1-5)	Incentives
3.66	Property tax reductions for managed forestlands
3.29	Free or low cost management assistance or advice from a forester or natural resource professional
3.19	Free or low cost educational materials or events on forest management
3.17	Income tax deductions or credits for management expenses
2.80	Lower capital gains tax rate for forestry incomes
2.64	Partial property tax reductions for managed forestlands
2.64	Higher prices for forest products
2.58	Cost-sharing assistance to help pay for forest management expenses
2.15	Low interest loans to help pay for forest management expenses until timber is harvested or other forestry income received
2.10	Annual rental payments to provide income while trees mature

When asked to rate the value of forestry information sources, landowners with forest stewardship plans rated publications, field tours, and video tapes most

highly (Table 4) (Baughman and Updegraff 2001). Next were conferences, newspaper/magazine, and television. Last on the list were correspondence course, Internet/Web, CD ROM, and radio. Landowners with larger than average acreage placed a higher value on publications, books, and newsletters than other sources. Older landowners preferred conferences, seminars, workshops and radio while younger landowners preferred information from the Internet/Web. Highly educated landowners with post graduate education preferred to learn from conference/seminar/workshop, Internet/Web, and CD ROM while those with some college or lower education preferred to learn from television or correspondence courses.

Table 4: Value of information sources to forest stewardship plan holders in north central states. (Baughman and Updegraff 2001)

Mean Rating (1-10) ¹	Information Sources
7.17 ^a	Field tour
7.01 ^a	Publication/book/newsletter
6.84 ^{ab}	Video tape for home viewing
6.80 ^b	Conference/seminar/workshop
6.45 ^c	Newspaper/magazine article
6.10 ^d	Television program
5.84 ^e	Correspondence course
5.81 ^e	Internet/web information
5.57 ^f	CD ROM disk
4.62 ^g	Radio program

¹ = Ratings with different superscripts are significantly different.

A cross-section of Minnesota landowners arrived at a somewhat similar list except that field tours were rated noticeably lower than in the survey of north central forest stewardship plan holders (Table 5) (Cervantes 2001). This comparison indicates that field tours appeal more to landowners with management plans than to those without such plans. Educational programs that emphasize field tours may miss landowners that are not active managers.

Table 5: Value of information sources to Minnesota landowners.

Mean Rating (1-5)	Information Sources
2.86	Newsletter
2.80	Newspaper or magazine article
2.78	Publication or book
2.78	Video tape for home viewing
2.70	Written management plan
2.68	Field tour
2.27	Correspondence course through the mail
2.13	Weekend workshop
2.10	Cable TV program
1.92	Radio program
1.91	Weekday workshop
1.71	Internet or on-line computer service

To reach private landowners, it is helpful to know that 46% belong to conservation organizations. More specifically participation is 32% in hunting/game/gun clubs, 31% in forestry-related organizations, 29% in farm organizations, 11% in wildlife conservation organizations, and 29% in other environmental organizations. Educators could deliver some of their educational programs to members of these organizations to reach a relatively high percentage of forest landowners.

Conclusion

The primary conclusions from these surveys for extension educators in north central states are as follows:

- The average landowner is a highly educated, white male, 55 years old, that has owned forest land for 18 years. Focus on landowners from 37 to 55 years old to influence management.
- Landowners are likely to own natural timber, plantations, agricultural land, water and wetlands, and more developed land. Package educational programs to address management of these different land uses.
- Design programs for resident and absentee owners to reach a high percentage of owners.
- Keep in mind that the primary land ownership objective for most landowners is recreation. Timber management is not a high priority, but most landowners will harvest timber at some point and, therefore, need education about marketing and the affects of a timber harvest on their resources.
- Encourage landowners to develop forest management plans because plans do lead to a wide range of management practices.
- Focus educational programs on loggers and landowners because of their multiplier effect. Landowners need to know how to carry out specific

management practices, where to get supplies and contractors and what other incentives are available, especially property tax reductions, income tax deductions, and low cost technical assistance.

- Teach forestry professionals how to better identify and describe management options for stands or other management units and how to produce better maps.
- Give priority to developing publications, books, newsletters, video tapes, and field tours. The Web still does not appeal to a large percentage of landowners, but it does appeal to younger, more educated people.
- Offer education to conservation organizations since many landowners belong to these organizations.

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ANALYSIS OF EXTENSION EFFORTS IN BAVARIA: EXTENSIONISTS PERCEPTION

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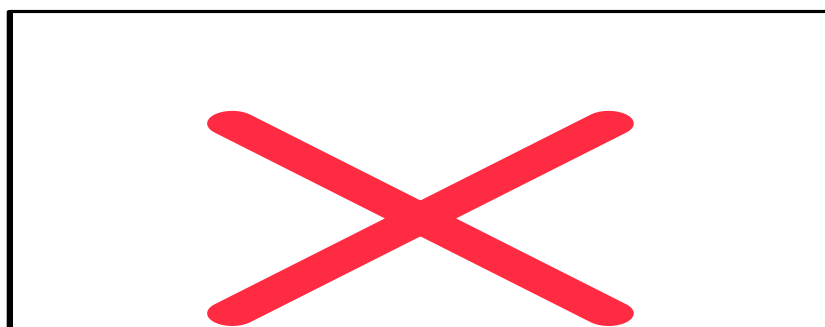
Introduction

Change is an ongoing process in every society. Since years especially the primary sector- and as a part of it forestry- is heavily and increasingly effected by these changes. Relevant fields of change effecting forestry are the structural developments in agriculture, the general forestry and wood industry framework, as well as general changes in attitudes and views of the population and the forest owners. The focus group of forestry extension therewith has become more complex: the traditional clientele- farmers – fast decreases in number and the portion of owners hard to reach by traditional means of information and communication increases (Beck and Schaffner, 2000). In addition tense public budgets and discussions on the effectiveness and efficiency of state activities also pulled the attention on the extension efforts of the Bavarian Forest Service. So far no in depth scientific analysis of these extension activities has been carried out. The paper presents the approach, design and the results of the first phase of the 3 years project „Communication Strategies in Forestry Extension in Bavaria“, focusing on extension foresters perceptions and accomplishments.

Background

The Bavarian Act on the Support of Bavarian Agriculture and the Regulation on the Support of Private and Corporate Forestry in Bavaria formulate the support measures for Bavarian private forest owners. Besides financial incentives this support includes the provision of extension services free of charge by the Bavarian Forest Service. Bavaria therewith follows the traditional institutional extension approach: 480 field foresters in 441 ranges and additional 292 managing foresters (i.e. 40% of the forest service personnel) provide extension for the ca. 400 000 forest owners in Bavaria (Bayerisches Staatsministerium für Ernährung, Landwirtschaft und Forsten, 2000). Table 1 shows the size distribution of private forest ownership in Bavaria. The average forest holding reaches only 3,7 hectares, divided in 2 parcels.

Table 1: Ownership Size of Private Forests in Bavaria



66% of the 211 000
forest ownerships
larger than 1 hectare

still belong to the group of farm forests. 174 forest owner associations, covering ca. 70 % of the private forest area and 28% of the forest owners provide a variety of services in differing intensity.

General information on extension activities are documented through the field foresters log books, which are also serving as progress reports. The analysis of the last 10 years data reveals a rather surprising stable picture: Person to person contacts dominate. An average of 110 forest owners directly can be reached by a forester per year through that approach. Another 150 owners get in touch through about 8 – 10 group information events per year. Personal or contacts by phone at the average range office sum up to additional 220 reached owners. Multiple contacts with the especially active clientele are included in the sum though. Nevertheless it has to be stated that the recent extension practice enables the communication with 20 to 30% of the approximately 1000 – 1300 forest owners per range.

An average of 7 – 10 meetings with bodies of forest owner association takes place per year, underlining the special awareness given to these organizations. Extension contents differ from region to region, but in general the focus is laid on forest regeneration, tending, harvesting, pest control and financial support.

Project Objective and Project Design

So far available data are insufficient to formulate founded conclusions on the effect of extension activities and communication tools, the reached clientele or forest owners preferences in terms of content and means.

Therefore in 2000 the project „Communication Strategies in Forestry Extension in Bavaria“ was launched to provide an in depth analysis of the extension situation, but also to allow the modification or development of strategies, methods and contents to adjust extension efforts in Bavaria to the changing forest owner clientele.

The project is structured in 4 phases:

1. Analysis of extension activities (situation analysis - offer profile) [Year 2000]
2. Analysis of forest owners needs and preferences (situation analysis - demand profile) [Year 2001]
3. Development of communication concepts [Year 2001/2002]
4. Implementation, monitoring and evaluation of the communication concepts in selected communes [Year 2002]

Phase 1 has already been finished and phase 2 is in the final analytical stadium. Therefore the following explanation will focus on the results of the extension activity analysis.

Scientific approach

Interactions between people stand in the foreground of the project. Therefore central aspects to be covered are perceptions, communication and human behavior. Referring to the trimodal model of Merten (1994), forest owners are bound by different internal and external contexts, which influence the perceptions, knowledge and opinions about their forest property and therewith the communication with extensionists. Besides interpersonal structures the organizational structure effects the extension offers and the communication of extensionists with forest owners.

Workshops were used to assess the extension activities profile. 10 regionally distributed one day sessions with 10 field foresters each time involved in total almost 25% of the Bavarian field extensionists in the process.

Group discussions, group work, a social environment analysis and a force field analysis approach with additional questionnaire formed the content of the workshops.

Workshop results

The objective of the workshops was to:

- assess field foresters understanding of extension
- gain insight in the extension process
- draw a picture of extension actors network and relationships
- recognize furthering and hindering forces and
- formulate extension strategies, concepts or measures and name possible partners

Foresters understanding of extension

Figure 1 lists the central terms used by the field foresters to describe their understanding of extension. The type-size represents the frequency of mentioning.

Figure 1: Field foresters understanding of extension

- **Client orientation**
- **Social competency**
- **Technical competency**
- **Extension efforts**
- **Contentment**
- **Help for self help**
- **Experience**
- **Time**

“Client orientation” includes statements like “personal and individual”, “partnership” and “acceptance of forest owner decisions”. “Social competency” is connected with “create interest”, “open and positive manner”, include needs of owners”. “Extension Efforts” means mainly “mutual contentment”, “positive feedback” and “implementation of advice”.

Over all field foresters strongly relate to extension as a process, mainly based on a person to person relationship which forms the core of foresters experience and practical extension work.

Aspects of extension work

The following figures include the perceptions of field foresters towards central aspects which influence or describe extension efforts: Extension organization (Figure 2), extension process (Figure 3), extension clientele (Figure 5) and forest owner organizations (Figure 6).

Extension organization aspects

In every forest district office 2 managing foresters are responsible for planning, coordination and support of the extension efforts on the range level. 30% of the field foresters are not content with the provided support of the management level, 54% state a lack of clear objectives and work focus for extension activities, 60% recognize a need for detailed focus group descriptions. Only 68 % feel well and timely informed.

Figure 2: Foresters perception on the influence of extension organization

Aspect	Manifestation	Cluster analysis of the statements revealed 2 groups of extension management and organization: a. an active support and team system with content field foresters (ca.70%), b. a passive and uninterested layout rather negatively perceived by field foresters (ca. 30%)
• Leading foresters	- Difficulties through lack in support and leadership (30%) - missing operational objectives (30%)	
• Field foresters	- important role of experience, but training period missing - continuity of extension personnel	
• Framework	- limited time budget for active extension - insufficient technical equipment - time consuming control of funded activities - regional difference of the role of funds as an incentive	

Extension process

The person to person approach forms the dominating extension measure. Group information events and meetings are less important. Leaflets, press articles or training courses play a minor role. Time restrictions (68%) and insufficient technical equipment (74%) are named to hinder extension efforts with forest owners. 56 % of the foresters though state actively to contact and try to extend their clientele.

Aspect	Manifestation
• Client orientation	- Interest and mentality oriented extension - Target group description necessary (65%) - 15% of clientele with frequent contacts
• Communication means	- mainly person to person approach - group information and meetings of minor importance
• Skills	- sufficiently prepared (76%) - additional skills in extension methods and time management needed - practical training necessary

Figure 3: Foresters perceptions on extension process aspects

The role of grants as an incentive in extension work finds a differentiated judgement: For 63% of the extensionists, grants and the respective guidelines support their work, but 40% claim

insufficient funds. Though 76% of the involved foresters feel sufficiently prepared for their job, ground education at forestry schools or in service training should include additional subjects like extension methods, time management and practical training.

Extension clientele

Forest owners are the major focus of extension activities. A former study already developed 3 “forest owner descriptions” relating to forest extension, to structure the clientele (Figure 4). The foresters confirmed the characteristics and distributed their clientele among the 3 clusters:

Figure 4: Characteristics of forest owner descriptions

Interested forest owner	Indifferent forest owner	No contact forest owner
<ul style="list-style-type: none"> • Strongly interested in forestry • active and frequent contacts • easy to reach • mainly farmer • member of forest owner organization 	<ul style="list-style-type: none"> • Partly interested in forestry • active contacts only on opportunity • no frequent contacts • emotional decisions • partly organized 	<ul style="list-style-type: none"> • not interested in forestry • absentee • non farmer • no member of forest owner organization

According to the results, 21% of the forest owners belong to the group of interested and active owners, 35% are more indifferent; 42% are not in contact with the foresters or owners lack of interest in extension.

Ca.150 – 200 forest owners form the core audience, field foresters are repeatedly in contact with. They belong mainly to forest owner

description 1. The general data of the log book analysis are therewith confirmed.

The change in ownership structure manifests the major concern of field foresters towards the extension clientele (Figure 5). Depending on the region the consequences for extension work are already perceptible.

Figure 5: Foresters perceptions on forest owners

Aspect	Manifestation	Forest organizations	owner
• Clientele characteristic	- 21 % interested in extension - 35 % indifferent towards extension		
• Structural change	- number of non-farmers increases - relation towards forest ownership, knowledge and time decreases - impeded contacts, contacts reduced to active clientele		
• Demand for extension	- complete service packages requested		

Organized forest owners form the more active and open clientele for field foresters. Forest owner organizations function as major multipliers for the work with forest owners. For 46% of the field foresters though these organizations are not accepted as equal partners in the extension process.

Figure 6: Foresters perception of forest owner organizations role

Aspect	Manifestation	
• Alliance and collaboration	- Important multiplier - improved contacts with owners in number and quality - collaboration especially important in the future - mainly well functioning cooperation - partly rather competitors than partners	In some regions forest owner organizations are even recognized as competitors especially for the work with the traditional most active and high motivated owner clientele.

Extension actors network and relationships

To clarify the roles of different actors in the field of forestry extension, the participating foresters structured the extension environment with the help of a "Social Environment Analysis" (SEA)¹.

The most important actors were identified by short telephone interviews in the run-up to the workshops. During the sessions the extensionists first determined the influence of each selected actor in the extension field². The second step determined the level of influencing each actor is exposed to. The result is shown

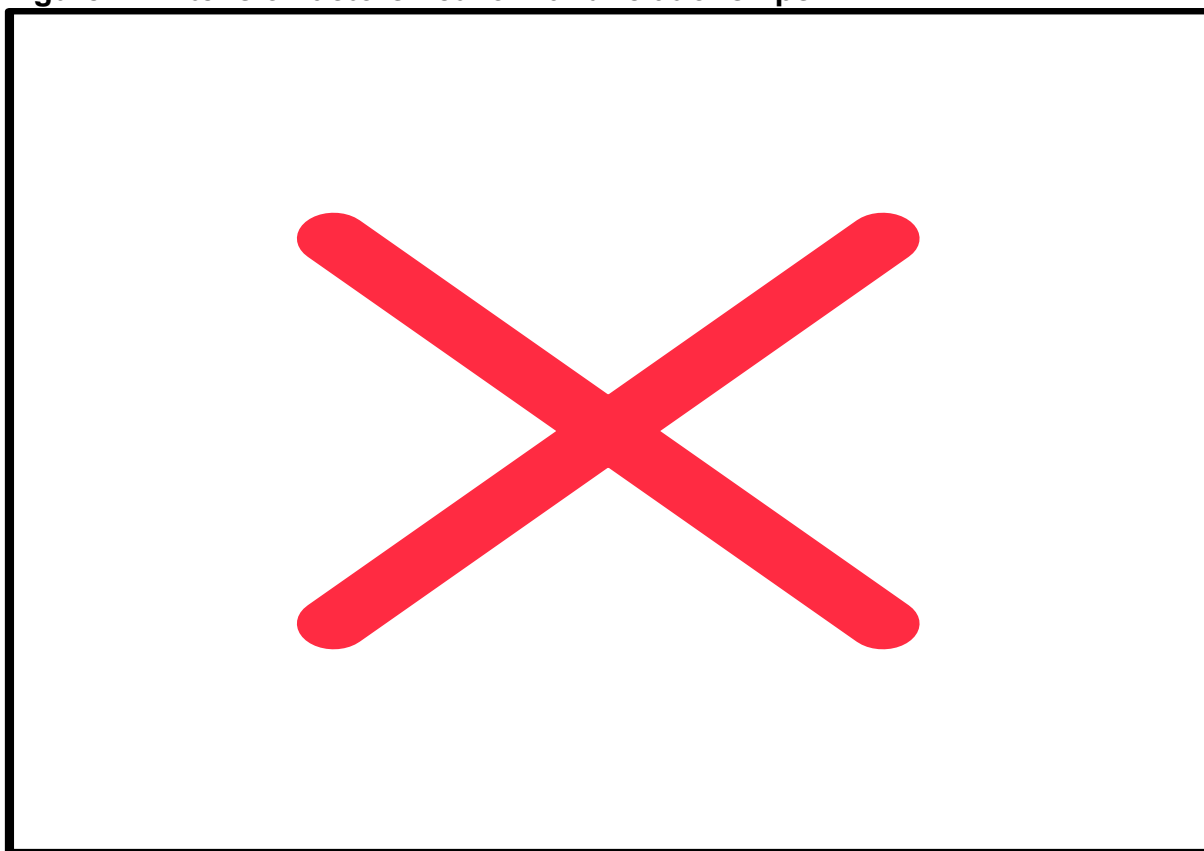
¹ SEA refers to the method of influence matrix by Vester (Vester, 1990, 1999; Suda, 1993)

² The influence is determined by the participants through the distribution of a given sum of point to every actor

in figure 7³. The mutual relations and dependencies of the different actor and actor groups reveal.

The perception of the field foresters shows, that neither actors are located in the (upper left) “active” field, nor in the “reactive” corner. So no real actor dominance exists and none of the actors is only influenced and without acting autonomy. The forest owner stands in the center of all extension attention, with high influence, but also heavily influenced by other actors. Extensionists, family and forest owner organization count for the strongest influence.

Figure 7: Extension actors network and relationships



The position of the field foresters is also located in the moderating sector with the strongest influence on the extension field in total. This influence is directed mainly towards forest owners and owner organizations.

These organizations are also positioned in the moderating sector. This rather active but modifiable position make forest owner organizations an important partner for extension. Contacts here may be regionally intensified and professionalized. Successful collaboration though depends on clear definitions

³ The focus is not on the influence or influencing points per se, but on the positions and relations of actors to one another.

and differentiation of the mutual competencies and tasks between organization and extension forester.

The position of the leading foresters at the forest district office level is located in the lower midfield with tendency towards the “observing” section. Their influence points are concentrated towards the field foresters and the press without showing a clear focus. Leading foresters build a link between the actors in the moderating and the observing sector. Press, interest groups and communes only observe the extension field.

Furthering and hindering forces (“Force field analysis”)

The elaboration of furthering and hindering forces in extension work is a necessary step to develop extension strategies and concepts. Figure 8 presents the most important citings, structured in the sectors “forest owner”, “extension impulse”, “multipliers”, “framework conditions” and “field forester”.

Figure 8: Foresters perceptions on furthering and hindering forces

Field	Forces
• Forest owner	- Personality - Tradition, motivation, relation towards property - Knowledge, education, time budget
• Impulse	- Financial incentives, calamities
• Multipliers	- Forest owner organization, press
• Framework conditions	- Property and forest structure, road net - Legislation - Equipment, distances to property
• Field forester	- Personality

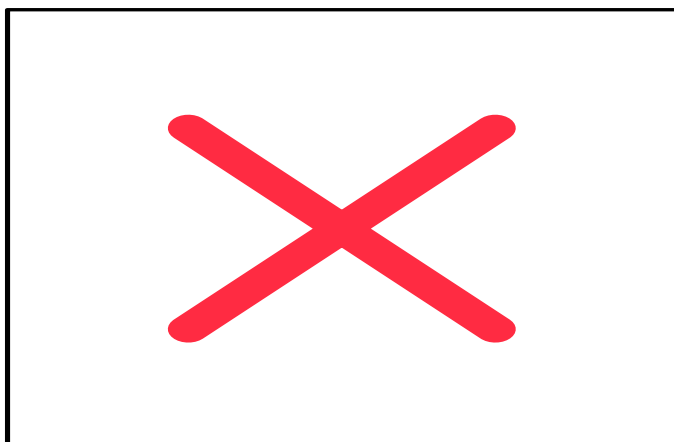
The listed forces might be either furthering and/or hindering. Its obvious, that several of the listed forces may not be modified by extension means, for example legislation, property structure or personality. Nevertheless the citings provide indications for necessary fields of

action. Education, calamities and owner organizations seem to be the most promising ones.

Strategies and concepts

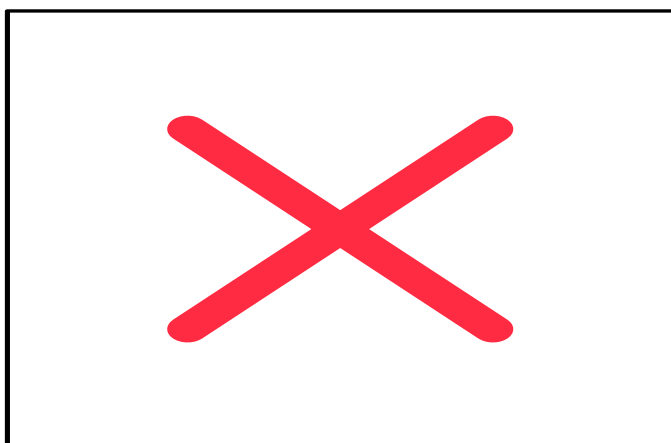
Based on the force field analysis the field foresters developed a set of concepts and strategies for extension activities for the 3 groups of forest owner descriptions. Figure 9 to 11 present results for the active and interested, the indifferent and those not in contact forest owners.

Figure 9: Extension projects for the active and interested forest owner clientele



The over all objective for this clientele is to keep in contact but transfer more responsibilities and tasks to forest owners. Measures therefore heavily rely on the collaboration with forest owner organization and in further education. The creation of a sufficient number of reliable multipliers among the forest owners stands in the foreground.

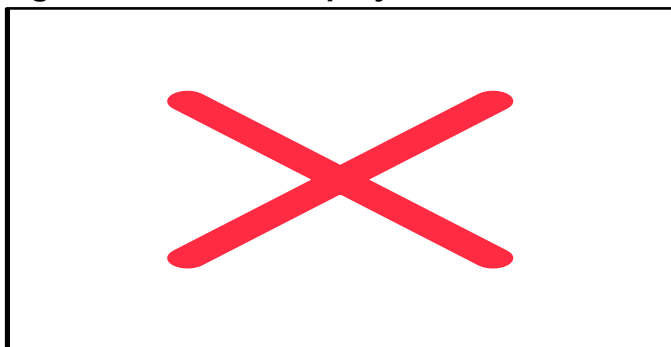
Figure 10: Extension projects for the indifferent group of forest owners



According to the discussion most energy for the implementation of additional extension measures should be directed to this group of forest owners. The improvement of extension contacts forms the core objective. Information and further education offers build the focus of activities. The development of full service packages in collaboration with

the forest owner organization for non farmer and/ or absentee forest owners seem to be an appropriate tool to further forest management.

Figure 11: Extension projects for forest owners not in contact with



The participating foresters were sure that not too much energy and time should be invested for this group of forest owners. Therefore the general objective of the listed measures is rather awareness rising on forestry themes and the existence of an extension service free of charge

Conclusion and outlook

The results of the first phase of the project reveal that the Bavarian forestry extension personal still heavily relies on person to person contacts. Group information and other meetings play a minor role. The social environment analysis proved the “forestry extension field triangle”: Forest owners, extensionists and forest owner associations play the most active roles in forestry extension. Other actors- like the communes or the forest owners family, neighbors and friends- were identified to be in a rather observing than actively influencing position. The motivation of the owners, further education efforts, the owner-extensionist relationship, availability of financial incentives as well as the effectiveness of the existing forest owner associations influence extension work either positive or negative. The already interested and active extension clientele might be kept motivated through improved further education measures, closer collaboration with forest owner associations, public relation measures and financial incentives. For those not easy to reach and non interested forest owners, awareness rising activities- like special events or clientele focused personal mail -seem to be the most promising approaches. The development of a quality management system seems to be necessary to overcome the gaps in strategic and operational planning and implementation.

Phase 2 of the project is already in progress: 762 forest owners in 7 selected communes have already been interviewed on their needs and perceptions towards forest extension. The analysis of these data is still in progress. By the end of the year the results of the forester workshops and the forest owner interviews will be used to plan in a participatory process extension measures to be implemented in the selected communes the coming year.

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WAYS OF IMPROVING FOREST OWNERS' PARTICIPATION

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Abstract

Forest owners' participation in decision making process is very important. In Slovenia, in cooperation with FAO we designed and implemented a project to build the capacities for support to private forest owners and public participation. The most important goal was to create the nucleus of a highly trained group of Slovenia Forest Service staff, which would train other foresters.

Introduction

In positive relation between forestry professionals and forest owners, as one of the most important part of the public, ways of participation have the most important role. Unfortunately, in reality we can not talk about participation. On one hand we have foresters who think they are superior in questions concerning forestry and on the other hand we have forest owners and other parts of the broader public who are not invited in decision making processes or they do not want to cooperate. Therefore the crucial question is how to incorporate the participatory methods in a forester's every day work. In Slovenia we have lack of such skills and knowledge so we were accepted and offered from FAO for cooperation through a technical cooperation project (TCP) called "Capacity Building for Support to Private Forest Owners and Public Participation". Together we designed the content of the project, where the most important goal was to create the nucleus of a high trained group of Slovenia Forest Service staff which would train other foresters.

The background of the project was well described in the proposal for the project where the situation of the entire region (Central and Eastern EU countries) is described as follows:

"Over the past ten years massive areas of forestland in Central and Eastern Europe have been put into private hands. These "new owners" sometimes have limited experience and knowledge of forest management and are put significant demands on local forest services for support in sustainable forest management. Forest services in CEE countries are faced with a whole new class of forest owners in addition to different civil society dynamics. However they lack skills and experience in dealing and communicating with private owners and other sections of civil society. There is a risk of unsustainable forest management, safety concerns, loss of biological diversity, and loss of economic and social benefits if mechanisms and systems are not developed and skilled staff not trained. Many factors are involved, including

liberalization, EU policy and regulations. Changes in formal forestry curricula are needed for long-term improvements, but are difficult and inadequate in the short term to respond to immediate and critical needs.”

In Slovenia the situation is not similar but anyway we could accept some parts of explanation also for our conditions.

We could concentrate the sense of the main idea of the project in a short sentence: "We have to start in our own house!", meaning that we have to start to promote the idea of participation among foresters if we want to change the relationship between foresters and others - forest owners and public. The conditions in Slovene forestry, in spite of generally recognized professional level, were and still are such that it would be necessary to reestablish such relationship with forest owners and broader public, which would enlarge participation of all subjects in decisions about management of forest as an economic source and a natural ecosystem. That means that in all important decisions all subjects would cooperate equally and in democratic ways. The relationship "forester is law, everybody has to obey him" must be changed into a relationship "forest owner/public and forester are partners". Of course first relationship is not something special just for Slovenia, not even for other CEE countries in transition. We can find similar conditions everywhere. To reach the second relationship was our objective when we created and carried out the project.

Objectives of the Project

It was already mentioned that we wanted to start with education among forest service staff. In the proposal of the project it was mentioned, that three target groups should be addressed:

- In-service training was urgently needed for forestry field staff, particularly those in direct contact with private and family forest owners and those responsible for contacts and collaboration with other stakeholders such as NGOs, forest users, and the private sector;
- A small core of facilitators and trainers needed to be developed to assure continuity and sustainability of training. This group could come from several organizations including forest service, forest research institutes and educational organizations and NGOs; and
- A small group of educators should be involved because elements of the training program needed to be integrated into on-going training programs in order to give present and future foresters the knowledge, skills, attitudes and behavior, necessary to support private forestry and public participation.

The objectives of the project are capacity building of the forest service and related support systems for improved forest management through:

- Program development of in-service and continuing education and institutional strengthening in support of private forestry; and

- Upgrading of the capacities through training of about 10 foresters who would be part of the future nucleus of well educated trainers for further education of the SFS staff and others.

The Process of Preparing and Realization of the Project

The process of preparing and realization of the project comprised several steps:

- need identification - the idea (1998),
- inception workshop (2000),
- situation analysis,
- project development and activities,
- project evaluation,
- follow-up phase (2001) – proposal for a regional programme.

The project started in 1998 when we organized some workshops to present the situation in Slovenia, as one of the CEE countries in transition. Even though in Slovenia we were quite good in forestry as a profession, and we hope we still are (close to nature and sustainable forest management is build in every pore of forester's work), we realized that lack of knowledge about different skills of communication was our defectiveness. The situation is described in the following text (BEGUŠ, MEDVED 1997):

"... during transition there has been a change in the relationship forester - owner. From the predominant power of the forester there is a state when the foresters have to take into account quite a number of opinions. While in the past we could easily bring forward the professional arguments we must now persuade the owners to accept them and educate them so that they will understand their meaning. It's well known that we the foresters are very bad at communicating, we don't like to write, we don't know how to contact people and the most worrying part, we don't know how to promote our ideas and the results of our work. By nature the foresters are somehow introverted and we think that it goes without saying that the public knows what we do, that they understand the contents of forest work and that the sense and the purpose of our work is clear and well known. Unfortunately this isn't so. Our work, such as the importance of the forest needs to be promoted constantly, in everyday contacts with the forest owners as well as through the information to the public through media (if we the foresters, who constantly work with the forest, don't do this, other professions will do it instead of us). It is logical that, speaking of the importance of extension for forest owners, we cannot forget about the extension in the field of communication, public appearance and andragogics for foresters."

More intensive work on the project started at the beginning of 2000, when we organized an inception workshop with experts from different countries and some from Slovenia where we analyzed the situation in forestry with the emphasis on participation of forest owners in decision making processes. The fact is that we best know the situation in our country but it is very useful if someone from a

different point of view takes a look on the problems independently. During the inception workshop we recognized the need of a good situation analysis, which would be the basis for creating different modules of the project.

Therefore it was essential and quite important, for further activities, to take a quick look on the results of the situation analysis (SA), which included:

- Due to the fragmentation of ownership, today most forest owners do not get substantial revenues from the forest and can not, as a result, live from this resource. Agriculture or employment are their main sources of subsistence; (the forest being considered today mainly as a saving account);
- A major problem forest owners face today, is related to damages caused by wildlife;
- Forest owners are, in general, satisfied with the services provided by the SFS, though they do not contribute to the elaboration of management plans, nor do they own a copy of them. It is worth noting that most forest owners, except large ones, are not even aware of the contents. The subsidies for silvicultural activities and road construction provided by the SFS are well accepted;
- Technical training courses provided by the SFS are appreciated, and also found useful; and
- The sale of forest products is carried out on individual basis, the annual cut reaching only 50% of the realizable increment. Forest owners are organized, only to a minor extent, either in agricultural co-operatives and/or machine circles. Purposely created forest owner associations or co-operatives do not exist. The usefulness of and interest in such organization depends, to some extent, on the location of the property, the level of information it holds and the characteristics of the property.

Forest owners rely, to a great extent on the SFS, and thus genuinely expect it to bring them solutions to various problems they face. At the same time, a need to improve the flow of information concerning subsidies, compensations, training possibilities is also highly expressed. On the other hand, a much too high influence of the SFS on forest activities was pointed out. In this context, the functions of an authority and support service in particular, are named to be problematic.

Over all, forest owners seem to remain quite individualistic and rather isolated, though regional differences can be noted. It was also noticed that, in terms of forests and forest management, the owners tend to portray a re-active rather than pro-active behavior. The need to get organized, in order to improve market structures or reduce costs of forestry activities, is not yet identified as a priority.

Rural migration to urban centers is a serious concern, both for forest owners and also the SFS.

The SFS provides a full service package to forest owners which includes the preparation of highly detailed management and silvicultural plans, advice, the marking of trees for selective cutting and the maintenance of forest roads as well as the provision of subsidies.

Circulating information is difficult because the SFS has, on the one hand, to deal with individuals and, on the other, it favors a person to person approach. There are no associations to relay the information.

Other constraints in managing the forests are the high number of owners who are not aware about their rights and obligations and the high number of absentee owners. Also time limitation was named. The SFS is very well structured and organized. Its staff show a high level of commitment.

Generally, the SA showed (in comparison with objectives of the project) that training was needed in the following spheres:

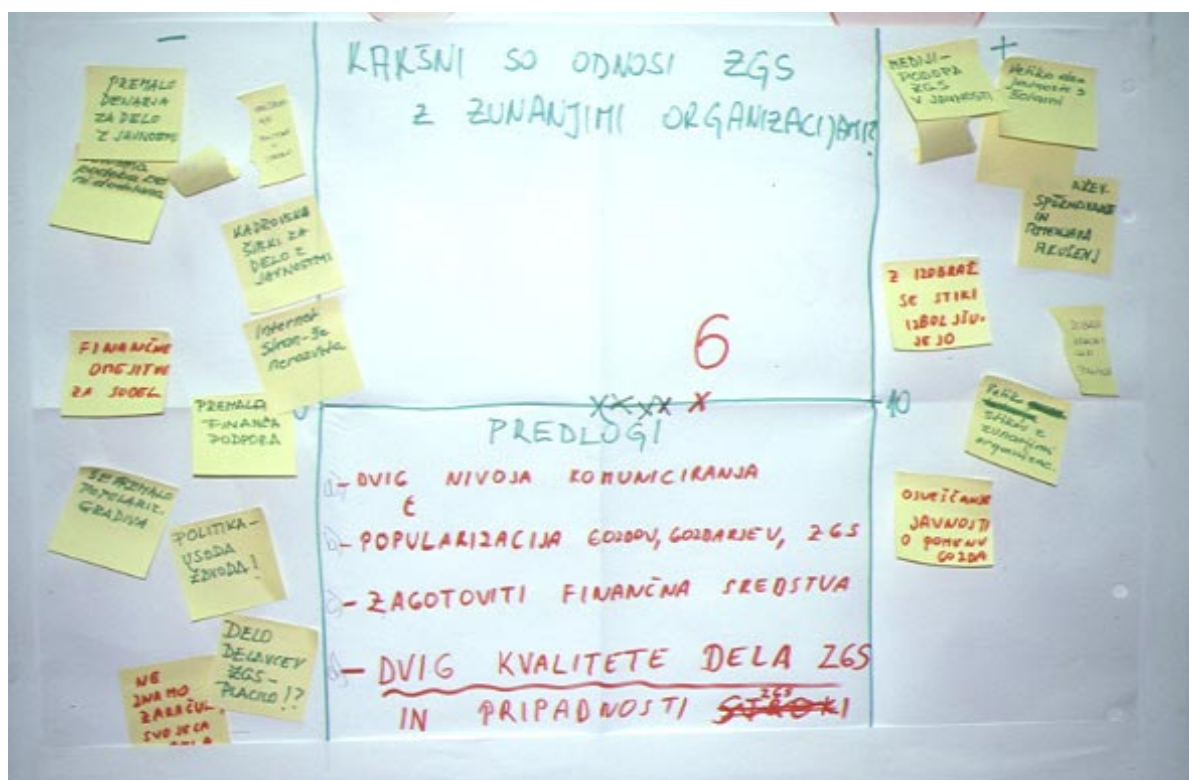
- adult education to know how to deal with alder population;
- conflict management;
- group promotion to get more interest for establishing new FO associations;
- participatory methods to involve FO and public in decision making processes.

On the basis on mentioned needs and some additional requests we designed following program (Table 1):

Table 1: Modules of the project

module	duration (TOT)	duration (TOF)
training of adults	3 days	1 day
distance learning	½ day	
conflict management	1 day	½ day
extension methods	1 day	
participatory approach	3 + 3 days	1 ½ days
group promotion	1 day	½ day
field day	2 days	1 day

The most important module was participatory approach regarding also to the title of the project where “participatory” was especially highlighted. It was also the most popular one among participants because, for our conditions, the methods represented something new.



Picture 1: H form – a participatory approach

The whole project was split up in two phases (Table 2). The first phase was called “Training of Trainers” (TOT) and the second one “Trainers of Foresters” (TOF). During the project we decided that also a “follow up” phase was necessary so finally three phases were created. TOT and TOF courses were four weeks long and finished in November 2000. After that the “follow up” phase continued till end of May next year.

Table 2: Training course schedule

Week	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
TOT						
1 st	Introduction	Training of Adults	Training of Adults	Training of adults	Conflict Mgt.	
	Training of adults			Distance learning		
2 nd	Participatory approach	Partic. approach	Field day - Partic. approach	Extension methods	Group promotion	Meeting with forest owners
						Evaluation of meeting
3 rd	Evaluation, Review of modules	Partic. approach	Partic. approach	Partic. approach	Evaluation, Review of modules	
TOF						
4 th	Preparation of trainers	Training of adults	Partic. approach	Partic. approach	Group promotion	Field day Meeting with forest owners
				Preparation of field day	Conflict Mgt.	

The TOT course was most important course of the whole project and was designed to train the SFS professional foresters as trainers for the preparation of foresters in their ability of interactive communication with forest owners and other actors related to forestry. With the modules in the course we wanted to overcome constraints in communication and technology transfer between the Slovenia Forest Service (SFS) and forest owners. These constraints have resulted in a lack of participation of forest owners in the process of preparing of the forest economic and wildlife plans as well as forest silvicultural plans.

SA had revealed the convenience to improve the above skills, initially at the SFS through preparation of trainers. If course participants would use these techniques and skills, it would be expected that communication between the SFS employees and forest owners would improve significantly, leading to a strong increase of forest owners participation in actively managing their forest property in accordance with regulations, management plans and administrative acts. Additionally it was expected that forest Owners motivation about the future of their properties management would increase their disposition to find ways of connection.

The TOT course objectives were:

- Participants will be capable to prepare Foresters to judge conflict situations and choose and apply conflict management techniques and strategies;
- Trainees will be able to train Foresters to combine appropriate participatory techniques and extension methods in their work;

- Trainees will be able to train Foresters in the application of Adult Training techniques, and the use and coordination of different communication channels in participatory sustainable management of forests with various stakeholders to motivate and introduce Foresters to use electronic sources for up to date information and distance learning; and
- Participants will be prepared to train Foresters to seek together with Forest Owners to organize and develop F.O. associations.



Picture 2: Field day with forest owners

14 future trainers participated in the TOT course. From the group of almost 50 candidates of the SFS staff, 11 of them were chosen. With each, candidate we made an interview and at the end we selected the best of them. In addition, we invited three participants from other organizations dealing with forestry – forestry inspection, forestry institute and secondary forestry school. As can be seen in the table 2 we organized two field days with forest owners. Those two days were the first challenge for both – for future trainers and also for facilitators because we didn't know how FO would react. At the end this first experience showed that even though participatory techniques are, compared to classical education, different, FO accepted this new approach.

For the next phase – TOF we invited 23 foresters from the SFS. In one week, the future trainers had to prepare a complete course with all materials and organizational needs. We tried to create the course, as it would be presented in the future. TOF course was crucial for future trainers and also for facilitators while during the course differences between future trainers were expressed.



Picture 3: Training for Foresters

In order to become skilled and confident trainers, the new trainers need constant feed-back and close coaching in all phases of training including needs analysis, program design, preparation, delivery and evaluation. Those were the reasons why we created the Follow up phase, too.

The general purpose of the Follow up was to provide assistance to the new trainers while they were carrying out the TOF and to facilitate the final selection of the best trainers who will take over training activities in the SFS. The Objectives of the Follow-up Program were:

1. To give new trainers the opportunity to independently:
 - facilitate the Training Needs assessment and determine the training objectives for the training of foresters (TOF) Program
 - plan the training event (module design and selection of training methods and techniques)
 - prepare and design training materials (instruction guidelines, workbooks, slides, etc.)
 - deliver effective training directly aligned with the training plan
 - evaluate individual modules and overall training
 - prepare a final report with recommendations for the future of the TOF Program

2. To use new trainers' new experiences for their personal improvement (feedback, suggestions, tips)
3. To select the group of trainers which will in future:
 - perform complex and demanding activities in the field of Human Resource Management in the SFS
 - facilitate group processes in problem solving inside the SFS.

Trainers decided to run two separate TOF's in different parts of Slovenia. On both TOF's they trained foresters involving Forest Owners and public in preparation of the forest management plans. The trainers split themselves into two teams and continued to work separately. It was obvious from the beginning that there would be a difference in the procedure of the program design. Participants of the first TOF were involved in the designing of the program, on the other hand, participants from the second TOF were invited to an already designed program. We decided to let the trainers continue as they had planned. It would be interesting to compare the effects of each TOF. They agreed to focus their attention on the specifics in the preparation during the evaluation of the Follow up. People learn best on their own experiences.

Each trainer prepared (besides training materials for the participants) an evaluation questionnaire. After each module, we organized a "round table" of the trainers, where we encouraged the trainers to analyze and evaluate the performance of their colleagues and express praise and suggestions for improvement. We expressed our opinion only if it was necessary. In most situations the trainers were able to notice what was working and what should have been improved. The "Follow up" evaluation showed that we were reaching all objectives from the beginning of the module. At the end of this module and also at the end of the project some recommendations for the SFS were accepted:

1. Participation should become a strategic aim of the SFS.
2. All employees should experience the modified ways of such training, i.e.: district foresters cooperate with the forest owners, leaders with their colleagues, etc)
 - methods of participation
 - conduct of meetings
 - communication and conflict prevention
3. Official status of trainers is a precondition for their future dedication to training activities.
4. Continuous training system and employee improvement, employee development project, annual interviews – these are the three options for trainers to demonstrate their capabilities.

5. Currently the SFS has 11 experts. It would be useful to make it possible for the trainers to experience facilitation of other modules.
6. There are many possible areas where trainers can prove their capabilities. We could divide them into two groups – the first one would comprises training activities and the second one moderating activities. For example:
 - employee training within the SFS:
 - training facilitation (that's what they were trained for in TOF and Follow-up)
 - SFS training supervision (they know what good training is therefore they can evaluate training facilitators and their programs)
 - event moderation:
 - problem-solving within the SFS
 - diverse public meetings
 - as the intervention group (using the cooperation techniques to crisis conciliation).

Some results

The most important remark of evaluation at the end of the project is that we should have dedicated more time in TOT course to participatory approach and should have planned more field days with forest owners. We have to take this remark into account when we prepare TOF in the future.

Participatory techniques are implemented in some activities of the SFS, mainly during meetings with our staff as well as in some so called preparation meetings in forestry and wildlife planning process.

One of the most important tasks in the future is promotion of FO association. After project one forest owners association has been formed. We cannot say that this is the result of the project but we are aware that some incentives have come from it, too.

The core group in the SFS will continue its work in the following activities:

- organizing TOF seminars for the SFS staff,
- participatory approach in “critical” situations,

Instead of a conclusion

The idea of the project is very interesting also for other countries of CEE. In March 2001 we presented the project at a Ministry Conference of Forestry (COFO) in Rome. Some delegations showed interest to do the same in their countries, so in September we invited them to Slovenia to join the workshop entitled *“Strengthening of private and community forestry in selected countries in Central*

and Eastern Europe” where the idea was presented and where the initial project for the region was designed. 12 countries participated in the workshop, 7 of them from CEE. In the workshop two main objectives were discussed:

- Capacity building of the forest services: The proposed regional program would strengthen the capacity of forest services to enable them to provide effective forestry support to the new forest small-holders and for community forestry; and
- Developing and strengthening the role of small-holders and communities in forest management.

The workshop provided a forum for discussion and comparison among the participants by promoting the sharing of information and experiences concerning small-holder and participatory forest management in Central and Eastern Europe. We hope that donors will be interested in supporting the program which, almost in the same shape as TCP project, will last four years.

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WHAT AMERICA'S FEDERAL AND STATE GOVERNMENTS WANT FROM PRIVATE FORESTS: THEIR PREPAREDNESS TO FUND PROGRAMS RELATED TO GOVERNMENT BEING A STAKEHOLDER IN PRIVATE FORESTRY?

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Introduction

America's Federal and State Governments and America's citizens are interested in and concerned about the Nation's private forests. Their interests are expressed in a variety of ways including public expenditures to protect and enhance the Nation's forest resource base. The principle approaches used by government to foster private forests conservation and management are --- Research, Education, Technical Assistance, Incentives, and Regulations. This grouping provides a continuum of services ranging from "what to do - research" "how to do it – group education and one-to-one technical assistance," "resources to do it with – cost share incentives," and, "where necessary, penalties via regulations."

The Government's preferred choices for private forest enhancement are the four non-regulatory approaches. These approaches tend to be highly effective and unobtrusive forms of public policy. A contemporary example is the 1990 Farm Bill. Here the U.S. Congress found that:

"(1) most of the productive forest land of the United States is in private, State and local governmental ownership, and the capacity of the United States to produce renewable forest resources is significantly dependent on such non-Federal forest lands;

"(2) adequate supplies of timber and other forest resources are essential to the United States, and adequate supplies are dependent on efficient methods for establishing, managing and harvesting trees and processing, marketing, and using wood and wood products;

"(3) nearly one-half of the wood supply of the United States comes from nonindustrial private timberlands and such percentage could rise with expanded government assistance programs;

"(4) managed forest lands provide habitat for fish and wildlife, as well as aesthetics, outdoor recreation opportunities and other forest resources;

"(5) the soil, water, and air quality of the United States can be maintained and improved through good stewardship of privately held forest resources;

“(6) insects and diseases affecting trees occur and sometimes create emergency conditions on all land, whether Federal or non-Federal, and efforts to prevent and control such insects and diseases often require coordinated action by both Federal and non-Federal land managers;

“(7) fires in rural areas threaten human lives, property, forests and other resources, and Federal-State cooperation in forest fire protection has proven effective and valuable;

“(8) trees and forests are of great environmental and economic value to urban areas;

“(9) managed forests contribute to improving the quantity, quality, and timing of water yields that are of broad benefit to society;

“(10) over half of the forest lands of the United States are in need of some type of conservation treatment;

“(11) forest landowners are being faced with increased pressure to convert their forest land to development and other purposes;

“(12) increased population pressures and user demands are being placed on private, as well as public, landholders to provide a wide variety of products and services, including fish and wildlife habitat, aesthetic quality, and recreational opportunities;

“(13) stewardship of privately held forest resources requires a long-term commitment that can be fostered through local, State, and Federal governmental actions;

“(14) the Department of Agriculture, through the coordinated efforts of its agencies with forestry responsibilities, cooperating with other Federal agencies, State foresters, and State political subdivisions, has the expertise and experience to assist private landowners in achieving individual goals and public benefits regarding forestry;

“(15) the products and services resulting from nonindustrial private forest land stewardship provide income and employment that contribute to the economic health and diversity of rural communities; and

“(16) sustainable agroforestry systems and tree planting in semiarid lands can improve environmental quality and maintain farm yields and income, (4).

This legislation served as a means of identifying and authorizing contemporary programs specific to the Federal Government's economic, social and

environmental interest in private forests. The programs authorized via this legislation complimented and /or expanded many old authorities and brought a wealth of new fiscal resources. For fiscal year 1999 the Federal investment in management assistance for private forest exceeded one-half billion dollars. The expenditures are illustrated in Appendix A.

• Forestry Extension (Table 1)	\$28.2 million
• University Research (Table 2)	\$217.0 million
• Forest Service State and Private (Table 3)	\$92.7 million
• Forest Service Research (Table 4)	\$197.4 million
• USDA - Cost Share Incentives (Table 5)	\$23.6 million
• Total:	\$558.9 million (5)

In addition to the Federal Government's investments in private forest, the State Governments, through the State Forestry Commissions, collectively invest another one billion dollars. Much of the state investments revolve around protection issues (fire prevention and suppression, and insect and disease surveillance) but the funds also support approximately 1500 State Service Foresters (Table 6) (2). In some states a major portion of Service Forester time is directed towards compliance with Forest Practice Acts. The cost of administering these acts is highly variable ranging from \$.15 cents per acre per year to nearly \$1.00 per acre per year.

In the Beginning – Dispersing the Public Domain

The Federal Government's interest in private forests began with the Declaration of Independence in 1776. Initially, the overriding issue was ownership. This concern prompted a variety of government-sponsored land transfer programs and the establishment of private property rights.

In the eastern United States much of the public forestland was simply sold to private parties. Land grants to states on entering the Union and for internal improvements also played a role. As the frontier moved west, forestland was granted, under the terms of laws intended to encourage settlement. Three examples are the Preemption Act of 1841, the Homestead Act of 1862, and the Timber Culture Act of 1873. These acts focused on incentives for westward expansion and settlement through parcelization of the public domain. Grants to railroads and statehood grants also moved substantial areas of forestland out of federal ownership (9).

The results of the parcelization acts of the 19th century are an expansive forestland base (278 million acres) owned and managed by 10 million private citizens (12). The nation's private forests, (72 percent of the nation's productive forests), provides nearly 80 percent of America's forest products, important habitat for wildlife and recreational fisheries, a significant portion of the nation's water

supply, recreational opportunities for millions of people, and countless other environmental and social benefits to the public (1). To sustain these benefits and values federal, state, and local governments have established laws and policies (water quality act, endangered species act, state forest practice acts, best management practices, county timber harvesting and burning acts, etc.), and appropriated fiscal resources to foster private forest sustainability.

Private Forest Laws and Regulations

Subsequent to the 19th century ownership issue came 20th century legislation that fostered forest management and protection (Weeks Law, Clarke – McNary, Norris-Doxey and Smith-Lever Acts). The focus of these laws was largely fire control and tree planting followed by efforts to enhance management and reforestation of private lands by farmers through education and technical assistance. The dust bowl era of the 1930's added emphasis to the need for public conservation efforts involving private woodlands (11). Government incentives for private forestlands peaked in the 1950's, 60's and 70's with the Cooperative Forest Management Act, Soil Bank Program, Forestry Incentives Program, Agricultural Conservation Program, McIntire –Stennis Cooperative Forestry Research Program and the Renewable Resources Extension Act (8).

In the last quarter century a number of regulatory programs have emerged thus the public focus on private lands has shifted from one of protection and productivity to protection and production in harmony with the environment. Examples of the latter include:

§ The Clean Water Act – charges states with the responsibility of developing plans to manage and assess the extent of impact of nonpoint sources of water pollutants. The act regulates wetlands and requires permits for dredge and fill. Currently, normal silviculture activities are exempt.

§ The Clean Air Act – authorizes the Environmental Protection Agency to establish air quality standards. For forestry the primary focus is prescribed burning.

§ The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) – regulates pesticide application by requiring that restricted-use pesticides be applied only by certified applicators.

§ The Endangered Species Act – authorizes regulatory actions to conserve endangered and threatened species and their ecosystems. For listed species, Federal regulatory action can be initiated for (1) forestry practices that jeopardize any species existence (or destroy any species habitat); and (2) persons that harass, harm, kill or capture listed species.

§ Occupational Safety and Health Act (OSHA) Logging Regulations – requires the establishment and implementation of workplace safety and health standards. The act affects forest related occupations, such as pulpwood workers, by setting standards for protective measures for

chainsaw users, field sanitation conditions, and ways of felling, bucking and limbing trees, (5).

Administering Government Programs Pertinent to Private Forests

The principle private forests management and protection assistance laws and policies in the Federal government are centered in the U.S. Department of Agriculture and administered by the U.S. Forest Service; Cooperative State Research, Education and Extension Service; and, Natural Resources Conservation Service. Examples of the authority for federal support are the purpose and policy sections of the 1990 Farm Bill. This legislation provides the preeminent basis for Federal assistance to private forest landowners in the U.S. today. Moreover, it illustrates the process used to authorize Federal investments in private lands.

“(b) PURPOSE. – It is the purpose of this Act to authorize the Secretary of Agriculture (hereafter in this Act referred to as the ‘Secretary’), with respect to non-Federal forest lands of the United States, to assist in ---

“(1) the establishment of a coordinated and cooperative Federal, State, and local forest stewardship program for management of the non-Federal forest lands;

“(2) the encouragement of the production of timber;

“(3) the prevention and control of insects and diseases affecting trees and forests;

“(4) the prevention and control of rural fires;

“(5) the efficient utilization of wood and wood residues, including the recycling of wood fiber;

“(6) the improvement and maintenance of fish and wildlife habitat;

“(7) the planning and conduct of urban forestry programs;

“(8) broadening existing forest management, fire protection, and insect and disease protection programs on non-Federal forest lands to meet the multiple use objectives of landowners in an environmentally sensitive manner;

“(9) providing opportunities to private landowners to protect ecologically valuable and threatened non-Federal forest lands; and

“(10) strengthening educational, technical, and financial assistance programs that provide assistance to owners of non-Federal forest lands.

“(c) Policy. It is the policy of Congress that it is in the national interest for the Secretary to work through and in cooperation with State foresters, or equivalent state officials, non-governmental organizations, and the private sector in implementing Federal programs affecting non-federal forest lands (4).

Why Public Assistance

Part of the rationale for government assistance programs to private forest owners is the belief that too few non-industrial forest owners have enough knowledge of the ways in which they might use their lands to take full advantage of opportunities that would be in their own best interest. To make the wisest possible resource decisions, landowners must better understand their roles as managers and stewards of forest resources and the implications of their decisions. In short, they must possess the knowledge and skills to undertake management activities. Without doubt, some basic knowledge, understanding, and education are critical constraints, which must be overcome before widespread progress can be made toward the development of private forest resources (10).

In America, the logic for a better delivery system of general education is based on the view that the landowner is the decision maker on their woodland acres. Whenever woodlands are neglected or ignored we tend to assume that (a) the landowner is inexperienced about forestry and the multiple benefits to be derived from managing their land, and (b) unaware of the plethora of public and private services available to assist with informed decision making. As a result much time and effort is expended in general information and educational outreach to an ever-changing private forest landowner audience (3).

Education – A High Priority Service

Consequently, within the government's continuum of service, Education is regarded as one of the most valuable public services. Education programs to inform landowners of:

- (a) opportunities for protecting and managing their lands in an environmentally sound manner, and
- (b) of sources of assistance are relatively inexpensive and a prerequisite to success in gaining wide participation in other programs. A good educational program provides the landowner a rational basis for deciding how to manage their land --- whether to more fully develop any particular resource potential or to enjoy it in its undisturbed state.

Over the past 20 years America has more than doubled (332 – 711) the number of Extension professionals serving the nation's 10,000,000 private forest and rangeland owners and managers (7). This cadre of professionals annually plan and conduct, on average, more than 6,000 group education events, produce over two million pieces of literature and more recently, volumes of electronically based

educational materials. On average, their efforts yield the following annual accomplishments on behalf of forest ecosystems:

- 400,000 private non-industrial forest landowner contacts
- 21 million acres of improved forest land management
- \$160 million of increased revenue from forest and wildlife management practices
- 23,000 forest industry worker assists
- 1,600 wood processor assists
- \$48 million in savings through forest industry efficiency
- 100,000 contact hours of continuing education training to 25,000 natural resource professionals
- 50,000 teachers trained in environmental science (6).

A general trend in the overall educational services provided to private forest landowners via the Cooperative Extension System the last 20 years is declining services for production and utilization values, and increasing services for environmental and social values, (table 7). Statistically these changes are not significant, but they do suggest a subtle transition from commodity values to environmental and social values (7).

Summary

America's governments (federal and state) are interested in private forests. Their interests are expressed in a variety of ways including public expenditures to protect and enhance the Nation's forest resource base. The principal public investments occur at the state level. Here, the bulk of the public expenditures support university teaching, research, and extension and state forestry protection and management services.

The Federal government compliments the state investments by convening and promoting leadership and investment opportunities within the private sector and other units of government. The Federal government's role can include building institutional and managerial capacity within regional, state, and local forestry organizations; promoting the integration of environmental and economic policies and programs; developing a coherent set of national principles of forest resource sustainability; fostering strategies that lead to regional integration across a spectrum of forestry interests; promoting a blend of economic and information incentives; and encouraging multiple stakeholder decision-making processes at all decision levels (3).

As America becomes more dependent on private forests commodities (market and nonmarket) the Federal Government's role will likely increase. An example of how this will occur is the 2002 Farm Bill. Over the last several months America's 107th Congress has worked to strengthen the Government's foundation for supporting private forests. Their objective is to establish a coordinated (Federal, State, and local) program that fosters the establishment, management,

maintenance, enhancement, and restoration of private forests in the United States. If passed, this Bill will establish Federal policy and authorize Federal expenditures for private forest for the next 10 years. The jury is still out on the 2002 Farm Bill but there are some encouraging signs. For University employees the most notable is a recommendation to double the authorized funding level for Forestry Extension. For years non-formal education (extension education) has been the weakest aspect in the public's approach to private forest sustainability. Many feel this is about to change and regard the 2002 Farm Bill as a means of catapulting Forestry Extension to a much superior plateau in the new millennium.

Appendix A:**Table 1. Forestry Extension Expenditures, 1999. (\$ in 000).**

Renewable Resources Extension Act:	3.2
Smith – Lever Act: (estimated)	4.0
State Appropriations: (estimated)	21.0
Total:	28.2

Table 2. University Research Expenditures, 1999. (\$ in 000).

Hatch Research Act:	2.2
McIntire – Stennis Forestry Research:	20.7
CSREES Grants:	5.6
Forest Service and Other Federal Grants:	41.5
State Appropriations:	95.0
Self Generated:	11.8
Industry:	16.5
Other:	23.6
Total:	217.0

Table 3. Forest Service State and Private Forestry Expenditures, 1999. (\$ in 000).

Forest Stewardship:	28.8
Forest Legacy:	7.0
Urban and Community Forestry:	30.6
Economic Action Programs:	17.3
PNW Assistance Program:	9.0
Total:	92.7

Table 4. Forest Service Research Expenditures, 1999. (\$ in 000).

Vegetation Management and Protection Research: (Fundamental Plant Science, Silvicultural Applications, Forest and Rangeland Management, Forest Operations Engineering, Fire Science, Quantitative Analysis, Insect/Diseases/Exotic Weeds)	86.2
Wildlife, Fish, Watershed and Air Research: (Terrestrial Wildlife Habitat, Aquatic Habitat, Watershed, Atmospheric Sciences)	42.2
Resource Valuation and Use Research: (Economics, Urban Forestry, Wilderness, Social/Cultural, Forest Products Utilization and Processing, Forest Product Safety/Human Health)	37.7
Science Policy, Planning, Inventory and Information: (Forest Inventory and Analysis, Forest Health	30.5

Monitoring, Monitoring Methods/Applications)	
Total:	197.4

Table 5. USDA – Cost Share Incentives, 1999. (\$ in 000).

Forestry Incentives Program:	6.0
Environmental Quality Incentives Program:	7.3
Conservation Reserve Program:	10.3
Total:	23.6

Table 6. State Appropriations for Private Forests Protection and Management Services (1998). (\$ in 000).

<i>State</i>	<i>Approp.</i>	<i>State</i>	<i>Approp.</i>	<i>State</i>	<i>Approp.</i>
Alabama	11,968	Louisiana	9,225	Ohio	8,897
Alaska	N/A	Maine	1,000	Oklahoma	9,120
Arizona	2,076	Maryland	4,485	Oregon	33,950
Arkansas	5,915	Massachusetts	5,220	Pennsylvania	15,844
California	442,626	Michigan	8,869	Rhode Island	1,340
Colorado	4,075	Minnesota	34,840	So. Carolina	16,842
Connecticut	1,314	Mississippi	19,800	So. Dakota	1,095
Delaware	754	Missouri	10,682	Tennessee	14,700
Florida	46,300	Montana	6,616	Texas	11,373
Georgia	34,612	Nebraska	1,160	Utah	3,926
Hawaii	1,500	Nevada	4,000	Vermont	3,210
Idaho	17,511	New Hampshire	1,908	Virginia	12,309
Illinois	5,407	New Jersey	6,156	Washington	82,674
Indiana	8,000	New Mexico	4,100	West Virginia	2,151
Iowa	1,640	New York	11,126	Wisconsin	26,000
Kansas	291	No. Carolina	33,027	Wyoming	2,367
Kentucky	8,462	No. Dakota	731	TOTAL	1,001,194

Table 7. Percentage of Forestry Extension Services Allocated to Activities, 1979 –1999.

	Production	Env. Quality	Utilization	Env. Ed.	Cont. Ed.
1979	34%	17%	19%	21%	9%
1999	30%	20%	15%	25%	10%

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CHOOSING THE RIGHT DECISION SUPPORT TOOLS

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Introduction

Why do we need Decision support tools?

Rural and natural resource management is concerned with achieving the integrated, productive and sustainable use of biological, physical, social and financial capital at diverse geographic and temporal scales. As our understanding of the natural resource base has improved, the need for integrated approaches to management has been increasingly widely appreciated. As a consequence, decision-making in rural, natural and environmental resource management has become a more complex process. The intensification of agricultural production and more recent emphasis on holistic environmental management has meant that managers are increasingly expected to address more complex issues (including negative externalities as well as issues associated with productivity) such that a broader domain of information needs to be considered. As the complexity of the decision-making task increases, resource managers (whether farmers, agri-business, Government Agency staff or other managers) are increasingly unlikely to have the necessary expertise, and, therefore, capacity to make resource management decisions that integrate the range of issues that demand consideration (Walker, 2000).

Have they helped us so far?

This increasingly complex environment for resource use and management has necessitated the development of new skills, methods and tools to consider new information and apply new ways of thinking to consideration of that information. As a consequence, research has played an increasingly active role in preparing resource managers to achieve high quality decision-making processes and outcomes. This 'decision support' research has included:

- Development of effective access to the broad range of technical data, knowledge and process information that might be relevant to decision-making;
- The development of new ways of analysing potential strategies for resource use and their implications
- The development of tools or methods that 'package' these new approaches to make them accessible to the resource manager, and
- A role in building the capacity of land managers and their advisers to bring these advances into existing and evolving decision-making processes.

How do we proceed from here?

Given that decision support seeks to improve the quality of decision-making processes and outcomes, the provision of decision support needs to be thought of more broadly than the development of decision support systems. It is, in part, a scientific and technical undertaking but, given that it seeks to change decision-making processes and, therefore, the decisions made, it is influenced by institutional, social, policy and political context. "If you change the way you make decisions, you will change the decisions you make" (Attributed to Jim McNeil by Slater, 1995). Seeking to change the way that people make decisions about resource use and management is not a consequence-free academic exercise, it is an initiative that bears significant responsibilities (Walker 2000).

What this means is that a bad decision support tool, and by this I mean an aid that produces wrong or misleading information, is worse than no tool at all. A farmer that acts on wrong or misleading information supplied by a decision support aid will at best be loath to trust information supplied from such sources in the future, and at worst will diminish the economic and environmental condition of his farm. Due to the critical nature of the environmental imperative facing our agricultural systems, the relationship between the providers of rural extension and farmers cannot afford to be compromised in this way. It is partly for this reason that a need has arisen for a way to systematically evaluate potential decision support tools.

Assessing Decision tools.

The aim of this paper is to discuss the Decision Support Tool Assessment framework. The products of the Farm Forestry and Revegetation team at the Department of Agriculture Western Australia target frontline revegetation advisers. The decision support tools and systems to be analysed using this framework are expected to be used by our clients – the frontline revegetation advisers - to assist them in their efforts to successfully extend revegetation information to land managers and community stakeholders. To successfully analyse the tools, we need to keep in mind the fact that they will be used as an information bridge for the passage of revegetation information between these groups.

A decision support tool can be presented in a number of forms, such as

- Simple text based guidelines
- Flow diagrams or decision trees
- Spreadsheet based systems with calculations
- Software based systems with a complex of numeric values and decision trees
- Optimising systems such as MIDAS

Output from the use of the tool might fall into a number of categories, such as:

- Simple conceptual
- Single choice action
- Single solution numeric value

- Statistical options
- Conditional multiple options
- Ranking of options

The framework will need to incorporate a filter to ensure the inclusion of a strong experiential and empirical component to the knowledge of the Decision Support System (DSS), reflecting conservative decision behaviour of even innovative farmers. By this I mean that stakeholder input will be important to help make outputs relevant, and acceptable to farmers.

Extending this stakeholder involvement concept to the actual use of the tool allows the process to integrate stakeholder perspectives, and ensures all participants see the problem in the same way. While a decision support tool will be based on common definitions, and therefore will be able to describe a given problem in a way that is understood by most people, it should also allow users to define the problem in their own terms, enabling them to build on their existing problem solving framework.

This is particularly important when the problem to be resolved involves a considerable amount of technical information. Some decision support systems or tools may be more useful if they are viewed as a source of knowledge, rather than as an analysis tool, which may require not only significant data to use, but also acceptance that the form of analysis was the most appropriate (Parker, 1999). In other words, the outcomes can be dependent on the process of facilitation as much as the utility of a decision support system. A tool may be useful just as a source of information to add into a group discussion. Bear in mind here, that DS tools vary enormously – from tools with lots of data and very little analysis at one extreme, to ‘empty’ tools which contain no data, but have lots of built in analyses capacity at the other extreme.

DSS tool Assessment framework

The Rural Extension Centre at the University of Queensland designed a “Change Analysis Framework” (Clarke, *et al.* 1997) as an aid to the design, management and evaluation of extension processes. The DSS assessment framework discussed in this paper used the CAF as a starting point for its design. The framework below is suggested as a method of systematically analysing existing and potential decision support tools. This framework has been developed specifically with farm forestry and revegetation tools in mind, but could be more widely applicable.

A potential DS tool or system will need to be assessed against each step in the process. This will ensure that it is tested against each relevant criterion when deciding whether it will be worth the cost of development and promotion. The framework is phrased as a series of questions to be asked about the tool under scrutiny. The list is not exhaustive. It is a set of prompts to facilitate discussion.

The response to these questions can be reported in a standardised format. Ranking of the importance of the response to each question will be a subjective process to be done on a case by case basis.

Many of these questions should be answered explicitly in the manual accompanying the tool. As well as analysing existing tools, the following process would be useful to follow when developing a new tool.

See Figure 1 for a diagrammatic representation of how the following criteria or steps in the process fit together.

Criterion 1: Context

In what situation will the tool be used? It could be one or more of the following:

- Single 'Do it yourself' user
- One to one advice
- Group Discussion
- Strategic decision making
- Negotiation
- Learning aid
- Field day display

Other questions which help establish the context would be:

- What is the target audience or user group?
- Does the tool fill an identified knowledge gap?
- If not, is the knowledge developed useful?
- Is there an existing equivalent?

Criterion 2: Objectives

What does the tool help with?

- Eg Oil Mallee profitability
- Tree water use

What is its intended role?

- Eg Should I or Shouldn't I?
- General information

Or what area of expertise is involved?

- Eg Hydrology
- Tree physiology

What is the type and level of output?

- Eg Economics (\$) etc)
- Graphics
- General information

How can the output be used in decision making?

Once these questions have been answered, put together a list of stakeholders and experts to assess and analyse the tool. Combine the 'who' information from

the step above with the 'what area of expertise' field from this step, to select individuals or groups who can help determine whether this tool will be useful to enough of our clients to warrant the expense required to develop and promote it. Perhaps ask all stakeholders and relevant experts including farmers, extension specialists, DS specialists and researchers to study the tool. Some may not need to be involved in discussion, but just asked for their appraisal.

Criterion 3: Principles and Assumptions

Approach this stage on two levels. Firstly, examine the tool in relation to the principles of the project.

- Are the principles congruent with its purpose and context? For example, if one of the project principles is to ensure stakeholder involvement at every stage of the decision-making process, does the tool allow for this in its current form?

Secondly, examine the tool in relation to the assumptions it is based on.

- Is the tool designed around realistic assumptions? Most tools, especially those developed using scientific research will be based on certain assumptions and generalisations about the natural, social and political environment. Assess the suitability of these assumptions for the type of decision to be made. For example, a DS tool on the economics of Oil Mallees will need to include some consideration of whether or not the political environment is likely to be conducive to the development of a market for the product. In other words, the Oil mallee DS tool may be based on an (unstated) assumption that politics will not be an impediment. Our job at this stage is to assess whether or not that assumption is reasonable. If not, then the tool is not useful.

There are two types of assumptions – internal ones on which the model is based, and external ones, which it is the user's responsibility to check from time to time. For example, consider cannabis instead of Oil mallees. A DS tool to decide whether or not to grow Cannabis may contain internal assumptions about what things you need to know to help calculate profitability. But as well, there are many external assumptions. When the DS tool was designed, cultivation of cannabis may have been legal, but now it is not. Therefore, the tool is no longer useful, because something outside the tool has changed.

The most common external assumption is that everything outside the model stays unchanged – the sun keeps rising every day, weather follows a predictable pattern, demand for primary products continues, etc. Instead of developing a long list of assumptions to check, it might be best to look for things that have changed since the DS tool was developed, and see if they effect its validity or usefulness.

Criterion 4: Equipping

- What is the type and level of input data required?
- Does the end user have the skills and resources required?
- What hardware and software are needed to operate the tool?

- What are the operating requirements (Time etc)?
- What are the requirements for analysing or interpreting the outputs?

Bear in mind that the tool will be used by our clients (revegetation front-liners), or our clients in conjunction with their clients (land managers). A decision support tool may require certain inputs that the user will need to provide. One or both of the parties will need to have the necessary information available to them.

A second requirement will be that the user has the skills to effectively work the tool. This may include not only understanding the inputs required, but some level of understanding of the rationale behind the process. This will be necessary to put the results in context in relation to the underlying assumptions. The user will also need to be able to understand the output from the tool in order to make use of the information extracted. This problem can be approached from a couple of angles. If the users are not equipped to use the tool we can either discard the tool, make it easier to use, or provide some training. For example, some useful decision support tools are based on spreadsheets, but many clients may not have the skills needed to use them. Providing training in spreadsheet use could help many of our clients use the tools more effectively.

Are the resources available to run the process?

Commitments of time and money will be necessary to get the tool to a useable stage, as well as getting the tool used. For example, uptake of a useful decision support tool may be hindered if the product is not fully developed, or adequately promoted. Take these expenses into account when deciding whether or not a tool is worth developing.

Criterion 5: Organising

- What's the best way make it available and get it used?
- Decide whether distribution of the tool will be economically viable. Compare the benefits to be gained from its deployment against its distribution cost. Then, if you decide to proceed, organise the distribution logistics. Although we are dealing with an extension product, apply adult learning principles when planning its promotion.

Criterion 6: Communicating

Decision support (DS) tools are an avenue for communication of information or knowledge and ideas.

- Is the tool likely to help pass revegetation information from our clients to theirs? Will it facilitate discussion on relevant issues?

Knowledge-based DS systems can be a valuable method of capturing farmer experience, and those systems that can accumulate this knowledge will become progressively more useful.

- Can the outputs be integrated with other more qualitative information for whole farm decision-making?

- Are the results quantitative (numerical)? Or quantitative (“rule of thumb”)?
- Differences between farmer wisdom and model outputs provide an opportunity for discussion and perhaps new insights on such issues.

Users can be sceptical of recipes, so generating a result interactively by allowing them to add or delete selection criteria may make a tool more user friendly.

Users will appreciate an interface that provides a maximum amount of information from a minimum of inputs, as well as being able to manipulate variables to see what happens.

Criterion 7: Performance indicators

- How will we know whether this tool is performing the task it was designed for, or if it is useful to our target audience?
- Is it possible to agree on performance measures before it is released for field assessment? If so, document them.

If a tool is used by our clients, we may assume that they find it useful. But are the outputs of the tool accurate? Some field testing will be necessary amongst our client group to collect feedback on performance, but this may not be enough. For tools that provide economic analysis of revegetation options, test them on examples where the results are known, to see if the model gives realistic results. Alternatively, does the tool provide examples of acceptable and realistic ranges for the output values. Even if the results are not accurate, the tool may still be useful if its results are within a certain percentage or order of magnitude of real life examples.

Criterion 8: Observing

Once the tool is released and (hopefully) being used by our clients, monitor its use and efficiency. The use of a valuable tool may be below expectations because of a lack of backup support or a need for periodical updates. This kind of efficiency monitoring will help make sure we get the most out of a tool we have invested resources into developing, but will also involve an ongoing cost. Make an assessment of what level of ongoing commitment is required to get the most out of the tool. If the maintenance required is regular or expensive, is the tool worth promoting at all? Think about the operational life of a tool, or decide at what point to review it. For example, the economics of oil mallees spreadsheet will need to be re-examined once the oil mallee processing plant is operational.

Criterion 9: System practice

- Critical thinking – why wouldn't it work?
- Are there any significant barriers (for example political or social) that would prevent or affect the rate of uptake within our target group?

Play devil's advocate, and try to look at the tool in question from a different perspective. Try to find reasons why the model would fail either through its content or its promotion, and explore whether these points pose a serious risk to

the successful extension of the tool. Once potential problems are listed, they can be explored in the following step, then the tool can be reinserted into the framework at the appropriate step.

Criterion 10: Creating

- How could it be improved or tailored to satisfy an identified need?

Make the necessary changes, repeat the process.

If at any step, a tool is considered to be not worth pursuing, then explore what changes could be made to overcome the perceived problem. The tool can then be put through the framework again, to see whether it would be viable if the changes were made.

Even after a decision support tool has been through this process, keep looking for improvements. There are no perfect tools or models, and there will always be many avenues to explore for improvements.

Conclusion

The steps in this framework are intended to guide analysis of a decision support tool or system by a group of relevant experts and stakeholders including (where appropriate):

- scientists to comment on the validity of the basic model,
- extension experts to identify any problems with the extension of the model,
- our clients to comment on whether or not the tool fits their needs, and whether or not they have the skills to use it,
- land managers to comment on the usefulness of the output.

The efficacy of the process will be governed by the choice of people chosen to execute it. To guarantee a useful analysis, someone needs to take responsibility for putting a DS tool through the process, and the right people need to be asked for their input.

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Tool Analysis Fram

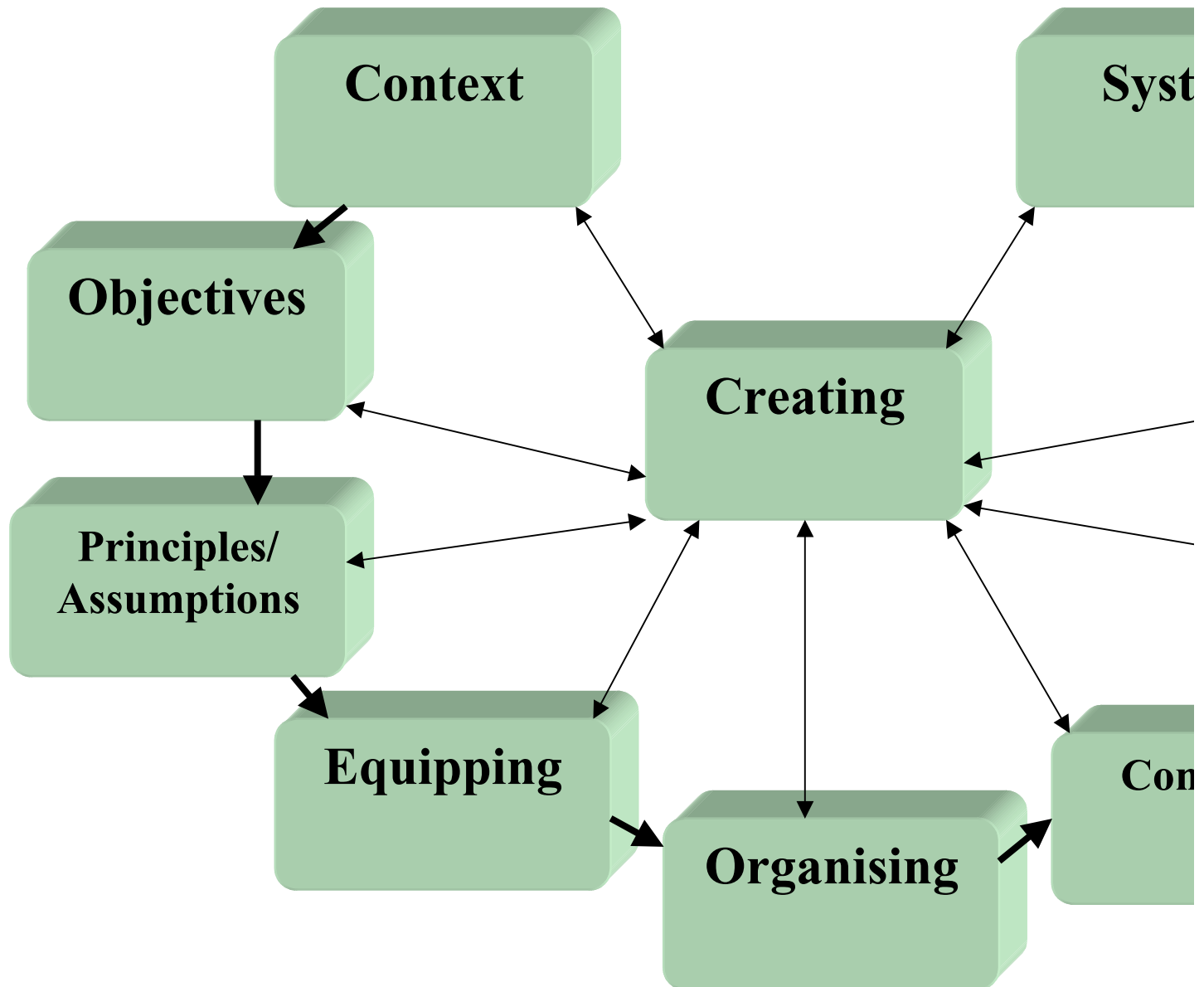


Figure 1.

PREDATORS BESIDE A MOUNTAIN STREAM: USING ART TO ENGAGE THE PUBLIC IN DIALOGUE AROUND FORESTRY ISSUES

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Abstract

Oregon State University Extension Foresters designed and evaluated a traveling art exhibit to reach new audiences, increase awareness of the complexity of forest issues, and provide a conducive environment for dialogue with Oregonians. Since 1999, over 118,000 people have seen the show in 10 Oregon communities. Thirty-seven artists have provided 88 strategically-selected art images, valued at \$45,000. Displayed works vary from environmental images to scenes of utilization and include art pieces made from forest products. We have tangible results that, while labor-intensive, *Seeing the Forest: Art about Forests and Forestry*, is a highly effective, low financial cost, means of engaging the public in dialogue.

Introduction

Forestry in Oregon continues to undergo changes in infrastructure, employment and performance due to many societal factors. The role of non-formal Extension forestry education is to improve Oregonians' knowledge of forest resources and their options for expanding benefits from these resources. In 1998, to better understand the forestry trends issues and educational needs, we conducted a systematic assessment, collecting such information from nearly 500 members of the forestry community potentially served by Extension. The assessment illustrated numerous programmatic opportunities which were expressed in six strategic goals. One goal emphasizes engagement of the public in dialogue about Oregon's forestry future to generate more informed citizens and ultimately better forest policies. Strategies to address this goal generally employ Extension's model of public issues education that encourages exploration of perspectives leading to definition of policy alternatives and their associated consequences. The art show was envisioned as one approach to engaging people in a learning experience that shares perspectives with others.

As a means to engage the public in dialogue about forestry and forestry issues, a non-traditional extension approach was employed using art as an educational medium. The objectives of *Seeing the Forest* were to:

- Increase viewers awareness of the complexity of forest issues
- Listen to what Oregonian's value and believe about forests and forestry
- Learn about the audiences forestry knowledge and educational needs
- Introduce Forestry Extension to non-forestry public

It is important to understand the core concepts that guided the design and implementation of *Seeing the Forest*. This was an educational art show, with specific learning objectives and formal evaluation procedures. In addition, there were characteristics that ensured this was not a traditional juried art show, but rather an effort to engage the public in an informed dialogue about forestry. *Seeing the Forest* was designed as an educational experience for the general public with learning and dialogue to occur along the featured forestry and forestry themes. Specifically, the art was to convey various values and issues related to forestry. This may have been the most central guiding concept in the work: the content of the art show. In the solicitation to artists, the steering committee requested submissions in the following areas: harvest methods, conflict resolution, wildlife habitat, aesthetic beauty, recreation use, water resources, urban encroachment, forest health, fire control, and jobs. The steering committee encouraged art across all mediums (oil, watercolor, photographs, painted media, etc.). In addition, artists were asked to submit a short statement (one paragraph) describing their work.

So in addition to the art piece, we also had artist statements' detailing what they were trying to convey through the art. The steering committee also wrote statements describing how the art fit with the content categories that we were targeting. The art, artist's statements, and committee statements triangulated well and provided links between the art and the content target areas. Other important characteristics of the show included showings at multiple locations around the state. Using the statewide extension network, steering committee members identified local "hosts" who aided in site selection and local arrangements. The sites chosen were to be public, potentially high traffic areas so as to maximize the number of people exposed to and viewing *Seeing the Forest*.

Evaluation Methods

As an educational program, *Seeing the Forest* included a formal evaluation component. The core concepts discussed previously guided evaluation design. A brochure with the artist's names, titles of their artwork, and the prices of the artwork were available for those who viewed the show. The brochure was an accompaniment to the art show and enabled participants to view the art show while associating the titles of the pieces. Inside the brochure, a one-page questionnaire with 6 questions was included. The survey questions were directly tied to the project objectives. Viewers returned the completed questionnaires by placing them in a box before exiting the area of the art show. In addition, a few surveys were mailed to the address indicated on the questionnaire. The surveys were anonymous and included two open-ended and four multiple-choice questions. The results were analyzed using thematic analysis for the open-ended questions and SPSS for the multiple-choice questions.

Results

Seeing the Forest was piloted in 1999. In this year, we selected 35 images by 11 Northwest artists, representing opposing values such as the Forest as Provider of

Goods vs. Preservation, Private Rights vs. Social Responsibility. Issues illustrated included harvest methods, recreation, fire control, jobs, water resources, wildlife habitat, and aesthetic beauty. The show featured multiple mediums, including photography, oils, watercolors, ceramic bas relief and tiles, as well as Native American-style wood carvings, and folk art painted saws.

During the three month pilot test in three communities (Corvallis, Tillamook, Bend) 68,000 people viewed the exhibit. Besides writing comments on corkboards interspersed throughout the show, 164 people responded to the written questionnaire. Ninety percent of the people who responded, indicated that the art show succeeded in illustrating the diversity of forest issues in Oregon. Seventy-three percent said that it increased their understanding of the complexity of forestry issues. The art show project also generated 100% positive responses from the host sites (a gallery, a tourist attraction, a city hall), the artists, and the OSU Forestry faculty and volunteers who interacted with the public.) Our pilot test experiences led OSU Extension Foresters to produce another show in 2000.

In 2000, we sent a statewide call for submissions to all art and craft guilds in region. From these submissions, we selected 53 art pieces, worth \$37,000, from 26 artists. Mediums added in 2000 were quilts and wood products such as furniture and turned wood. To enable more Oregonians to view and interact with the exhibit, we expanded the itinerary to include 7 communities in 8 months (Bend, Klamath Falls, Corvallis, St Helens, Coos Bay, Clackamas and in February, in the State Capitol.) To provide more opportunities for dialogue, we asked artists for Artist Statements which hang next to the art pieces. We also modified the questionnaire to add two qualitative questions; and we added another corkboard to receive more informal comments, primarily from youth.

Over the 1999-2000 time period a total of over 118,000 people have viewed *Seeing the Forest* across 10 Oregon communities. Thirty-seven artists have provided 88 strategically-selected art images, valued at \$45,000. Displayed works vary from environmental images to scenes of utilization and include art pieces made from forest products. A proportion of those who viewed the art show in 2000 completed the formal survey for a total of 305 respondents. The survey was given during the second year of *Seeing the Forest*. The survey was voluntary and not all those who viewed the art show completed the survey, nor was there any way to gauge whether all 118,000 estimated viewers walked the entire show. However, those viewers who took the time to complete the survey provided valuable information about their experiences related to viewing Art About Forestry. Table 1 indicates where the art show was shown in Oregon and the number of surveys collected at each location. The majority of survey respondents viewed the art show at the Bend location. This was a very high-traffic area since Deschutes is a major tourist attraction with the National Forest and unique Lavalands area.

Table 1: Viewing location of survey respondents, *Seeing the Forest* 2000

Location	Frequency	Percent
Bend Lavalands Visitor Center at Deshcutes National Forest	145	47.5
Klamath Falls Klamath County Courthouse	19	6.2
Clackamas Clackamas Community Center	3	1.0
Corvallis (La Sells) La Sells Stewart Conference Center Oregon State University	28	9.2
Corvallis (CH2M Hill) CH2M Hill Alumni Center Oregon State Univetsity	83	27.2
St. Helens St. Helens Public Library	10	3.3
Coos Bay Coos Bay Public Library	17	5.6
Total	305	100

In addition, survey respondents indicated where they lived. The majority of respondents answering this question (n=298) lived either in the Willamette Valley (Corvallis, Eugene) or were travelling from out of state (Table 2).

Table 2: Where survey respondents live, *Seeing the Forest* 2000

Region	n	percent
Portland Metro	53	17.8
Eastern Oregon	19	6.4
Southwest Oregon	27	9.1
Willamette Valley	81	27.2
North and Central Coast	8	2.7
Central Oregon	27	9.1
Outside of Oregon	83	27.9

Most of the survey questions were designed to gauge whether to not we achieved our broad content goals. When asked whether viewing *Seeing the Forest* increased respondents understanding of the complexity of forest issues, 76.8 (n=284) indicated

that they either agreed or strongly agreed with that statement. Eight-six percent (n=305) of survey respondents stated that *Seeing the Forest* succeeded in illustrating the diversity of forest issues in Oregon. A related question required the respondents to circle the forestry issues that they saw illustrated in *Seeing the Forest* (Table 3). The majority of respondents indicated that wildlife habitat, aesthetic beauty, and harvest methods were illustrated in *Seeing the Forest*. The issues respondents listed least frequently as illustrated in *Seeing the Forest* were urban encroachment and conflict resolution.

Table 3: Forestry issues survey respondents confirmed viewing in *Seeing the Forest*, 2000

Issue	n	percent
Wildlife habitat	235	77
Aesthetic beauty	233	76.4
Harvest methods	216	70.8
Jobs	197	64.6
Forest health	195	63.9
Recreation use	168	55.1
Water resources	168	55.1
Fire control	159	52
Urban encroachment	113	37
Conflict resolution	91	29.8

In addition to the multiple choice questions, respondents also completed two open-ended questions on the survey. Of the 49 images included in the show, only three were not mentioned at least once specifically by name or number in answers to the open-ended questions. This shows that *Seeing the Forest* was varied enough to appeal to a wide audience (i.e., there is something for everyone). These results also support the goal of creating dialogue in that the majority of respondents (65%) provided answers and commented on the art in the open-ended questions.

Viewers were also asked to identify the art image they like the best. A follow-up question inquired, "Which art image do you find the most intriguing or thought-provoking, and why?" The image titled "Predator" evoked the most comments from viewers and was at the top of most viewers "best liked image" list (Box 1, 2).

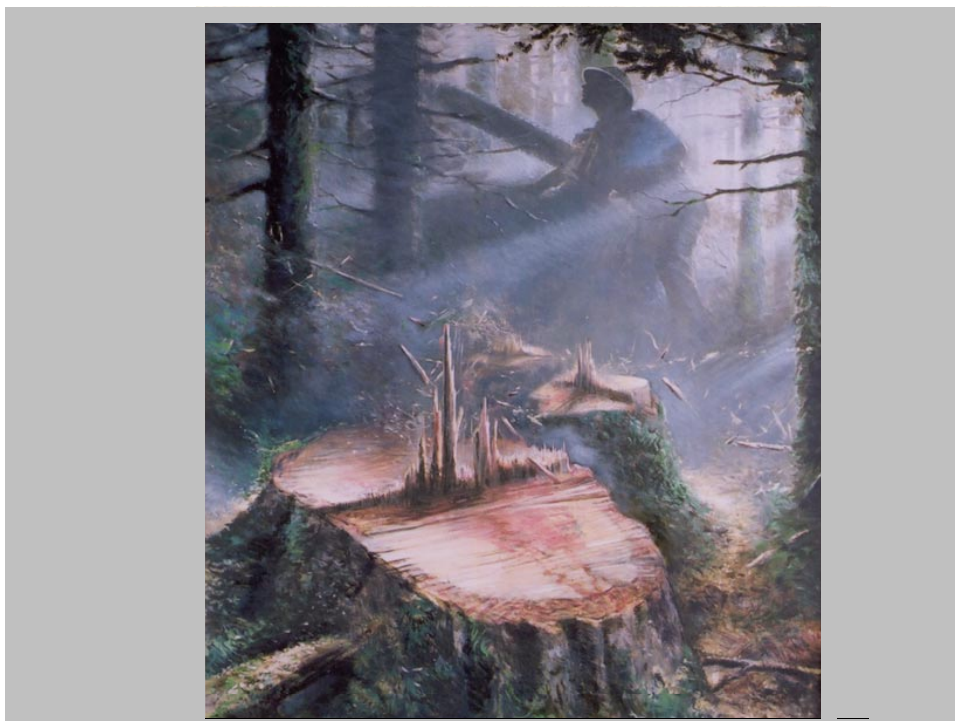
Box 1: Which art image did you like the best?

Predator	32 comments
Beside a Mountain Stream	30 comments
Fire Lilies	20 comments
Day's End	16 comments
Close Up Birch	14 comments
Looking Up	12 comments
Remaining images	10 or fewer comments.

Box 2: Which image did you find most thought provoking?

Predator	65 comments
Untitled	28 comments
Survival	19 comments
Fire Lilies.....	15 comments
Remaining images.....	10 or fewer comments.

Although the Predator image provoked more thought and or reaction than any other image, it was not the best liked award (Box 1, 2). In this category, (Predator and Beside a Mountain Stream were essentially tied. That these two images that image each captured the “appeal” award is useful information. Predator is shown below in Box 3. Beside a Mountain Stream was a vividly colored quilt composed of hand-dyed decorative yarns and threads. These are two very different types of art, representing two very contrasting images which evoked very different responses from the viewers. A dynamic piece (such as Predator) may evoke a lot of comments, but the comments tended to be focused on one or two forestry issues (see below).

Box 3: *Seeing the Forest 2000*, “Predator” by Stev Ominski

The content of *Seeing the Forest* was centered on the 10 issues listed in Table 3. We analyzed the answers to the two open-ended questions and examined the correlation with the issues. Forestry issues were identified 91 times in question 4 (best liked image) and 76 times in question 5 (most thought-provoking image) which amounts to forestry issues being identified 55% of the time for both questions. Thus,

viewers were cognizant of forest issues in general and were able to identify them in the images (Tables 4, 5).

All 10 forestry issues were identified in responses to question 4 (best liked image), whereas recreation and water issues were not identified at all in response to question 5 (most thought-provoking). One could conclude that in art that appeals to viewers, they are able to “see” the issues more frequently than in those pieces which provoked thought, but were not so appealing.

Table 4: Most frequently identified themes for survey respondents answering the open-ended question asking which art image was best liked and why

Theme	n	%
Aesthetic beauty	34	16
Harvest Methods	20	10
Jobs	10	5
Conflict Resolution	10	4
Wildlife Habitat	9	4
Fire Control	9	4
Forest Health	7	3
Recreation Use	6	3
Urban Encroachment	6	3
Water Resources	6	3
Total	91	100

Table 5: Most frequently identified themes for survey respondents answering the open-ended question asking which art image was most thought-provoking and why.

Theme	n	%
Forest Health	25	13
Conflict Resolution	22	12
Harvest Methods	21	11
Aesthetic beauty	11	6
Fire Control	11	6
Urban Encroachment	8	4
Jobs	7	4
Wildlife Habitat	9	4
Recreation Use	6	3
Total	76	100

Because of the strong reaction to the Predator image, we examined the issues that this piece evoked in respondents. In question 4 (best-liked), 16 responses identified at least one forestry issue, with harvest methods being the issue most frequently mentioned. In question 5 (though-provoking), 29 responses identified at least one forestry issue with harvest issues again being the most frequently mentioned. For both questions, conflict resolution, aesthetic beauty, urban encroachment, forest health, and jobs were identified. This image evoked a wide range of responses and

the data confirm that. In addition to the forestry issues, other themes which appeared throughout the responses included:

- Aesthetics which were expressed by comments of personal appeal and/or beautiful images;
- Comments about the art such as style, technique, color, composition, medium, subject or the design of the art;
- Emotion or an affective response including anger, sadness, humor, irony, serenity, or strength evoked by the art;
- Memory or memory evoking comments; and
- Comments about the show itself, including a request to continue the show.

In analyzing the data, we also triangulated answers to the quantitative and qualitative questions. Similar patterns emerged when relating the answers to question 2 (which issues did you see identified?), 4 (which image did you like the best, why?), and 5 (which image did you find most thought-provoking, why?). The issues listed most frequently in comments in the text-based data from questions 4 and 5 were aesthetic beauty, harvest methods, forest health, and conflict resolution. The issues most frequently identified (70%+) in the numeric-based data from question 2 were wildlife habitat, aesthetic beauty, and harvest methods. The first four issues identified in the text-based data and the first four in the numeric data are similar. Finding the congruence between the qualitative and quantitative data supports the goal of targeting content in the show. The data also indicate that forest issues like aesthetic beauty, harvest methods, and jobs are the easiest to see and we did a satisfactory job of including this content in the show.

However, wildlife habitat was the easiest issue to see in the show when reported from the numeric based data, yet was not commented upon as frequently in the open-ended comments. Further examination is needed to determine if that was that because of some factor related to the show locations or the show content. Conflict resolution could be appearing frequently in the text-based data because of the coding structure as it didn't reflect in the numeric responses. The remaining issues, recreation use, water resources, urban encroachment, forest health, and fire control aren't identified as often as the other issues. This could be due to these issues not being representing well in the art or because the images in the show that represented these issues were unclear. Another hypothesis is that the viewing public and the citizens of Oregon don't see these as issues and are not looking for them. In this case, our educational approach needs to be stronger. These are all considerations to be taken into account for the 2002 show.

Discussion

Based upon our experiences with the *Seeing the Forest*, we believe that educational innovations serve a meaningful niche in helping members of an increasingly urbanized society better appreciate the role forests play in their lives. Considerations for future shows include an expanded selection of traveling art designed around

selected themes or important forestry issues. We believe that the show could be productively designed for better penetration into the youth community, and will give consideration to including child art and selection of venues to better reach youth audiences. Extension's 4-H Youth Development Program may offer possibilities for development of targeted activities as part of ongoing projects in natural resources and environmental literacy. In addition, the show content is tightly linked to the results. If the goal is to provoke thought, then thought provoking images like Predator have a place in the show; if the goal is to engage the viewer in conversation, then polarizing images like Predator, may not be the best use of the show's space and focus.

Thus far, the show has engaged audiences in a relatively passive environment, where posted written "asynchronous" exchanges generate little active dialogue. Future settings will be considered where an associated forum may be held to allow for "synchronous", or active, real-time dialogue. Other ways to extend the show to more viewers are being explored including availability over the web where reactions and responses to our key questions could be posted for all to see and consider. Ultimately, the impact of this initiative may assist in development of forestry policies grounded more in understanding and appreciation of important issues rather than emotional and unprocessed reactions.

MAKING PARTICIPATION COUNT FOR LANDOWNERS, MANAGERS AND STAKEHOLDERS

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Abstract

This paper presents the case for Independent, third party forest certification of smaller scale tenures as a mechanism for delivering ecologically sustainable management, and for gaining product access to new markets. A range of options is available to the landowners (Forest Stewardship Council, Australian Forestry Standard, etc.), but what will deliver the best outcomes for all participants?

Landowners need to be sure that the process they engage in will both deliver cost-effective forest product certification and satisfy the requirements of the various stakeholder groupings that have an interest in forest management. Forest managers, planners and certifiers require a clear set of operational guidelines to ensure that they have captured all the elements necessary to demonstrate social, economic and environmental sustainability. Third party interest groups should be included in the management planning process in a way that guarantees ownership of and support for the initiative.

The process of certification can be complex and fraught with difficulties if not conducted properly. However, certification of forest management can be cost-effective for smaller tenures via a range of mechanisms, notably the use of "group certification" whereby costs of certification are borne by a number of landowners managing their lands under a common set of operational principles. This process, along with chain of custody, can be developed in a way that streamlines the extent to which managers, planners and certifiers are involved in the certification process. The paper outlines a new set of criteria and indicators for participation in the forest management process that provides land owners, managers, certifiers and community stakeholders with a clear methodology for this important social aspect of SFM.

The current state of play with current domestic certification initiatives is outlined, and a demonstration model for small-scale plantation/agroforestry that can result in certified forest products within a relatively short time frame is presented.

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Economic significance of certification of forest products

The market for independently certified wood products is growing internationally, and is now an important market-based tool for improving forest management internationally.

There is some evidence to suggest that consumers are concerned as to the origin and environmental claims of wood products and, like retailers, will pay a premium to obtain timbers that are certified.

Producers whose management principles already permit certification are well-placed to benefit from predicted increase in availability of certified timbers.

There are now over 17 million hectares of forests certified under the international Forest Stewardship Council's "Principles and Criteria for Well Managed Forests" (FSC). In Europe, certified timber occupies a large slice of market share in some countries and independent certification has become the basis for the development of national forestry standards (e.g. Sweden).

The UK has developed its own Woodland Assurance Scheme, which will be compatible with the FSC and other standards. Eight hundred thousand hectares are set to be certified under this scheme. UK-based "1995 Plus Group", a buyers group established by 50 wood product retailers and the World Wide Fund for Nature accounted for \$5 billion worth of forest product sales or 40% of all wood products sold in the UK in 1996.

The American situation echoes the European experience. On a national governmental level, the US Forest Service and State agencies are engaged in a process to develop conformity of approaches with Montreal. Independent, third party certification is mostly advocated by NGOs and follows the FSC model, while industry bodies in the main are advocating their own process, the Sustainable Forestry Initiative.

There is growing demand for FSC certified forest products from US markets.

This in turn is influencing US regional enterprises elsewhere (eg Australia) to convert to an FSC certification standard. Some of these processors are sourcing their softwood plantation requirements from State management agencies who are also examining the merits of pursuing FSC certification.

Australian farm forestry could benefit from pursuing C&L. To be cost-effective, there are avenues available to pursue group certification through a number of certifiers including the FSC.

Key Concepts

Sustainable Forest Management

Sustainable forest management (SFM) is an accepted aim of a number of international government agreements that have been developed post-UNCED. Of relevance in the Australian context is the Montreal Process which has developed "Criteria and Indicators for the Conservation and Sustainable Management of Boreal

Forests". The use of such criteria and indicators (C&I) is an accepted methodology for describing, assessing and evaluating a country's progress towards sustainability.

Ecologically Sustainable Forest Management

To maintain and/or restore all species of flora and fauna in their natural patterns of distribution and abundance across their natural range (National Forest Summit, 1999).

Ecologically sustainable forest management (ESFM) is the guiding philosophy for forest conservation and management. This philosophy is founded on a set of basic principles that are an integral part of the Regional Forest Agreement process and are reflected [sic.] Australia's international commitments, the National Forest Policy Statement, State Government Policies and the concerns and interests of stakeholders in the forest" (NSW State Forests, July 2000)

Criteria and Indicators

Criterion: A category of conditions or processes by which sustainable forest management may be assessed

Indicator: A measure (or measurement) of an aspect of the criterion. (Montreal Process, Dec. 1999)

Certification

Certification is a process which in a written quality statement (a certificate) attesting to the origin of raw wood material and its status and/or qualifications following validation by an independent third party (Baharuddin and Simula, 1996 in: Tropenbos, 1997).

Labelling

The provision and control of a physical label providing information to the consumer at the end of an unbroken chain of custody." (Bass, 1996)

Independent, third party certification

There is universal agreement that to deliver a credible label, certification assessments or audits must be carried out by an independent certifier (third-party assessment) and not by the forest owners or managers themselves. Furthermore, once certified, the forests should be monitored regularly (preferably annually) to ensure that management is in accordance with management plans and that required improvements have been carried out. Consultation of all stakeholders should be an essential part of the certification process. (Fern, May 2001)

Agroforestry

The combination of forestry and agricultural pursuits on the same land (Conservation Council of Western Australia, 2000)

Agroforests are defined as complex agroforestry systems which look like and function as natural forest ecosystems, but are integrated into agricultural management systems. Their conception, their management and their economic and environmental qualities, clearly differentiate them from better known "simple" agroforestry associations as alley cropping, intercropping or hedgerow systems... They appear in various forms and imply very different components from a region to another, but all

exhibit the same fundamental ecological, technical and socio-economic qualities, such as soil protection, biodiversity conservation, use of simple techniques and technologies, high compatibility with local knowledge and representation systems, provision of good levels of monetary income, high returns to labour.

(Michon, G. and de Foresta, pp. 52-58)

Plantation

Intensively managed stand of trees of either native or exotic species created by the regular placement of seedlings or seeds (BRS, 1998)

Non-Timber Forest Products (NTFPs)

Non-timber forest products can provide additional income for small forest growers. A wide range of NTFP's are now exploited commercially and include honey, berries and mushrooms (Lloyd, 1999).

Stakeholders

The stakeholder on any issue represents the parties or individuals that the expert source or sources believe are trying to shape the resolution of the issue(s) in question.

Decision Insights, Inc. <http://www.diiusa.com/stakeholders.html> (accessed 25/09/01)

Certifiers, Processes and Standards

Types of Certification Standard

Essentially, there are two types of certification used by the forest industry and these can be grouped around performance- or systems-based approaches.

- **Performance-based management standards** are designed to evaluate whether management practices in the forest itself meet specified ecological and social performance measures, and reduce the impacts of logging.
- **The process or systems-based approach** is designed to evaluate whether systems are in place that allow forest managers/owners to achieve and review targets they have set. Usually, it is the system itself, and not the forest that is assessed to determine the success of the standard (FERN, 2001).

The most well-known and widely accepted non-governmental certification organisation is the Forest Stewardship Council (FSC) formed in 1993. In Europe countries that are signatories to the Helsinki process are seeking to develop third party certification of the Helsinki process, based around "Pan European Forest certification" (PEFC) There are a number of other certification schemes whose status and relationship to other certifying bodies and organisations varies.

Forest Stewardship Council

The Forest Stewardship Council is an international non-profit organisation founded in 1993 to support environmentally appropriate socially beneficial, and economically viable management of the world's forests. It is an association of Members consisting of a diverse group of representatives from environmental and social groups, the timber trade and the forestry profession, indigenous people's organisations, community forestry

groups and forest product certification organisations from around the world. Membership is open to all who are involved in forestry or forest products and share its aims and objectives. (FSC, 20/9/99)

FSC Principles and Criteria.

1. Forest management shall respect all applicable laws of the country in which they occur, and international treaties and agreements to which the country is a signatory, and comply with all FSC Principles and Criteria.
2. Long-term tenure and use rights to the land and forest resources shall be clearly defined, documented and legally established.
3. The legal and customary rights of indigenous peoples to own, use and manage their lands, territories, and resources shall be recognised and respected.
4. Forest management operations shall maintain or enhance the long-term social and economic well-being of forest workers and local communities.
5. Forest management operations shall encourage the efficient use of the forest's multiple products and services to ensure economic viability and a wide range of environmental and social benefits.
6. Forest management shall conserve biological diversity and its associated values, water resources, soils, and unique and fragile ecosystems and landscapes, and, by so doing, maintain the ecological functions and the integrity of the forest.
7. A management plan, appropriate to the scale and intensity of the operations, shall be written, implemented, and kept up to date. The long-term objectives of management, and the means of achieving them, shall be clearly stated. Monitoring shall be conducted, appropriate to the scale and intensity of forest management, to assess the condition of the forest, yields of forest products, chain of custody, management activities and their social and environmental impacts.
8. Management activities in high conservation value forests shall maintain or enhance the attributes which define such forests. Decisions regarding high conservation value forests shall always be considered in the context of a precautionary approach.
9. Plantations shall be planned and managed in accordance with the above Principles. While plantations can provide an array of social and economic benefits, and can contribute to satisfying the world's needs for forest products, they should complement the management of, reduce pressures on, and promote the restoration and conservation of natural forests.
10. Plantations shall be planned and managed in accordance with the above Principles. While plantations can provide an array of social and economic benefits, and can contribute to satisfying the world's needs for forest products, they should complement the management of, reduce pressures on, and promote the restoration and conservation of natural forests.

<http://www.fscoax.org/principal.htm> (accessed 27/08/01)

Australian Forestry Standard

The Australian Federal Government in collaboration with the States is developing an Australian Forestry Standard that incorporates the Montreal C&I, ISO 14000 series, and the Regional Forest Agreements. The Standard is sponsored by Australian Forest growers, Plantations Australia and the National Association of Forest Industries. The initiative falls under the auspices of the Ministerial Council for Forests Fisheries and Agriculture (MCFFA) and the Standing Committee for Forestry (SCF). Internally, it is comprised of a Steering Committee and Technical Reference Committee. The standards setting process is being overseen by Standards Australia. The AFS is likely to audit only to the forest gate and may have no chain of custody or labelling provisions.

Differing Perspectives: Stakeholder Requirements and Views

Landowners

The [Tasmanian Forest Practices] Board fosters a partnership between government and private landowners that recognises the rights of landowners and provides benefits in terms of resource security and streamlined approval processes. In return, private landowners agree to comply with the legally enforceable Forest Practices Code. The partnership also recognises the principle of 'duty of care', through which landowners have agreed to reserve land from logging, up to prescribed thresholds, in order to protect natural and cultural values. The reservation of land beyond the thresholds is deemed to be for community benefit and on this basis is subject to voluntary arrangements or the payment of compensation.

Wilkinson, Graham <http://www.itto.or.jp/newsletter/v11n2/10.html> (accessed 25/09/01)

Timber industry

Views across the timber industry are not uniform, but they generally argue that intergovernmental processes such as Montreal and Helsinki provide the appropriate operational basis for sustainable forest management and hence certification.

In the US for instance, the American Forest and Paper Association has developed its own "Sustainable Forestry Initiative" (AF&PA, 1996).

National industry bodies are not generally in favour of the guidelines laid down by the Forest Stewardship Council, arguing that NGOs have too much control over the FSC (Forests Forever, 6/9/99).

In Australia, the National Association of Forest Industries supports the Australian Forestry Standard and is hostile towards the FSC (<http://www.nafi.com.au> accessed 28/08/01).

Labour organizations

Sustainable utilisation of forests can be achieved with a modest input of capital and technology. But it calls for a high degree of knowledge and skills during planning and implementation. Sustainable and socially acceptable use of forests requires the

following minimum standards, which must be respected in the same way as ecological and forest requirements:

- Comprehensive training and further training of wood and forestry workers.
- Securing adequate occupational safety and health, and accident prevention.
- Employment in permanent and secure jobs.
- The right to form trade unions (freedom of association) and to collective bargaining as laid down in the Conventions No. 87 and 98 of the International Labour Organisation.
- The rights of indigenous people must be respected as laid down in Convention No. 169 of the International Labour Organisation.

These social considerations must be accepted as binding criteria in forest certification schemes....

Each country should take specific measures to protect the forests and the jobs of workers and demand a plan of action including the cooperation and concerted action of trade unions, employers, research institutes, environmental organizations, international organizations and governments.

http://www.ifbww.org/~fitbb/Industrial_Dept/Forest_certification.html (accessed 22/08/01)

Investors

To a greater and greater extent, institutional timber investors are choosing to invest in certification under the aegis of the Forest Stewardship Council (FSC), for their forest investments. While certification is not, at present, a requirement for institutional investment in most parts of the world, its presence or absence affects the required rate of return on investment. In other words, forests with certification are more valuable than those without to many institutional shareholders. FSC is the certification standard best known to such investors; PEFC (Pan European Forest Certification) is building awareness in Europe; and the SFI (Sustainable Forestry Initiative) has been created in the U.S. FSC has the strong advantage of consumer credibility, and a better developed marketing campaign...

Of the various certification options, FSC certification is the most expensive (in both time, management attention, and money), certification schemes such as PEFC and SFI less expensive, and no certification the cheapest...

Our experience has been that FSC certification does not impair the basic flexibility of our operations, given that our environmental standards are fairly strong to begin with. The other certification standards have been better tailored by the participants to allow maximum flexibility of operations, with perhaps some sacrifice of credibility to a wider audience.

(Greger, 2000)

Environmental Non –Government Organisations (ENGOS)

NGOs remain unconvinced that intergovernmental processes will provide sufficient performance based methodologies for demonstrating sustainable forest management, and that certification schemes derived from such processes are not inclusive of relevant stakeholders (Ozinga, 20-4-99).

Subsequent to its May 2000 statement regarding independent third party forest product certification, the National Forest Summit has agreed to develop a national standard for plantation certification.

This follows from the Summits previous statements opposing the clearing of native forests and woodlands for plantation establishment and supporting the maximum commercially feasible use of existing plantations – under ESD principles – to take the pressure off native forests.

The Summit is now developing ecologically sustainable guidelines for the establishment and management of plantations and is considering the circumstances under which certification would be appropriate. (17th National Forest Summit Media Statement, 06/11/2000)

Indigenous Peoples' Organisations (IPOs)

Indigenous people remain alienated from stakeholder processes due to a lack of recognition of their prior use of land and a failure to address the spiritual, cultural and customary values of forests. (EU Forest Watch March 1999. <http://www.itv.se/boreale/samieng.htm>)

To date, key representatives of Aboriginal and Torres Strait Islander people in Australia have not been involved in the Australian committees for forest certification and labelling. I am certain that similar situations hold in other nations. That is wrong and needs to be fixed in the guidelines and criteria being developed today. The Committees in Australia appear to be industry run and based on a model of self-regulation by the industry. That model would be difficult to expect to achieve best practice in delivery of cultural and social needs where a corporate bottom line is paramount. One only needs to look at industry regulation in the media, telephone carriers, and the banks to see that social needs are very quickly lost in the dust left behind in the pursuit of profits and shareholder gains. Overseas, a large number of nations handle forest certification and labelling by Government regulation with significant community and NGO input, rather than leaving it to the ravages of the corporate bottom line.

(Dillon, R., Commissioner, "Helping us hear the earth – An indigenous perspective on forest certification and Forest product labelling", Aboriginal And Torres Strait Islander Commission, October 2000)

Forest Contact Groups

These are forest users who come from a range of sectors, but are linked in that they all make some use of forest products (Stephens, Michael, AFFA, *pers. comm.* 19/08/91).

Uses may be extractive (beekeeping, flowers and other NTFPs) or non-extractive (bushwalking, four-wheel driving, horseriding, etc.).

What Might Agroforestry certification Look Like?

Forest Management for Environmentally-Preferred Markets

A single consistent, and universally recognised set of ecological principles is not available but there are a number of common themes in most theories (Pilarski, 1994, pp. 32-38):

- Restoration: wherever possible, forestry should aim to benefit the natural forest by increasing diversity in damaged ecosystems. Conservation - and where degraded, enhancement - of biological diversity should be guiding principle. A further assumption would be the replanting of previously cleared forest ecosystems with indigenous stock.
- Old Growth: most views hold that while it may be theoretically possible to harvest old growth, there should be a moratorium or ban due to current industrial excesses;
- Timber Harvest Methods: clearcutting should be greatly reduced or banned. Principles based around single-tree selection or "natural selection ecoforestry" would remove a small part of the forests' volume, leaving the best. The forest is thinned from below rather than all-out canopy removal. This is different from classic selective logging which "highgrades" or "thins" leaving a one-aged forest. Even-aged forestry would be replaced by a greater diversity in age classes and species.
- Reforestation: the emphasis should again be on mixed, indigenous species, with ongoing maintenance and care rather than once-off chemical solutions.
- Protection of water, soil and habitat: forestry in riparian areas or catchments should not take place. Large numbers of roads should be decommissioned. New roads should follow contours and be narrower, with an emphasis on the use of smaller machinery with less compacting of soils. Burning of slash should be replaced with mulching techniques, while prescribed burning for fuel reduction purposes should be based around protecting residential areas rather than broadscale burn offs which encourage fire-loving species. Chemicals should be abandoned in favour of alternative methods.
- Non-timber products: a recognition that a forest can provide more than timber; medicines, nuts, mushrooms and so forth.
- Alternatives to wood products: forests should not necessarily be the only fibre source for the pulp and paper industries.
- Plantations: Less monoculture, more diversity. Planting and logging methods should avoid the "broadacre" approach. Cleared areas should be smaller and slash should be retained. Chemical use should be avoided (Greenpeace, 1994. pp.31-34).
- Reserves: A genuine reserve system is needed to counterbalance all areas harvested.

- Community participation: genuine consultation of indigenous peoples, community groups and environmental NGOs (FSC, 1996).
- Assessment and monitoring: a comprehensive methodology is required to examine all areas managed for wood production.

Group Certification

Group certification not only works for small forest owners, but was designed for exactly that type of situation so it should be no problem to make it work. In essence what is needed is:

- A group manager - this can be a person, a company, an association etc. but has to be legally recognisable (in order to sign a certification contract on behalf of the group)
- A group policy on the type of management required from group members – this is basically an interpretation of the FSC standard for the specific situation of group members and into a language which is familiar and clear to members (which the language of standards often is not).
- A system for joining the group. This usually involves filling in some forms (forest size, location, production, special features), signing a declaration of intention to manage the forest according to the FSC P&C (or the group requirements if there is still suspicion of the FSC itself) in the long term, and a visit by the group manager to ensure the applicant really is meeting all group requirements.
- A system for ongoing monitoring of members. This can be done by the group manager or members can monitor each other. This latter can work quite well due to the way the certificate is managed (see below)
- A system for requiring improvements from members and throwing members out of the group.
- Record keeping.

Once the above is in place the certification body does the assessment in two parts:

- An assessment of the group management system run by the group manager.
- An assessment of a random sample of group members.

The result is that it is much cheaper per member than individual certification. The formation of a group also helps with communication of information, training, support and improvement. The disadvantage is that if, when the certification body visits, one group member is not complying, then the whole group is affected. This is why it can work OK to get group members assessing each other because they all know that if they say someone is OK who isn't, and this is picked up by the certification body, then everyone risks losing the certificate.

(Nussbaum, Ruth, SGS Forestry, email to the researcher, 25/9/99)

Working plan for a research trial of relevance to small-scale agroforests and plantations

The author of this paper is developing a certification trial methodology (and timetable) that is structured to emulate what would be required if the landowner were seeking to have their plantation management audited by an independent third party certification agency. The trial itself is not part of a formal certification initiative, but could form the basis of further pursuit of certification based around that management methodology. The scale of the research trial site is predisposed to being part of a larger collection of properties that could be certified under group certification procedures should the trial prove successful.

1.Scoping: Forest Assessment and Stakeholder Consultation
1.1 The area will be assessed for its suitability for harvesting including, soils, aspect, catchment value and biodiversity. Initial removal of a small number of stems will be required to test the suitability of the wood derived from the site for processing.
1.2 Relevant stakeholders will be identified and invited to participate in the planning process to ensure that environmental, cultural and social values have been taken into account during the scoping process. These would include representatives from environmental, indigenous and local community groups (eg Landcare).
2.Management Planning Process
2.1 The proposed trial management will be re-examined in the light of any developments and issues identified by stakeholders.
2.2 A management plan will be drawn up in consultation with stakeholders and covering all relevant issues.
3.Silvicultural and Ecological Considerations
3.1 External advice will be sought from silvicultural and ecological experts as to the merits and problems of the management plan,
3.2 which if necessary, will be emended accordingly to suit the environmental and stakeholder requirements.
4.Harvesting and production
4.1 All forest products removed from the site will be processed at the local mill (belonging to the landowner) and
4.2 will be quarantined to ensure "chain of custody" from the research site.
4.3 The wood products derived from the trial would not be sold on the open market. Instead they would be used for a range of experimental purposes and to gauge the interest of potential

buyers should the landowner seek to gain accreditation in the future.
5. Monitoring, assessment, reporting
5.1 Monitoring for environmental impacts will occur immediately after harvesting on an ongoing basis
5.2 The strengths/weaknesses of the project will be analysed and documented
5.3 The whole project will be written up and a proposed nationally-applicable management methodology put forward.

Meaningful Participation

Certification and labelling (C&L) of forest products is an important market-oriented outcome for participants in the SFM debate. Successful stakeholder participation in forest management is recognised as an essential component of certification schemes. The 1998 International Union of Forestry Research Organisations acknowledged that there is an urgent need to:

obtain consensus on how scientific capability and stakeholder expectations can be brought together in pursuit of ongoing improvement in forest management, and to identify future R&D priorities on sustainability criteria and indicators (IUFRO, 1998)

Internationally, a number of certification and labelling schemes already in place are having a significant impact in the market as consumers shift to environmentally-preferred forest products. Therefore it will be increasingly more important to have measurable C&L of successful participation. Such international trends will inevitably be felt by the forest products industry in Australia, as opportunities for new niche markets will open and the demands of some traditional markets will change.

The use of C&L to reflect stakeholder participation will be an essential tool for measuring the success of the social component of SFM. The extent to which the involvement of forest users in planning for sustainable management can be quantified will become increasingly important for developing systems that meet the needs of all stakeholders.

Mechanics of Participation

Inclusion and integration of participants

The aim of good mechanism should be to develop an educated, informed, active and involved stakeholder base to enable effective and cooperative participation in the forest certification process.

Active participation of stakeholders who have a high degree of ownership of a project from the beginning is the most effective way of ensuring support. The target groups are geographically and socially dispersed. The forest certification process is complicated

and confusing and mechanisms incorporating the needs of the target audiences are most likely to be retained and incorporated into subsequent decision making processes.

Types of Non-Government Stakeholder

Non-Government Organisations

Local

This sector is intimately associated with the rights and wrongs of forest management on the ground, and consequently has a wealth of useful knowledge on management. These stakeholders relate to local government and local catchment areas and are a source of knowledge for other NGOs

Regionallsub-national/State

These groups are seeking to have influence on the State or regional level and interact with State Government and government agencies. They also have national interests in terms of the implication of federal government policies on forests (as do local stakeholders).

This sector is based in the capital cities and rural towns. It is comprised of a wide range of groups with a very diverse set of opinions. Group dynamics are lively in this sector and need to be well managed for negotiations amongst parties to succeed.

National

These groups are driven by a different set of agenda. They are out there talking face to face with government ministers and prime ministers. Some of them are capable of organising huge numbers of people to persuade the politicians of their intent. Compared to other stakeholders they have potentially wider political and social leverage. Their membership base is generally much larger than the other types of stakeholder.

Role of certifiers

The researcher's investigations into certification worldwide indicates that some certifiers come into a country with a pre-arranged "participation methodology". They arrive at the behest of a company usually, and proceed to implement their methodology, largely at several removes from the "stakeholder coalface".

This kind of approach is not always likely to be successful. Later, as more and more of these processes unfold, some key stakeholders begin to feel disempowered. Most researchers would agree that there has been some backlash to perceived failings of the FSC for instance in this regard. It is the "dance" that happens long before the actual certification process kicks off that is the most significant period. Many companies and certifiers in good faith get involved in a process that they think will work, then wonder why the process collapses.

Ultimately, the various stakeholders must have a degree of ownership in crafting the process from the outset. Circulating two page forms for people to tick boxes "yes/no/don't know", informing them they have 28 days to do so, and the next stage will commence (as is the case with some methodologies) is a recipe for disaster. Stakeholders immediately feel like they are dancing to someone else's tune.

- Preliminary assessments: currently, a company hires a certifier who then

“consults” with “stakeholders” - instead the certifier must concentrate on developing a process for scoping that is inclusive and driven by stakeholders from the outset. There is too much financial/ethical conflict of interest with the current status quo. NGOs (and various other stakeholders, especially Indigenous people and community interests) are already “unequal partners” from the outset, externalised from a key component in the certification process.

- Participation processes: a universal participatory methodological framework needs to be adopted by all certifiers, with the stated aim of identifying, including and bringing all stakeholders together to develop a mutually-owned participation process that leads to a consensus of all parties on a certification standard. Certifiers have too much power, acting according to a pre set methodology and justifying this by insisting this process has stood them in good stead elsewhere and that they know best, even if they are new to a region/country.
- Management planning processes are required in which stakeholders not certifiers drive the process. The people who are affected for good and bad by forestry activities may have a lot to contribute. The key issue is to integrate these solutions. The role of the certifier is to facilitate, monitor and record this process to ensure all parties have equal access to decision making fora.

How Might Cross-sectoral Stakeholder Participation in the Certification Process be Measured?

These differing community and industry demands over resource use and access clearly need to be resolved in order to achieve SFM. Agencies involved in the SFM debate have begun to examine what components should be included in C&I for assessing stakeholder involvement in processes for achieving SFM.

Initial research has focussed on developing countries in the tropical and sub-tropical zones. In order to develop participatory C&I of universal relevance, there is a need to expand on existing research and develop a core set of C&I that can also be applied to developed countries and temperate and boreal forest ecosystems. Any new criteria and indicators developed will need to be capable of moving beyond the existing constraints imposed on the implementation of SFM identified in this research. The existing power relationships between stakeholders will be a major factor influencing the development of C&I establishing effective participation.

The use of C&I to reflect stakeholder participation will be an essential tool for measuring the success of the social component of SFM. The extent to which the involvement of forest users in planning for sustainable management can be quantified will become increasingly important for developing systems that meet the needs of all stakeholders.

Criterion “X”

Participatory framework for cross-sectoral and multi-level involvement in sustainable forest management and planning

The intent of this criterion is to ensure that forest management is carried out within a management systems framework that includes stakeholder participation in

developing the forest management performance criteria and operational standards. The management planning framework is to be flexible and adaptable to stakeholder participation at all levels, scales and forest types, and provides for continual improvement in participation based on the key elements outlined in X.1-X.3 below

National Indicator: National-level stakeholders, where relevant, participate based around the elements outlined below.

Regional Indicator: Regional (state and local) stakeholders, where relevant, participate based the elements below.

Rationale: It is widely acknowledged that the role of stakeholders in forest management planning is an essential component of SFM. Such participation is a significant component of the social aspect of forest management.

CRITERION	INDICATORS	GUIDE TO IMPLEMENTATION
<p>X.1</p> <ul style="list-style-type: none"> The extent to which stakeholder participation in Forest management planning is undertaken in a systematic manner <p>Rationale Participation occurs in a manner that is consistent across regions, forest types and tenures, enabling assessment of participation.</p>	<p>Indicators</p> <ol style="list-style-type: none"> Stakeholders/local populations are identified in a consistent manner. Stakeholders are involved in the development of plans. Stakeholders' contributions are incorporated into the management planning processes and operational guidelines. Processes are in place to check that stakeholders have been included and corrective action is taken to incorporate those overlooked. The extent of participation is assessed. <p>Type of evaluation Document-based</p> <p>Basis of assessment That methods are in place to fulfil reporting against indicators 1-5</p> <p>Sources of information Policy and procedural</p>	<p>Stakeholders are included on all relevant levels by:</p> <ul style="list-style-type: none"> Identifying key players; Seeking advice from participants as to who else should be included; Public announcements seeking stakeholder input; Ensuring adequate representation at all relevant fora of all relevant participants; <p>Sources of information Media, community directories, personal interviews.</p>

	documentation Updating and monitoring Periodic checking for changes in stakeholder sectors and their incorporation into the participatory processes.	
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CRITERION	INDICATORS	GUIDE TO IMPLEMENTATION
<p>X.2</p> <ul style="list-style-type: none"> The extent to which forest managers develop an educated, informed, active and involved stakeholder base to enable effective and cooperative participation in the forest certification process <p>Rationale Managers and agencies are able to demonstrate that they have engaged stakeholders in the forest management planning process</p>	<p>Indicators</p> <ol style="list-style-type: none"> Stakeholders/local populations participate in forest management. <ol style="list-style-type: none"> Effective mechanisms exist for two-way communication related to forest management among stakeholders. Forest-dependent people and company officials understand each others plans and interests. Forest-dependent people/stakeholders have the right to help monitor forest utilisation. <ol style="list-style-type: none"> Conflicts are minimal or settled. <p>Responsibility is assigned for establishing, implementing and maintaining a systematic approach to participation in relevant forest management performance criteria and requirements;</p> <p>The organisation/owner has capacity to establish, implement and maintain stakeholder participation methodologies;</p> <p>There is a process whereby staff/employees/operators are made aware of their responsibilities and other requirements;</p> <p>There is a process whereby commitment to participatory</p>	<p>The Policy could include a statement on:</p> <ul style="list-style-type: none"> the core values and beliefs and mission of the manager in relation to pursuing stakeholder participation under the AFS; an awareness of and commitment to continual improvement in participatory processes; compliance with relevant environmental regulations, laws and other criteria to which the manager subscribes; requirements of and communication with interested parties; the key objectives and targets of participation in relation to the development of forest management performance criteria and requirements; <p>Scope of the policy:</p> <ul style="list-style-type: none"> commensurate with nature, scale of ownership and environmental aspects [define] of the activities of the organisation so that it is achievable; brief and written in plain English or translated

	<p>planning is established, reinforced and communicated to employees/staff/ operators</p> <p>Type of evaluation Document- and field-based</p> <p>Basis of assessment That a participatory process for developing forest management performance criteria and requirements is in place; That there is ongoing development of awareness, personal commitment, motivation and leadership from top management or owner to systematic management and continuous improvement in environmental performance.</p> <p>Sources of information Policy statement</p> <p>Updating and monitoring Periodic checking for changes in legal and other requirements and their incorporation into the participatory processes.</p>	<p>where English is a second language; publicly available; include a consultative mechanism provided to consider the views of interested parties, where appropriate, to broaden the information and decision making base; Relevant to all levels of stakeholder participation (national, regional, local, forest management unit) Interested parties may include: neighbours; local councils; regulatory authorities; unions; employees; environmental non-government organisations; community groups; Indigenous Peoples' organisations Recreational users Forest users</p> <p>Sources of information Forest Management Performance Criteria and Requirements; Academic research on participatory processes All levels of Government, including Regulatory Authorities, Government Agencies and associated web sites and informative material; AS/NZS ISO 14001:1996 Environmental Management Systems – Specification with guidance for use; Other forest certification agencies' principles, criteria</p>
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		<p>and indicators</p> <p>Organisation's values, beliefs and strategic plans;</p> <p>Industry Associations, Professional Institutions and Groups;</p> <p>Professional services.</p>
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CRITERION	INDICATORS	GUIDE TO IMPLEMENTATION
<p>X.3</p> <p>Encourages forest managers and or/relevant agencies to:</p> <p style="padding-left: 40px;">a) facilitate, monitor and record participation to ensure all parties have equal access to and ownership of the decision making fora;</p> <p style="padding-left: 40px;">b) commit to openness transparency and access to information to enable stakeholders to participate at all levels and in all fora where decisions regarding forest policy, management and operational guidelines are developed.</p> <p>Rationale</p> <p>Forest managers/agencies provide stakeholders with the opportunity to have input into the forest management planning processes</p>	<p>Indicators</p> <p>1. Materials collected and generated during all stages of planning are made available to all participants.</p> <p>2. <i>Participatory processes foster increased levels of community participation in landscape mapping and planning, with all stakeholders able to participate on an equitable basis;</i></p> <p>2.1 <i>participatory planning contributes to the social, cultural and long-term economic wellbeing of the community, especially local and Indigenous communities and traditional owners;</i></p> <p>3. <i>stakeholders have open access to all relevant information and data including from industry and Government agencies.</i></p> <p>4. <i>evidence of Social, environmental, economic and heritage impact assessment;</i></p> <p>5. <i>Evidence that stakeholders have been included in all fora associated with forest policy, management and operational guidelines.</i></p> <p>Type of evaluation</p> <p>Document- and field-based</p> <p>Basis of assessment</p> <p>A survey undertaken will determine who should participate, and key persons not captured by the survey will also</p>	<p>Adequate resourcing is required to identify, inform and enable all relevant local, regional, national and sectoral stakeholders to participate in the certification process, in particular Traditional owners, from the outset.</p>

	<p>be contacted. It is essential that the selected group of stakeholders represents as full a range of views as possible;</p> <p>All "levels" of participants must be able to claim ownership of the process; no grouping with a legitimate and representative mandate can be alienated if the process is to succeed</p>	
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FORESTRY EXTENSION'S ROLE IN STEWARDSHIP PLANNING FOR WOODLAND OWNERS.

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Abstract

Forestry Extension has a major role in helping woodland owners develop stewardship plans for their properties in Oregon. Involvement has ranged from helping develop uniform guidelines for stewardship plans written under a number of programs, to teaching landowners to write their own stewardship plans, to training certifiers with the Oregon Tree Farm System on developing stewardship plans for landowners.

The Oregon State University (OSU) Extension Forestry Program and the Oregon Department of Forestry (ODF) Service Forestry Program jointly developed Stewardship Planning Guidelines that are applicable to four landowner programs.

These guidelines were used in teaching OSU Extension's Resource Management Planning (RMP) Short Course. This 14-module course is designed to help experienced landowners develop a Forest Stewardship Plan for their woodlands using a template developed from the guidelines as a base. Plans developed in this course can be certified by ODF Service Foresters as official Stewardship Plans and qualify the landowner for participation in the federal Stewardship Incentives Program.

OSU Extension Forestry is also responsible for training Oregon Tree Farm System (OTFS) certifiers on a variety of topics including using the uniform Stewardship Planning Guidelines with landowners to write a management plan that meets the requirements for OTFS certification. Trained OTFS certifiers include a range of consulting, industrial, service, extension, public, and retired foresters.

Thus Extension Forestry in Oregon is actively involved in woodland owner stewardship planning by helping to develop uniform guidelines, by training landowners to write their own management plans, and by training certifiers for the OTFS to assist landowners in their plan writing. We believe that woodland owners with stewardship plans are able to make better-informed decisions regarding their forestlands.

Introduction

Woodland owners are an important part of the forestry community in Oregon. This group of forest owners, alternatively labeled Non-Industrial Private Forest Landowners, Family Forest Landowners, or Woodland Owners, collectively own about 16 percent of the commercial forestland in Oregon. Due to the large amount of

federal forestland in Oregon, the thrust of federal land management toward preservation rather than timber harvest, and the geographic juxtaposition of family forestlands between the population centers and the industrial forests, the management of these family forestlands is more important than their acreage alone might indicate.

Oregon woodland owners are fortunate to have two major sources of publicly provided technical and educational assistance. The Oregon Department of Forestry's Service Forestry Program provides one-on-one technical assistance to woodland owners and is the gateway to financial assistance available from state and federal programs. Service Forestry consists of 20 field-based Service Foresters and 11 headquarters-based support specialists. Oregon State University's Extension Forestry Program provides informal education programs to woodland owners using workshops, short courses, field tours, publications, newsletters and other means. OSU Extension Forestry consists of 16 county-based Agents and 12 campus-based subject matter specialists. Together these two programs of Service Forestry and Extension Forestry make up a strong support systems for family forest landowners.

A vibrant community of private Consulting Foresters also provides technical and educational assistance to Oregon's woodland owners. Assistance from consulting foresters is often related to commercial activities such as timber harvest whereby the woodland owner receives income and can justify the consulting fee.

Forest management planning has long been part of the decision-making process for industrial and federal forestlands but has been done to a lesser degree on family forestlands. Increasing complexity of regulations and incentive programs relating to forest management and the belief that lands under a management plan are likely to be more actively managed than those not under a management plan have led to an increased emphasis on management planning by Extension Foresters and Service Foresters.

The Stewardship Incentives Program (SIP) is a major source of federal financial assistance to woodland owners. SIP is administered by state Service Foresters and includes a 50% cost share for activities such as tree planting, thinning, pruning, fertilization, soil and water protection, fish and wildlife habitat improvement, and recreation. Before management activities can receive financial assistance, they must first be described in a Stewardship Plan that must be approved by the local Service Forester. Writing of Stewardship Plans by consulting foresters is eligible for cost sharing at a 75% rate under SIP. The evolution and acceptance of the Stewardship Incentives Program has led to increasing use of forest management planning by woodland owners and the acceptance of the name Stewardship Plans for these forest management plans.

Extension Forestry has a major role in helping woodland owners develop stewardship plans for their properties in Oregon. Involvement has ranged from helping develop uniform guidelines for stewardship plans written under a number of programs, to teaching landowners to write their own stewardship plans, to training

certifiers with the Oregon Tree Farm System on developing stewardship plans for landowners.

Stewardship Planning Guidelines

A team representing the Oregon State University (OSU) Extension Forestry Program and the Oregon Department of Forestry (ODF) Service Forestry Program jointly developed Oregon Forest Stewardship Planning Guidelines that are applicable to four landowner programs.

- A. **Forest Practices Stewardship Plan & Agreement (FPSP&A)** – The basic criteria for a Forest Practices Stewardship Plan are set in legislation and administrative rules. The Forest Practices Stewardship Plan is required for a landowner to receive a Stewardship Agreement. The agreement focuses on Forest Practices Rules requirements and allows the landowner to implement the Forest Practices Rules as a voluntary alternative to traditional mechanisms of operation planning and review, inspection, and enforcement. The agreements are only issued to landowners who demonstrate compliance with the Forest Practices Rules through their Stewardship Plans and their past management. Landowners with agreements can operate with less direct control by Forest Practices Foresters.
- B. **Forestry Assistance Stewardship Plan (FASP)** – A certified stewardship plan is required for a landowner to qualify for participation in the Stewardship Incentives Program (SIP). This program is designed to provide federal financial incentives to assist family forest landowners in defining and meeting their management objectives while protecting other natural resources on their properties. The three main objectives of the SIP program are to help landowners meet integrated resource objectives as indicated by development of a stewardship plan, to coordinate agencies and groups working with landowners and to fulfill the goals of the Oregon Plan for Salmon and Watersheds by enhancing riparian areas and water quality.
- C. **Resource Management Planning Stewardship Plan (RMPSP)** – The Resource Management Planning (RMP) program is an OSU Extension Forestry training program designed for landowners who are aware of basic forest resource concepts and wish to develop a resource management (stewardship) plan. The program guides landowners through the preparation of a stewardship plan for their forest property including developing objectives, constraints, a resource inventory, and an action plan. The landowner who completes the RMP training program and develops a stewardship plan may wish to take further training and become a Master Woodland Manager. Stewardship Plans developed through the Resource Management Planning program should qualify the landowner for participation in the Stewardship Incentives Program and the Oregon Tree Farm System.
- D. **Oregon Tree Farm System Stewardship Plan (OTFSSP)** – The Oregon Tree Farm System's purpose is to ensure that the excellence of the American

Tree Farm System is maintained in Oregon. Volunteer professional resource managers inspect and certify tree farms, but landowners must provide a management plan. These guidelines were used to develop the Oregon Forest Stewardship Plan Template. The Oregon Tree Farm System endorses the use of the template as meeting the requirements for the management plan required to be a certified tree farm.

Although each of these four programs requires a management or stewardship plan, they did not initially use the same language or format for planning. Landowners who wished to take advantage of more than one of these programs were typically required to have multiple management plans for the same property to qualify.

The Oregon Forest Stewardship Planning Guidelines provide a common vocabulary for planning, a common framework for planning and a set of common components to be included in Stewardship Plans. Stewardship Plan components included in the guidelines and templates are shown in Table 1.

In addition to developing the guidelines, the team developed the Oregon Forest Stewardship Plan Template for use with the Oregon Forest Stewardship Planning Guidelines. The template provides a fill-in-the-blank approach to writing a Stewardship Plan. Specialized versions of the template were developed for the Resource Management Planning Short Course and the Oregon Tree Farm System. The guidelines and the templates are available as hard copy and as electronic versions.

Table 1. Plan components required by stewardship plan types.

Component / Stewardship Plan Type	FPSP&A	FASP	RMPSP	OTFSSP
A. Cover Page	X	X	X	X
B. Plan Introduction	X	X	X	X
C. Landowner Objectives	X	X	X	X
D. Map/Woodland Description	X	X	X	X
E. Forest Vegetation		X	X	X
F. Wildlife/Fish Habitat	X	X	X	X
G. Soils	X	X	X	
H. Roads	X	X	X	X
I. Water Resources	X	X	X	X
J. Forest Health		X	X	X
K. Fire Plan		X	X	
L. Agro-forestry/Range				

M. Archeological & Cultural Resources		X	X	
N. Recreation		X	X	X
O. Aesthetic/Scenic Resources		X	X	X
P. Threatened and Endangered Species	X	X	X	
Q. Forest Practices Rules	X	X	X	X
R. Assistance		X	X	
S. Tax and Business Management		X	X	
T. Resource Situations, Management Recommendations & Priorities	X	X	X	X
U. Additional Sections for FPSP	X			
V. Forest Practices Stewardship Agreement	X			
W. Business & Tax Supplement				
X. Signature Page	X	X	X	X

A workshop on use of the Oregon Forest Stewardship Planning Guidelines and templates was taught in January 2001 for Service Foresters, Extension Foresters, and Consulting Foresters. The team used input from attendees at this session to modify the guidelines and template before final publication and widescale distribution.

Landowners who want to participate in more than one of these programs are encouraged to develop a single stewardship plan that will meet the guidelines of all the programs they want to participate in.

Table 1 shows plan components that are required for each plan type. Landowners and plan writers are encouraged to address each component in every plan wherever practical. A plan being written for one purpose can be amended in the future, if more components are needed for the other program.

Resource Management Planning Shortcourse

The Oregon Forest Stewardship Planning guidelines were used in developing and teaching OSU Extension Forestry's Resource Management Planning (RMP) Shortcourse. This 14-module course is designed to help experienced landowners develop a Forest Stewardship Plan for their woodlands using a template developed from the guidelines as a base. Plans developed in this course can be certified by ODF Service Foresters as official Stewardship Plans and qualify the landowner for participation in the federal Stewardship Incentives Program.

OSU Extension Forestry has long included elements of management planning in its Basic Forestry Short Course that is taught nearly every year by each Forestry Extension Agent through out the state, reaching thousands of Oregon woodland

owners over the years. Management planning has also been central to the training of Master Woodland Managers who develop management plans for their woodlands as they work to become volunteers for Extension Forestry.

Stewardship Planning Trainings for woodland owners have been taught in Montana and Washington State for several years as mainstays of their Extension Forestry programs. OSU Extension Foresters used these programs as models, but developed a unique program that made use of OSU's unique network of Forestry Agents and Specialists and fit the program within the framework of other woodland owner education programs including the Basic Forestry Short Course and the Master Woodland Manager training.

The Resource Management Planning curriculum consists of 14 modules developed by teams of Extension Agents and Specialists. Each module consists of classroom lectures and field exercises to give woodland owners the background and skills necessary to develop their own Stewardship Plan using a template developed from the Stewardship Planning Guidelines. The curriculum includes PowerPoint presentations, lecture scripts, handouts, datasheets, and worksheets with instructions for classroom and field exercises. The idea is to contain enough background information and detail in the curriculum that an Extension Agent who is a generalist can use the materials to teach the entire 85-hour course. However, they are encouraged to draw on other Agents and Specialists as fellow instructors when possible.

RMP Modules include the following:

1. Introduction to Management Planning, Mapping, Soil Survey & Aerial Photos;
2. Sources of Assistance;
3. Record Keeping & Taxes;
4. Forest Ecology & Silvics;
5. Reforestation;
6. Pest Management & Fire Protection;
7. Inventory Methods;
8. Water Resources;
9. Access, Harvest Planning, Erosion Management, & Soils;
10. Fish, Wildlife & Riparian Management;
11. Silviculture & Density Management;

- 12. Marketing Timber Products;
- 13. Recreation, Cultural, Agro-Forestry & Scenic Resources; and
- 14. Management Decisions & Plan Finalization

The Resource Management Planning Curriculum was pilot tested in April & May 2001; was revised in June & July 2001, and the revised version is being field tested in August – October 2001. Future plans call for it being taught in all Oregon counties served by OSU Extension Forestry. The Basic Forestry Short Course is a prerequisite to RMP, which will become a prerequisite for Master Woodland Manager training.

A specialized Oregon Forest Stewardship Plan Template provides the basis for Stewardship Plans developed by participants in the RMP short course and as shown by the module list, provides the skeleton that holds the course together. As each module is taught, a piece of the Stewardship Plan is developed, so that when the course is finished, the plan is complete.

Participants in RMP courses are encouraged to have their plans certified by their local Service Forester as official Stewardship Plans under the Stewardship Incentives Programs. They are also encouraged to have their properties certified under the Oregon Tree Farm System using their newly developed plans as the basis for certification.

Oregon Tree Farm System

Certification of forestland and land management has become a major issue facing private forest landowners in the U.S. and throughout the world. The American Tree Farm System began in 1941 as a way of recognizing the outstanding forest management being done by private landowners. The standards espoused by the American Tree Farm System have been raised over time, as public expectations of private forest management has increased. The Tree Farm System has asked forest owners to have a forest management plan for at least the last 15 years.

In the past 5 years, the American Tree Farm System has evolved to be recognized as a Certification System. This involved the development of formal standards, guidelines and performance measures which tree farmers and their lands must meet in order to be certified under the system. One of the standards and guidelines involves practicing sustainable forest management. The main performance measure that must be met to satisfy this standard and guideline is to have an acceptable management plan for the property.

The Sustainable Forestry Initiative (SFI) of the American Pulp and Paper Association is the major Certification System endorsed by the U.S. forest products industry. Recently the SFI has recognized the American Tree Farm System as meeting its criteria of management. SFI certification encourages forest products companies to

buy timber from certified sources. The American Tree Farm System is rapidly becoming the certification system of choice for woodland owners.

The Oregon Tree Farm System is the state division of the American Tree Farm System. The Oregon Tree Farm System has recognized the Oregon Stewardship Planning Guidelines and associated Oregon Tree Farm Stewardship Plan template as a recognized and preferred system for developing management plans for member's properties.

OSU Extension Forestry is responsible for training Oregon Tree Farm System (OTFS) certifiers on a variety of topics including using the uniform Stewardship Planning Guidelines with landowners to write a management plan that meets the requirements for OTFS certification. Trained OTFS certifiers include a range of consulting, industrial, service, extension, public, and retired foresters. In addition to certifying tree farms, OTFS certifiers assist landowners in developing rudimentary Stewardship Plans and teach workshops in conjunction with OSU Forestry Extension on using the OTFS Stewardship Planning Guidelines and template.

Conclusion

Extension Forestry in Oregon is actively involved in woodland owner management planning by helping to develop uniform guidelines, by training landowners to write their own management plans, and by training certifiers for the OTFS to assist landowners in their plan writing. We believe that woodland owners with stewardship plans are able to make better-informed decisions regarding their forestlands. We believe that Extension's role in enabling better forest management planning is leading to improved decision making and land management by Oregon's woodland owners.

CONSOLIDATING EXPERIENCES FROM TRAINING AND CAPACITY BUILDING IN FORESTRY EXTENSION: TRANSLATING LESSONS INTO DESIGN FEATURES IN UGANDA.

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Abstract

The ultimate aim of training and capacity building is to improve performance through change in attitude and enhancement of knowledge and skills. Training and capacity building in forestry extension are part of the overall national education and manpower or human resources development. To be effective, these two should deal with the dynamics of both physical/biological and socio-economic aspects of forestry in the country.

Despite the need for forestry extension in Uganda being expressed in varying degrees in the national forest policies enacted in 1948, 1970, 1988 and 2000, a large portion of foresters and the general public in the country has limited awareness of the value of forestry extension.

The fundamental forest extension problem in Uganda is logistics. Trained staff and extension facilities are few or absent in most parts of the country. This is connected to lack of appreciation for forest extension, particularly among the decision-makers. Many don't understand what forestry extension is, what it does or why it is important. Fortunately, the recent changes in government policies as expressed in the Plan for Modernization of Agriculture, places emphasis on decentralization and broader participation in the provision of agricultural services. The recently created National Agricultural Advisory Services (NAADS) is an effort to empower the resource poor families to make effective demand for extension services, directly and via agricultural service providers.

The paper reviews experiences of many years of attempts to train and build capacity in forest extension in Uganda. Errors like missing or incomplete training needs assessment at both technical and professional levels are accentuated. Positive efforts taken in the recent past like creation of a dynamic organizational system (National Forestry Authority) to cope with changes and developments and manifesting qualities of creativity and innovations are stressed.

ACRONYMS AND ABBREVEATIONS

CBOs	Community Based Organisations
DFOs	District Forest Officers
FORRI	Forestry Resources Research Institute

NAADS	National Agricultural Advisory Services
NGOs	Non Governmental Organisations
NFA	National Forest Authority
PMA	Plan for the Modernization of Agriculture

Introduction

Uganda is a small landlocked country in East Africa lying between 4⁰N and 1⁰S and from 29⁰E to 35⁰E longitudes. It has an area of 236,000-sq.km. and an average altitude of 1,400 meters above sea level. Forests and woodlands cover approximately 4.9 million hectares of which 40% is under government ownership, control and protection while 60% is in private hands.

Formal forest management in the country started over 100 years ago and has been guided by a series of national policies. The first ungazetted policy was that which created the Forestry and Scientific Department in 1898 with a mandate covering forestry, botany, agriculture and veterinary. The current Forest department has got its origin in the Forestry and Scientific department. In 1929, the first definite official forest policy was written and adopted by government. Subsequent to signing this policy, the Forest Department was organised to more or less its current form. This policy has remained in force till today with minor changes in subsequent revisions.

Training of local staff appeared as a definite aim for the first time in the 1939 revision. A revision of the policy in 1948 gave allowance for education and propaganda on forestry. The 1970 Forest Policy was an expansion of the 1948 Forest Policy, still emphasizing forest management and protection, but specifying suitable measures for carrying out forestry extension services. A popular version of the forest policy (2000) clearly spells out forestry extension and advisory services as a priority area.

Forest extension

In Uganda, forest services have traditionally been organised along the lines of our British colonial masters' models. This is associated with the technical activities of managing forests, basically for wood production while other goods and services are treated as incidental.

Currently there is no well-defined forestry extension service despite the emphasis in the policy to establish extension services to assist farmers to grow their own trees. The forest extension and publicity section of the Forest Department, DFOs and the Forestry Resources Research Institute (FORRI) haphazardly arrange whatever is done. The department conducts lectures, radio and TV talks, gives shows and demonstrations on open days like the World Food day and World Environmental day. There are also some NGOs, which are supporting the Forestry Department in this respect.

Forest extension has lacked recognition and esteem for a long time. It has been used as a dumping ground for undisciplined staff and deployment in extension is still

viewed as punitive. This is aggravated by the fact that most or even all the resources, including departmental housing quarters are often entirely used for forest management leaving the forest extension service with limited or no resources.

Constraints, issues and challenges of forest extension in Uganda.

A fundamental forest extension problem in Uganda is logistics. Trained staff and extension facilities are few or absent in most rural areas. This is linked to lack of appreciation for forest extension. Many decision-makers don't understand what forestry extension is, what it does or why it is important. Consequently, there is lack of government commitment to forestry extension and forestry extension activities lack the appropriate financial backing from the Government. So inputs and equipment for establishing demonstration plots or conducting demonstrations are lacking.

The capacity of government to deliver forestry extension services has been very minimal and ineffective. There is no effective organizational structure for extension and the conceptual basis is very weak. There are no known priorities and the focus is blurred. There are no officially recognized priorities for extension and the message has been reduced to mere appeals to plant trees without consideration of the different needs, interests and potentials of different target groups.

The needed vertical and horizontal linkages, especially with extension services of other sectors that have a stake in land use are either *ad-hoc* or non-existent. The population is not adequately sensitized and there are no incentives for individuals, institutions or groups to devote their resources to tree planting.

The dual purpose of the Forest Department staff belies their rapport with the population. At one time they are and have to be friendly while at another they are adversaries especially when it comes to law enforcement. The NGOs and CBOs, which are trying to carry out forestry extension, have little or no expertise to do the task.

Uncertainty of ownership of land/trees in most parts of the country promotes a sense of irresponsibility and apathy. This is more pronounced in areas where there are squatters on milo land. In many parts of Uganda, the local population still feels suspicious about forestry because many of them think that the Forest Department will gazette the land where their private woodlots are growing into government forest reserves.

Inadequate training in forestry extension both at technical and professional levels is another bottleneck to forestry extension in Uganda. On graduation most of the staff who are employed with the Forest Department have inadequate technical skills and knowledge relevant to forestry extension.

Interest in many aspects of forestry extension has also been limited by the long time interval between efforts and reward in forestry activities. It is normal for the local population to express surprise at knowing that they have to wait for four years for a *Eucalyptus* plantation to pay off its establishment costs, not to mention the

spontaneous laughter created by having to wait for 30 years for timber from *Measopsis eminii* or over 60 years in case of *Milicia excelsa* or *Khaya spp.*

In some areas where forestry extension efforts could easily establish increased tree planting activities often lack suitable marketing arrangements. Customers who travel from the urban to the rural areas offer very low prices for wood materials to maximize their benefits. This is aggravated by the poor state of most rural roads during the rainy seasons of the year when paradoxically the demand for fuelwood is at its peak.

Inadequate Forestry Extension Research is another serious obstacle to forestry extension work in Uganda. Owing to limited facilities and funds forestry research in the country is mainly concentrated on silviculture, utilization and protection aspects of forestry. So the effectiveness of the few forestry extension programmes has not been readily updated to cope with new issues.

Poor linkage between research and extension to enable the digestion of research information for use by rural communities (no workshops on research findings, field days/demonstrations of major research activities or joint editing of research reports for extension purposes between researchers and extension workers). Communication between rural communities and forestry extension is also very poor and community needs in terms of forestry products or put differently what compels rural communities to plant trees have not been well understood and therefore suitable technologies or extension messages/instruments to cater for these needs have not been well developed.

Training and capacity building for forest extension in the country

Formal training

Forestry extension and capacity building cannot be reviewed in isolation from overall forestry training and forestry structures. However, the most relevant and functional material for building a forestry extension curriculum resides in the daily life problems which people face.

In Uganda, there has been poorly organised formal training in the area of forestry extension. Private tree farmers, sawmillers, furniture makers or other individuals have not been able to assess their needs and take action to acquire such training. Accordingly the target groups for training in forestry and forestry extension have been limited to schools and college students, leaving out a large segment of stakeholders in forestry and forestry extension.

Unfortunately, primary school programmes in the country do not teach forestry. The science and social studies syllabi only provide rudiments of tree species identification, and structure and functions of a tree. Secondary school syllabi of biology, geography, and agriculture provide some basics of plant physiology, types and geographic distribution of plant communities (grasslands, woodlands, forests etc), functional services of trees and plant communities.

Therefore each pupil leaving the formal school programme normally has some knowledge of the various tree species in his neighbourhood, the structure, physiology and functions of the various parts of a tree, the types, distribution and uses of the common plant communities.

“On job” training started immediately with the establishment of the scientific and forestry department in 1898. Formal technical training was launched in 1932 when a one-year course was instituted at Kityerera, in Iganga district mainly for practical instructions for “natives” to take charge of the native administration plantations and departmental staff training.

The forestry school at Kityerera was closed in 1941 due to outbreak of sleeping sickness but selective training continued under DFOs. In 1948, the forestry school was re-started at Nyabyeya in Masindi district at the present site. Training of professional foresters started in the 1950s but mainly from British Universities. A department of forestry under the faculty of Agriculture started at Makerere University in 1970.

Today, the Uganda Forestry College-Nyabyeya is the only institution in the country offering forestry training at technical level. The training offered includes diploma, certificate and short courses. The Faculty of Forestry and Nature Conservation at Makerere University, which started as a Department of Forestry in 1970, offers training at professional level. The training offered includes BSc's, MSc's, and PhDs. The training offered here has had a bias in wood utilization to produce people geared and prepared to work in forest industries. Therefore until late 1980s, all graduates were lined up in traditional forest management and utilization than extension.

Due to limited time and inadequate teaching materials, most of the graduates from Makerere and Nyabyeya have inadequate technical skills and knowledge relevant to forestry extension. Most of them, therefore are ill-equipped in terms of the ability to communicate on a number of different levels in concepts, words and expressions the target communities understand while having the patience to listen to the views of these intended beneficiaries.

Recently however, the formal forestry extension courses both at professional and technical levels have been revised to include the various forestry extension and communication principles, strategies, tools, methods, and prescriptions necessary to enable the students carry out extension task of disseminating forestry message and delivering appropriate forestry technologies to the intended beneficiaries.

Shortcomings

The study programmes of elementary science and forest education as recorded in the schools and college syllabi provide a reasonably good foundation for forestry though not forestry extension. However, there are shortcoming and problems, which denigrate this foundation:

- i) First, professional foresters are not involved in designing the syllabi and

- advising on what knowledge, practical skills and sequence of study to be followed;
- ii) Teachers who handle the syllabi are not adequately prepared and have little or no knowledge about forests;
 - iii) There are few or no study materials prepared for syllabus designers, teachers, or pupils and students to select relevant knowledge and skills for teaching and study; and
 - iv) There is almost no practical session.

Although there are strong and often formal linkages between the Forest Department and academic institutions both in the development and implementation of forest extension programmes, NGOs/ CBOs are only loosely linked to the first two through collaboration in form of technical backstopping from the Forest department during the preparation and implementation of their projects.

Regardless of the relationship between the Forest Department and training institutions, the technical and professional training has not been able to meet the needs of the poor forest farmer. They tend to produce white-collar job seekers while much of work in forest extension and major forest problems have tended to call for more practical skills.

Informal/Public training

As early as 1930, the Forest Department believed that supplies of fuelwood, poles and sawn timber to meet the national requirements could be best guaranteed by encouraging peasant farmers to grow trees in small plantations under the control of local administration. During this period, administrative officers and not forest officers carried out tree planting and extension, as this was a directive from the governor.

In effect, local capacity in forest extension service was instituted and functioned well until the late 1960's. Extension efforts included regular radio broadcasts on farm forestry and publications of advice and information on tree farming. Many farmers responded and planted woodlots mainly eucalypts and acacia spp. Almost every county and sub county headquarters planted plots some of which were sizeable plantations.

In 1967 the powers to manage all forests in Uganda were shifted to the Central Government (Uganda Forest Department) and local farmers, communities and other entrepreneurs involved in growing and tending trees were left out of any training programmes for forest extension.

Although the task of forest department was supposed to have changed over the years, that fact was seldom recognized or acknowledged by the department itself. The department, its competence, organizational structure and management by blueprint style remained the same. This mismatch between the task, mandate, ability and competence of the department resulted in many unsuccessful attempts by the

department to build local capacity in forest extension and public awareness.

Shortcomings

It has been and may continue being difficult for sometime to come, to establish the true picture of public knowledge and opinion about forestry partly because illiteracy, apathy, linguistic diversity and inadequacy of logistics hamper public/informal education in the country.

It has been difficult for the public to acquire and adopt a positive attitude of forestry because it has been portrayed as a purely physical science though it is now clear that forestry is more of a social or people's business. Therefore some aspects of informal education have failed partly because the methodologies used have been unsuitable.

Lack of centrally organised training could be attributed to lack of organisations like Uganda wood farmers association, sawmillers' and pitsawyers' groups which are relatively new and they are very poorly facilitated and even now cannot cater for such common interest or act as forums for discussion.

Inadequate informal, training and consultations especially for the local farmers generally resulted lack of good combinations and levels of adequately competent human resources, technology expertise and institutions to ensure effective forest extension services.

Adjustments and reform

The government of Uganda has recently outlined its strategic framework for national development and has launched the Plan for Modernization of Agriculture (PMA) which provides the overall policy context of agricultural development.

At the same time, forestry is becoming more linked with agricultural production, income generation, survival and welfare of rural households. This role oversteps the forest boundaries to include all forms of tree integration in agricultural and pastoral production systems.

This change has brought to light the fact that forest extension is not a simple mono-disciplinary domain but a combination of interrelated physical, social and economic problems often outside the Forest Department. It has already been noticed that traditional expertise of local populations includes a sizeable pool of technical skills about forestry, which cannot be excluded.

Therefore the first challenge to the Forest Department in relation to forest extension is to create an incentive for staff to work in partnership with hundreds of farmers and communities. Forestry can be practiced over the long run by individuals and communities that own and control land. It follows that a person who decides how land should be utilized is very important to the future of forestry and forest extension. If a farmer decides to clear his woodlot and grows maize and beans, the most stringent

rules and regulations in the country will not save that woodlot.

The second task for the Forest Department is to enable individuals and communities to make informed choices, organize themselves and make wise decisions on landuse practices. This can be done through intensive informal/public training.

Another very important task is to initiate a training programme aimed at establishing and maintaining a strong, dynamic and more committed extension staff. The training programme should be able develop the individual extension worker, develop his skills, capabilities and his commitment to the demands of a more dynamic extension system. This will involve expansion of the teaching curriculum both at technical and professional levels.

This therefore makes the job of capacity building in forest extension increasingly complicated. Fortunately, a determined effort is now being made by the Forest Department and the training institutions to address these challenges. The Government of Uganda has committed itself to revitalizing the forestry sector with particular emphasis placed on addressing the needs of locally resident communities. This however, calls for a change in mindset in which people's progress and prosperity are given special priority in addition to sharing of powers with locally resident communities. Emphasis is being increasingly placed on actively involving local people and communities in decision making regarding management of forests and thus building local capacity.

Uganda can no longer rely solely on public delivery of services and the number of organisations with forestry and tree-planting programmes has increased rapidly in the recent years. The recently created National Agricultural Advisory Services (NAADS) is an effort to address the demand side by making funds available to local authorities to stimulate effective demand for services and inputs.

Fortunately, the ground is well in favour of this revolutionary approach and the policy environment in the country is ripe for it. The Forest Department is reorienting and/ or recasting its strategies and the thrust is on Social, or what others would call Rural development, Community, Village, Participatory, or Collaborative forestry. In short the Forestry Department is entering into partnership with the public in forest management and extension. As such forest management and forest extension will soon become more of a social or people's businesses by shedding their feathers as a purely technical activities. Existence of many environmental NGOs/CBOs including religious organisations within the country provides a suitable net work and hence medium for accessing and involving local communities

Administrative structures and mechanisms including intersectoral co-ordination, decentralisation, responsibility, incentive system and public relations are being put in place. As part of its public service reform programme, government decided in 1998 to establish a Nation Forest Authority (NFA) to manage the Central Forest Reserves. The current plan for the Nation Forest Authority (NFA) assumes that a focused service support NAADS, and the districts will be necessary to supply farmers with the technical advice. The Plan for Modernisation of Agriculture (PMA) envisions that

NAADS should be decentralised, farmer owned and private sector serviced extension system. It is expected to lead to increased farmer access to information, knowledge and technology through effective, efficient, sustainable and decentralised extension with increasing private sector involvement in line with government policy.

Efforts are being consolidated on the following key areas:

- i) Formulating mechanisms of diffusing appropriate forest management technologies, customised to local circumstances and landuse systems, with full attention to economic incentives, commercial possibilities and cultural factors;
- ii) Establishing, developing and sustaining an effective system of extension and public education to educate and create awareness, appreciation and management of forests with regard to multiple roles and values; and
- iii) Establishment and strengthening institutions of educating and training staff for developing an adequate cadre of trained and skilled manpower at the professional, technical and vocational levels.

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HOW TO DETERMINE WHEN YOUR CONSERVATION RESERVE PROGRAM (CRP) PINE PLANTATION IS READY TO THIN

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Abstract

An outdoor workshop, "Are My Pine Trees Ready to Thin?", was developed to help small private landowners decide when their CRP pine plantation was ready to be thinned. The goal was to train landowners to measure their own plantation and make a preliminary evaluation. This half-day workshop did not replace professional advice by a forester but helped landowners decide when to contact a forester. This workshop is easily adaptable for other species in different timber economies.

The CRP program was initiated in 1985 by the United States Department of Agriculture to protect topsoil from erosion. Many farmers converted marginal cropland into pine plantations under this program. Approximately 1.2 million acres of CRP pine plantations have been established nationwide (308,000 acres in Mississippi). Many of these plantations will soon be ready for the first thinning.

The workshop trained landowners and foresters how to measure and quantify five characteristics a pine plantation needed to have before it should be thinned. Sampling techniques, measurements, and terminology were simplified to improve landowner comprehension. The five plantation characteristics measured and their target values (in parentheses) were: stand density index (density > 55%), natural pruning height (pruning >18 feet), average tree DBH or diameter at breast height (diameter > 6 inches), average heights of dominants and codominants (height > 40 feet), and basal area growth rate (growth rate < 11%).

The decision of whether to thin or not was made with specific knowledge of these five characteristics, rather than on stand age, appearance, or pulpwood prices. Plantations with all 5 characteristics above target value should be thinned. Plantations with one or two characteristics on the borderline or below target do not have to be thinned immediately. The landowner may wait a few years for better pulpwood markets. Plantations with all characteristics below target value should not be thinned.

Workshops were held in 36 locations throughout Mississippi from 1999-2000. Written evaluations from the 812 attendees indicated this training would improve their forestry income \$6.7 million.

Introduction

The Conservation Reserve Program (CRP) is the federal government's single largest environmental improvement program (USDA 1997). The CRP program was initiated in 1985 by the United States Department of Agriculture, Farm Services Agency to encourage farmers to establish permanent land cover to protect marginal cropland from erosion. Plantations of loblolly pine (*Pinus taeda*) qualified as a permanent land cover in the southeastern U.S. Farmers received annual rental payments plus half the cost of establishing plantations (Dorell et al 1993). The average rental payment in Mississippi for CRP Pine Plantations has been \$45 per acre per year for a 10-year period (Londo 2000). CRP funded the establishment of approximately 1.2 million acres of CRP pine plantations nationwide and 308,000 acres in Mississippi (Londo et al 2001). Most of these plantations began with the 1986-1990 sign-up periods and will soon be ready for the first thinning.

Proper timing is the most important management decision landowners can make for their pine plantation. The first thinning sets the stage for the future sawlog production. Timing of the first thinning should be determined by plantation characteristics and the landowner's objectives. Mississippi has traditionally been a sawlog economy. Sawlogs are frequently worth 5 or more times the pulpwood value. The Mississippi Timber Price Report (Daniels 2001) shows a drop in pulpwood prices once thinning CRP pine plantations began in 1998. Pulpwood prices fell from a high of \$17 per ton (Daniels 1998) to \$6 per ton (Daniels 2001). The size of the CRP pulpwood supply bubble in Mississippi is estimated at 1 million tons per year (40,000 acres thinned x 25 tons/acre). The sawlog market has not been influenced by CRP yet and averaged \$50 per ton (Daniels 2001).

In a poor pulpwood market, the first thinning becomes an important tool used to speed pine growth to sawlog size. However, some landowners view the first thinning only as an income source and resist thinning when prices are low. When pulpwood prices peak, the opposite is true. Landowners want to thin before their plantation is ready. While thinning income is important, most landowners would benefit by ignoring the pulpwood market and thin when plantation characteristics say it is ready. Timing the first thinning too soon or too late will decrease sawlog production and subsequent financial returns for the landowner.

A workshop, "Are My Pine Trees Ready to Thin?", was developed to train landowners and foresters how to determine the time when a pine plantation is ready for the first thinning. The workshop provided hands-on training in plot sampling and tree measurements. Data averages were then compared to target values for five plantation characteristics. They were stand density, natural pruning height, DBH, height and growth rate. Faculty in the Department of Forestry at Mississippi State University conducted 36 workshops over a two-year period testing and perfecting the workshop. The workshop, as well as the target value for each characteristic will be described.

Workshop mechanics

Each workshop was hosted in a county by the County Extension Agent in conjunction with the local County Forestry Association (CFA). The Extension Agent distributed brochures and handled all mass media advertisement. The CFA collected registration fees and paid for refreshments and other program costs. The program was delivered by Extension Foresters with help from recruited consulting and industry foresters in the area.

The first hour of the workshop was a review of information about pine growth and development, reasons for thinning, and methods for thinning pine plantations. Following this lecture period, each landowner then received training on use of a diameter tape, clinometer, compass, and increment borer.



Under the guidance of a forester, landowners were broken into groups and dispersed through the plantation. Measurement plots were laid out in a systematic grid using compass and pacing. Participants were encouraged to collect data on at least ten plots, scattered throughout the plantation. This was a minimum number of plots needed to get a representative sample. A tally sheet was provided to record data for 10 plots in a way that made hand calculations easier.

A double sampling technique was used to collect data. The first sample was a 1/100th acre circular plot measuring DBH of each tree and number of trees per acre. Within each plot, a single sample tree in the dominant or codominant crown class nearest plot center was measured for total height, natural pruning height, and basal area growth. The sample tree selected was also preferably free from any serious defect.

DBH was measured with a diameter tape and total height with a clinometer. Natural pruning height (height to the first live limb) was measured using an 11 ft. pole that is marked into 1-foot increments. A normal person holding this pole, with arm fully extended, could measure heights to about 18 ft. Stem radial growth was measured from

an increment core of wood taken horizontally through the central pith of the stem of the sample tree at breast height. Width of the growth rings for the last full three years was measured. Radial growth was used to estimate basal area growth.

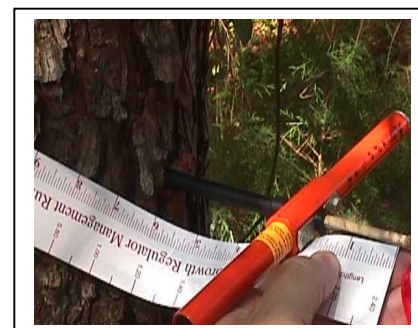


Table 1 was developed using the sample tree DBH and radial growth to estimate future basal area growth. Predicting future wood growth using past growth is "a reasonable postulate for a 3-5 year span" (Avery and Burkhardt 1994). Bark growth for the three-year period was assumed to be negligible. A simple interest rate

was used because a straight-line best describes tree growth in young unthinned stands (Grosenbaugh, 1958). The calculations used to generate Table 1: Basal area (BA) was expressed in square feet per tree while DBH and radial growth are in inches.

$$\text{current BA} = [\text{DBH}]^2 * .005454$$

$$\text{future BA} = [\text{DBH} + (2 * \text{radial growth})]^2 * .005454$$

BA growth rate expressed as % per year:

$$\text{BA growth \%} = [(\text{future BA} - \text{current BA}) / (3 \text{ years} * \text{current BA})] * 100\%$$

Table 1. Basal area growth rate estimates using DBH and 3-year radial growth.

Bold numbers designate the target 10% annual rate of growth. Growth rates at or below the threshold indicate it is time to thin.

DBH (inches)	3-year wood radial growth (inches)					
	0.3	0.4	0.5	0.6	0.7	0.8
	Basal Area growth rate (% per year)*					
5	9	12	15	18	21	25
6	7	10	12	15	17	20
7	6	8	10	12	15	17
8	5	7	9	11	13	15
9	5	6	8	10	11	13

- see text for calculations

In some plantations, the number of forked, diseased, or ice-damaged trees was also collected. Ice storms in 1994 and 1998 damaged many pine plantations in North Mississippi. This additional information can be important for determining stand health and thinning recommendations.

After measuring the sample plots, groups returned to calculate averages for DBH, trees per acre, total height, pruning height, and growth %. Average values were then recorded on Table 2 and compared to target values to determine if a pine plantation was ready to thin. Plantations with all 5 characteristics above target value should be thinned. Plantations with one or two characteristics borderline or below target do not have to be thinned immediately. The landowner may wait a few years for better pulpwood markets. Plantations with all characteristics below target value should not be thinned.

Table 2. Summary table for evaluating pine plantation characteristics measured in the field to determine whether plantation is ready to be thinned.

Characteristic	Target Value	Ready for Thinning?		
Average DBH _____	≥ 6 inches	YES	Borderline	NO
Trees Per Acre _____				
Stand Density Index from Figure 1	$\geq 55\%$	YES	Borderline	NO
Total Tree Height _____	≥ 40 feet	YES	Borderline	NO
Natural Pruning Ht _____	≥ 18 feet	YES	Borderline	NO
Basal Area Growth Rate _____	$\leq 10\%$	YES	Borderline	NO
What Do We Recommend?	THIN	WAIT __ yrs		

DBH

We recommend at least an average DBH of six inches before thinning. Average diameter is important, because trees must be at least 5" DBH to be sold for pulpwood (Traugott 2000). Trees smaller than five inches DBH typically won't be cut. Consequently, thinning plantations when only the larger trees are big enough to cut for pulpwood may result in high grading of the stand (Traugott 2000). Thinning larger diameter trees also produce more volume, increasing the money generated by thinning.

Stand Density

Stand density was evaluated by plotting average DBH and trees per acre on Figure 1. The plotted point was compared to a "thin – wait" decision line for loblolly pine.

Table 2: Summary table for evaluating pine plantation characteristics measured in the field in order to determine whether plantation is ready to be thinned.

Characteristic	Target Guideline	Ready for Thinning?		
Average DBH _____	≥ 6 inches	YES	Borderline	NO
Trees Per Acre _____				
Stand Density Index from Figure 1	$\geq 55\%$	YES	Borderline	NO
Total Tree Height _____	≥ 40 feet	YES	Borderline	NO
Natural Pruning Ht _____	≥ 18 feet	YES	Borderline	NO
Basal Area Growth Rate _____	$\leq 10\%$	YES	Borderline	NO
What Do We Recommend?	THIN	WAIT __ yrs		

Tree Height

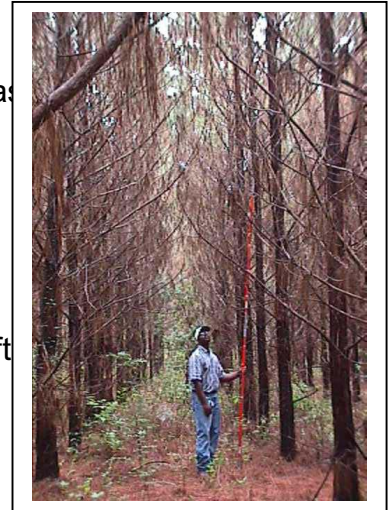
Trees should be at least 40 feet tall before a plantation is thinned (Traugott 2000). Experience indicates that a total height of 40 feet will produce the minimum 30-foot merchantable length needed for tree-length mechanized thinning. The top ten feet will be cut off to achieve a 3-inch top. Double stacking stems shorter than 30 feet on a log truck prevents trucks stacked full to be close to the maximum haul weight. Hauling pulpwood in underweight trucks can subsequently drop stumpage prices.

Natural Pruning Height

Natural pruning needs to be at a minimum height of 18 feet. Since pines are shade intolerant, their branches die from the ground up as trees become crowded and over topped (Traugott 2000). Waiting until branches die to 18 feet will result in a clear 16-foot butt log for future harvests.

Natural pruning is most important in the butt log since it is the largest and most valuable log in the tree. Live limbs produce knots in the wood, decreasing strength and subsequent value as lumber. Thinning before natural pruning occurs will allow limbs to live longer and get larger in diameter. Future quality sawlogs may become pulpwood. Mechanical pruning can be used to remove limbs, but most landowners do not have the time or money to invest in this kind of operation.

The 18-ft minimum here is a much lower standard than the 25 ft reported by Nebeker et al (1986). This height would achieve 1.5 clear logs. Natural pruning to 25 ft is fine if pines are 42 feet tall. This equates to a 40% live crown ratio, the lowest ratio recommended for young pines (Nebeker et al 1986).



Basal Area Growth

We recommend thinning plantations once basal area growth drops below 10% per year. Basal area (BA) growth is the annual percent change in stem cross-sectional area at breast height. BA growth is one of the most important factors to consider before thinning. Slow growth is an indicator of poor tree health and increased risk of loss to southern pine beetles. BA growth is also an important financial measurement because it is closely related to volume growth (Wenger 1984). In general, trees growing 10% or more each year are producing enough wood to justify waiting to thin.

The minimum acceptable growth rate can change with the economy. If landowners can reinvest thinning income at a much higher rate of return, they may choose a higher minimum. Landowners would thin earlier. If lower rates are expected from reinvestments, landowners may delay thinning.

Workshop evaluation

Workshops were held in 36 locations throughout Mississippi from 1999-2000. A total of 812 landowners and foresters owning 254,789 acres attended. Attendees returned written evaluations indicated this training would improve their forestry income \$6.7 million. Many of Extension Forestry's regular clientele stated this workshop was the best forestry program they ever attended.

Summary and conclusions

Thousands of acres of CRP pine plantations are approaching the time for the first thinning. Proper timing is the most important management decision landowners can make for their pine plantation. The first thinning sets the stage for future productivity and value.

The "Are My Pines Ready to Thin?" workshop was very successful at training landowners to determine when their CRP plantation should be thinned. The decision of whether to thin or not was made with specific knowledge of DBH, density, total height, natural pruning height, and basal area growth. Threshold levels for each of these factors were provided to indicate the need for thinning. Workshops were simple to conduct and much appreciated by landowners and foresters alike. Modifications for other species in different regions of the world could be easily made.

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**INCLUDING THE COMMUNITY:
COMMUNITY CONSULTATION AND COMMUNICATION IN THE
WEST VICTORIA RFA PRIVATE FORESTRY PROJECT**

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Introduction

Increasingly communities are claiming increased input into government decisions that affect them, and governments are reciprocating by providing more opportunities. This is a project that was characterised from the very outset, by a process that sought to move beyond mere rhetoric of "community consultation and community participation", to one that sought at every stage to integrate notions of inclusion, participation, and transference of learning.

Background

The West Victoria RFA Private Forestry Project (Victorian Sawlog Farming Project) is a \$1.45 M Victorian government initiative to encourage hardwood sawlog production from cleared agricultural land across north central and southern Victoria (Figure 1). This three-year project is part of a package entitled 'Growing Victoria's Forests' which was announced upon the signing of the West Victoria Regional Forest Agreement between the Commonwealth and State governments, in March 2000.

The RFA determined that the sustainable yield of hardwood sawlogs from the Midlands Forest Management Area (covering state forests around Ballarat) will be reduced from 58 000 m³/year to 40 000 m³/year and established a process for further review based on new data. At the same time the timber processing industry in central Victoria has indicated that their markets are expanding both overseas and domestically, and that their long term wood supply requirements will increase to between 100 000 m³/year to 150 000m³/year.

Recognising a future shortfall in hardwood sawlogs, this project aims to:

1. Develop a strategic framework that will enable farm forestry* to provide a complementary hardwood timber resource to that available from state forests, and
2. Integrate farm forestry in previously cleared systems in priority areas to deliver improved environmental outcomes such as salinity mitigation and biodiversity, in addition to regional development and commercial benefits.

The project comprises 6 modules, which are responsible for research and collation of relevant information required for project development and implementation. They are:

Module 1- Community consultation and communication

Module 2 - Land base and priority zone establishment which seeks to identify zones for priority plantation establishment according to environmental and productivity factors

Module 3 – Identification of silvicultural management prescriptions and target species for zones throughout the region

Module 4 – Cost sharing arrangements, taking into account public versus private good

Module 5 – Recruiting private investment

Module 6 - Options for the Riverine Plain, assessing suitable options for the northern irrigation district.

*Farm forestry refers to the incorporation, with or without other land uses, of commercial tree growing and management on cleared agricultural land. It may take many forms including timber belts, alleys and spread-out tree plantings. The aims may be diverse and include wood production for a variety of purposes, increasing agricultural productivity and sustainable natural resource management

The project is overseen by a stakeholder steering committee appointed by the Minister for Natural Resources and Environment, the Hon Cheryl Garbutt. Committee members come from a range of backgrounds including, the timber industry, environmental groups, farm forestry networks, the Victorian Farmers Federation, local government, catchment management authorities and state government.

There can be a tendency in multi-disciplinary projects to view stakeholder committees as a comprehensive means for attaining stakeholder and community input. They can however, inadvertently over or under represent certain stakeholder groups, and stakeholder committees have limitations when it comes to reflecting the diversity of opinion that occurs amongst the broader community. This recognition inevitably required us to engage in a more reflective practice about notions of representativeness and participation.

Community concern generated from blue gum wood chip plantation expansion in south western Victoria has highlighted the importance of sincere and thorough community consultation in broad scale land use change. From the outset this project has recognised that community awareness, acceptance and participation is critical to the project's success, so the project has attempted to place emphasis on social, as well as biophysical and economic aspects, so that they can be incorporated into project development and implementation.

Myriad Consultants Pty Ltd were engaged to design a process for Module 1 – Community consultation and communication. The importance of attaining a clear picture of stakeholder and community attitudes to farm forestry, rather than relying on assumptions and hearsay was identified, so that the project had a firm base on which to develop communication strategies.

Methodology

The broad methodology adopted by the Consultants was informed by Participative Design Principles. At every stage in the process, the consultants sought to ensure the involvement of a diverse range of stakeholders. As stated, participative processes of consultation increase the chance of acceptance and ownership of any resultant outcomes.

The process began with an all day workshop conducted by the Consultants with the Module Reference group. The process sought to clarify the group's vision and expected outcomes of the project. It was important from the very outset that the process build on, and be informed and guided by the wealth and experience of the Reference Group to ensure a genuine sense of ownership and commitment to the outcomes.

A literature review was also undertaken to ensure that the process was one of continuous improvement, building on important previous research, rather than unnecessarily duplicating. As an outcome of the literature review, it became apparent that the process would be one that was pioneering and innovative in its approach. Rarely had such diverse range of stakeholders had the opportunity to meet across their sector interests and share and exchange information in a co-ordinated way that would contribute to challenging the traditionally segmented approach to private forestry.

The methodology adopted for the stakeholder and community consultations is known as triangulation. This recognises that social research is dependent on people's perceptions of an issue and is thus subject to bias. A triangular approach attempts to test that bias and hopefully, correct it when it comes to drawing conclusions.

In this project the three points of the triangle were:

- Stakeholders – farm foresters, existing (but not sawlog) plantation companies, timber millers and processors, sawlog carters, environment and landcare groups, Catchment Management Authorities, local councils, the Department of Natural Resources an Environment and a local Chamber of Commerce;
- Telepoll – 400 people, randomly selected against certain demographic criteria (age, education, income level, sex, location, employment status, and interest group membership) who were interviewed by telephone using a structured, 15 minute questionnaire; and
- Community Forum – 15 people, randomly selected from the telepoll group, chosen against the same demographic criteria, who had been asked in the telepoll if they would be willing to participate.

The Community Forum was an innovation in the context of community consultation on the subject of forestry. It was based on the idea of Citizens' Juries which have been used in NSW and are common in the USA when seeking public opinion which has been informed (at least to some extent) about the subject in contention. It

overcomes some of the disadvantages of focus groups which are made up of people who have a particular interest in a subject and may already have fixed views. Participants in a Community Forum, in contrast, come to a particular subject without fixed views (activists are screened out) but are generally interested in the issue and willing to learn more. They are provided with written information in advance which is a balanced presentation of the issues, have access to more information at the two and a half day forum, listen to and can question “expert” speakers who are invited to make presentations to the Forum, have to deliberate on certain key questions, debate with their peers and finally produce a consensus report with recommendations to the State Government. In this case, the report was presented to Mr Geoff Howard, Parliamentary Secretary Department Natural Resources and Environment, to be passed onto the Minister.

Findings of the Consultations

Almost all stakeholders and the community expressed enthusiastic support for farm forestry conducted on individually or family owned farms and other landholdings. They recognised the multiple benefits which landholders aimed to achieve. These often went beyond commercial outcomes and addressed landcare issues and benefits for stock and crop production, as well as producing aesthetic benefits and added to the value of the land.

There was also majority support for corporate plantation development for the production of sawlogs. The telepoll found 58.5% of those surveyed were in favour of industrial sawlog plantations. This support was, however, tempered by a variety of concerns which stakeholders and the community wanted addressed and even officially regulated by governments. Where this regulation has already fallen on local government, there was widespread concern that local governments do not have the resources or, often, the expertise to handle these responsibilities.

The picture in the public mind of the nature of corporate plantation development has been determined by both pine plantations and especially by the more recent blue gum plantation establishment. These have some positive but also a considerable number of negative connotations. On one hand, they provide employment especially in down-stream processing in the softwood industries. The blue gum plantations will provide an export product but wood chip production was criticised by stakeholders as offering low returns to the Victorian community. These plantations have been subject to other criticisms as revealed by the telepoll and stakeholder consultations, such as that they are a fire hazard and that they use chemicals which are not good for the land, water or people. There was also a belief that they were contributing to the demise of rural communities at the same time as offering farmers a dignified exit from the land or a steady income in retirement (through leasing). The distinctions which can be made between blue gum plantations for the pulp industry and future sawlog plantations is not apparent in the community mind.

Any particular stakeholder was likely to give emphasis to one of the project aims over the other, either providing a hardwood timber resource or obtaining improved environmental outcomes. Those concerned with providing a hardwood timber

resource tended to favor larger scale plantings of 100 hectares or more which is more likely to attract corporate investors.

On the other hand, although tree growing on farms has been taken up enthusiastically by farmers, their motives are often not commercial but environmental. In some areas however, farmers and small landholders, such as hobby farmers, have taken up commercial tree production and formed agroforestry networks. It is in the interest of farmers and landholders to address environmental issues in order to increase productivity and add value to their holdings. It is a challenge to this project to persuade them that they can also add a commercial element to their growing of trees and thus, in the long term, diversify their income.

The communications strategy for this project will need to recognise that the aims of individual landholders are more diverse than those of the larger scale, single species plantation managers and thus it is unlikely that a one-size-fits-all strategy will be successful.

The consultations found that there were other characteristics which distinguished those landholders who took up farm forestry compared with those farmers who were not interested: they tended to be better educated and frequently had off-farm income. Many, but by no means all, were hobby farmers, resident in the cities of Melbourne and Geelong, or retirees. Some farm foresters were involved in joint ventures with industrial plantation companies.

Support for farm forestry was expressed not only by farmers and other landholders, but also by conservationists, trade unions and Indigenous groups. The telepoll and the Community Forum revealed that farm forestry had a very high level of support. The predominant reasons given were environmental and in support of biodiversity. Other reasons included aesthetics, employment creation, shelter for stock and crops, and to reduce logging in public native forests. Industrial plantation companies were largely indifferent or doubted that small scale planting could ever meet the government's targets or the demand for hardwood timber.

A number of stakeholders believed that Landcare and farm forestry could marry quite well, although concern was expressed that a lot of people in Landcare were running out of energy, especially as increased responsibilities were being placed on their office bearers. Some thought that adding a commercial element to the planting of trees would bring in new members and add an incentive. In any case, the Landcare model was considered appropriate for promoting farm forestry. The Consultants would add that a community development model in which farm forestry played a dominant part might be more appropriate because it would involve non landholders, such as local store keepers and the tourist/travel industry and outside educational programs. It would seek to build on existing agroforestry networks and extend the benefits to a wider community.

The stakeholder and community consultations identified a range of barriers to the uptake of farm forestry. The barriers to farm forestry have been categorised as economic, environmental, social and regulatory. Economic barriers include the

uncertainty of future markets and the current competition from logs from state forests whose price was believed not to reflect the true cost of production; financial risks and the long wait for any return on investment; limited knowledge of the costs and the productivity benefit for stock and land; and the viability of traditional products which demanded more attention from farmers. Environment risks included fire, vermin and weeds, the effects on water tables, and the impacts of harvesting and on infrastructure. Social factors included the age of farmers and low morale; past negative experiences with past commercial promotions, including pines; a culture negative to change and lack of awareness of trees as a crop. Government and regulatory issues included uncertainty about future government regulation; right of harvest issues and the complexity of the process of applying for government funding.

A range of suggestions were offered by stakeholders and the community for overcoming these barriers. Among the economic initiatives suggested were promoting relationships between farm foresters and industrial plantations and other members of the timber industry, such as furniture makers and possibly saw millers; the fostering of cooperatives, though not all were confident that this would be successful; Forest Stewardship Certification; financial incentives though once again this is not universally approved; overcoming the long wait for returns, including by demonstrating other non-timber benefits to the farm land; value adding on farm and the upgrading of sawmills to make them more efficient and able to add value.

Carbon credits and biomass fuel generation were believed to offer incentives in the future. Education programs including the Master Tree Growers Course were considered to contribute very positively to the professionalisation of farm forestry and Whole Farm Planning assisted prospective farm foresters to maximise the benefits of tree growing for commercial and other benefits. Extension work and informal education programs, such as farm walks and field days and other forms of demonstration of benefits and the support that came from networks of like-minded people were all endorsed. The importance of identifying the appropriate targets for information is discussed in the report.

Of particular concern to many stakeholders and to the Community Forum, was the capacity of local government to be able to discharge its responsibilities as a regulatory of forestry on private land.

Finding in these consultations are consistent with results from other investigations into attitudes to private forestry in Victoria (see references). They provide invaluable information for confident development of practical communication strategies.

Recommendations

Based on the findings from consultations, future work will include development of a communication action strategy, which will focus efforts at both the broad and local community scales, as well as targeting specific stakeholders. Consistent with the philosophy on which the consultations were based, future work will seek to be inclusive, building on existing community, catchment and industry plans and strengths.

On a local scale it is important that private forestry, whether large or small scale, is well integrated into and accepted by local communities. To achieve this, a range of community stakeholders must see direct benefits to themselves. Thus, we recommend that several community development projects should be undertaken in which private forestry plays a significant part.

For example, eco-tourism and education could play a significant role in this development and businesses such as bus lines, accommodation providers and caterers, would benefit, as well as the local farm foresters themselves. Large industrial plantations would be part of the development and may see it as in the interest of good community relations, to be active partners in such development.

Activities of the Otway Agroforestry Network can be seen as going some way towards developing partnerships within their community that will increase acceptance and development of farm forestry. They have identified the need to engage with local government recognising that they both share similar visions with aspirations for increased employment and improved local economy, boosted ecotourism and an improved environment. Engagement is likely to lead to improved information flow and partnership development that will benefit both groups. Future work would assist in broadening local partnerships so that a range of community stakeholders understand and have the opportunity to benefit from the benefits of farm forestry. Greater community acceptance will also serve to increase confidence amongst potential farm forestry participants.

On a broad scale, information and feed back processes will target a range of stakeholders. To engage the community in farm forestry it is important that high quality information is available to have an informed debate and discussion of issues. A clear understanding of both positive and negative effects of trees on farms, catchments and communities is important. Communication to the broader community will include provision of information through a range of mediums that will raise awareness and provide opportunity for participation if desired.

Due to the long term nature of trees it is important to take time to consider all possibilities before committing and implementing. Existing promotional, information and extension materials will be analysed to ensure that they address queries and concerns of new entrants to farm forestry.

The recommendations recognise that the promotion of farm forestry goes hand-in-hand with Whole Farm Planning. Thus, educational and other institutions and officials involved in Whole Farm Planning should be encouraged to include farm forestry as an option and forestry training/promotion/extension should be encouraged to promote the benefits of Whole Farm planning.

Future activities will include engaging with the plantation industry and assisting industrial plantations to work with neighbours and communities.

The project will seek to facilitate the coming together of farm foresters with the processing industry to share information about markets as well as characteristics and quality of product. It will also work to address the concerns of local government, attempting to reconcile their visions with that of the project.

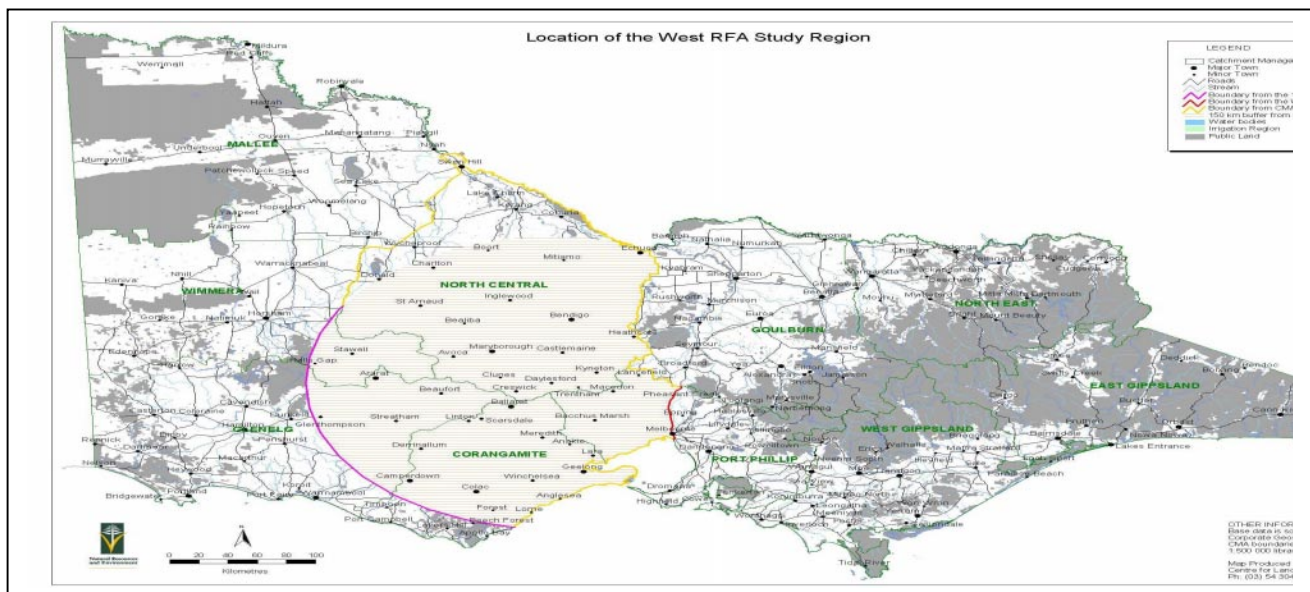
Conclusion

Consultations with stakeholders and the community found considerable support for farm forestry. Support for industrial plantation development was not so overwhelming but more than 50 per cent of the people consulted favoured its development for sawlog production. Interestingly, there was a significant consistency in the results from each of the methodological perspectives used in this project thus adding to our confidence in our conclusions.

This project, and its outcomes, undoubtedly represents an exciting and innovative approach to the issue of private forests. Through its highly consultative and participatory processes, the project has successfully brought together a diverse range of people from a range of different sectors and agencies to discuss a common goal. By adopting an inclusive project design, a greater degree of ownership and responsibility for the outcomes can be expected.

The project sought to incorporate a process that aimed to build on the strengths of the various stakeholder networks that had already begun to be established. Increasing the capacity of these networks, and developing engagement processes that move the objectives of the triple bottom line towards new possibilities in farm forestry becomes the ongoing challenge for us in the next stage.

Figure 1. map showing location of the West RFA region



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SELF-ASSESSMENT IN FARM FORESTRY EXTENSION: FUTURE DIRECTIONS

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Abstract

The Training Needs & Linkages / Identification of Training Needs in Farm Forestry Project conducted by Melliodora Solutions in 1999 to 2000, on behalf of the Private Forestry Council and The department of Natural Resources & Environment, examined the key training requirements existing amongst potential and existing farm foresters. Its main aims were to:

- Provide a clearer picture of skill areas common to Farm Forestry
- Create a guide to relevant training and extension providers
- Identify where training resources should best be directed in future to ensure optimum accessibility and cost effectiveness.

One of the key recommendations flowing from this project was for the development of an easy to use self-assessment training tool to allow people to assess their existing skill levels against recognised farm forestry competencies. Such a tool was identified as being a potentially cost effective way to enhance the extension process by developing existing and potential farm forestry practitioners at levels appropriate to their own circumstances.

This paper will examine the following issues:

- What is self-assessment and how applicable is it to Farm Forestry Extension?
- Is there really a need for self-assessment?
- How well are people currently assessing their own training needs?
- How would such a tool fit in with existing extension and training activities?
- What form might such a tool take?
- What future implications could such a tool have on the way extension is carried out?

Introduction

Getting people involved in farm forestry is a process, which needs to be approached from many angles. Foremost amongst these is ensuring that levels of skill and knowledge amongst practitioners are equal to the task. Over the last few year there

has been a growth in extension activities and training programs aimed at the grass roots of the industry to try and ensure that people working on farm forestry projects or considering getting involved have access to the latest knowledge and skills. This process can be assisted immensely by people on the land being able to determine for themselves what they require. In this sense the whole training process is driven by the needs of the people in the industry. Melliodora Solutions involvement in the identification of training needs within Forestry and the development of appropriate training responses to those needs, highlighted an opportunity to give the farm forester, at a basic level, a tool which they could use to accurately identify their unique needs. In a sense, “to let them know what they don’t know and what they need to know”. If this information can be provided in an easy to follow format with guidance on where to acquire the knowledge, the benefits in terms of time and cost savings could be significant.

What is self-assessment and how applicable is it to Farm Forestry Extension?

Imagine the following scenario. You are a farmer with some land in a prime location in the Otways. For most of your life you have been busy planting trees on your property and over this time feel that you have acquired a very good knowledge of what grows well on your land and how best to cultivate it. Understandably, you feel good about this, but there is so much happening out there in the field of farm forestry that you wonder what else you may need to know in order to better achieve your own goals. There are excellent programs such as field days and Master Tree Grower’s programs, all of which deliver high quality information, but what if you could assess your own knowledge levels on site. Can this be done easily? Can it be done quickly? Will the gap you identify accurately reflect your real needs and can it then be addressed appropriately through extension and training activities?

Self-Assessment in this context refers to the process of an existing or potential farm forester, being able to accurately assess their own training needs in their own environment. It should start with the question, what do I wish to achieve? Using the practical objective as the foundation, the process will involve the identification of what skills and knowledge this person requires to undertake the task they wish to embark on. At a more basic level it may even involve them working out their own Farm Forestry potential based on where they are and the land they have. The advantage with starting the process with the person on the land is that any response involving extension or training will be centred strongly on the person’s own special needs.

Is there really a need for self-assessment? How well are people currently assessing their own training needs?

The Training Needs project revealed a great enthusiasm amongst people to find out more about Farm Forestry and develop their abilities. The days of education being something people on the land can do without have long gone but the fundamental issues of time and money remain. People need training options, which suit their own circumstances, and gaining skills takes time as anyone who has had to apply themselves to a completely new area would know. For a person wishing to know more about Farm Forestry there are probably a number of other things at any one

time, which could interfere with the process. Devoting time to training, especially more formal kinds is difficult for many people. Training and gaining skills in a less formal situation such as the Master Tree Growers program offers an option in a very practical format for people, but they would of course prefer to avoid being taught to suck eggs.

The wide range of circumstances people find themselves in also provides a powerful argument for the deployment of a Self-Assessment tool. People's objectives differ greatly when planting trees on their land. This will be reflected in the kinds of skill areas needed and the depth of knowledge sought. Consider the differences between a farmer wanting to grow some trees for firewood in the Mallee, compared to someone who is planting Blackwoods in the Central Highlands. They will both want to pick out those things from the corpus of knowledge, which they need. In many cases, nothing more and nothing less. The Self-Assessment tool could be useful to both of them, providing all the available options but directing them in an easy manner to appropriate areas.

Another vital issue is that of money. Time is money where people on the land are concerned, and one issue, which repeated itself strongly during the Training Needs Project, was that many of the people interviewed did not have the resources to commit to a lot of formal training. For most it would be more suitable to only pay for the things they needed. This again raises the value of people being able to realistically assess their own needs, in terms of existing and deficient skills and knowledge, so they can then arrange a training response, useful to them in terms of time commitment and costs. The research carried out on training needs in farm forestry showed that people are keen to further develop themselves. The problem is that Farm Forestry covers so many areas that it can be difficult to be sure about where actual gaps lie. A great deal of the training currently provided has been built around what are considered to be the core areas needed to successfully carry out Farm Forestry activities. For the current or budding practitioner this means picking from a suite of courses and programs, which in part cover their requirements. This means that people are picking out responses to their needs in a fairly inflexible way and without recourse to lists of the foundation skills and knowledge covering the whole discipline. As part of the Training Needs project a mapping exercise was carried out which broke down farm forestry into basic component elements comprising essential skills. These skills were then matched with existing competency standards drawn from Forestry, Horticulture and Agriculture; areas all relevant to farm forestry. This breakdown and matching exercise (Appendix 3) established the key skills and knowledge requirements for farm forestry and as such would form the basis for the development of the self-assessment tool.

How would such a tool fit in with existing extension and training activities?

There is a great deal of training now available in the Farm Forestry area, ranging from short courses in various skills areas, practical community oriented processes such as the Master Tree Growers program and higher level tertiary courses such as The Degree in Forestry offered by The University of Melbourne. The idea of the Self-Assessment tool is to help people decide, what it is they need to know, in order to

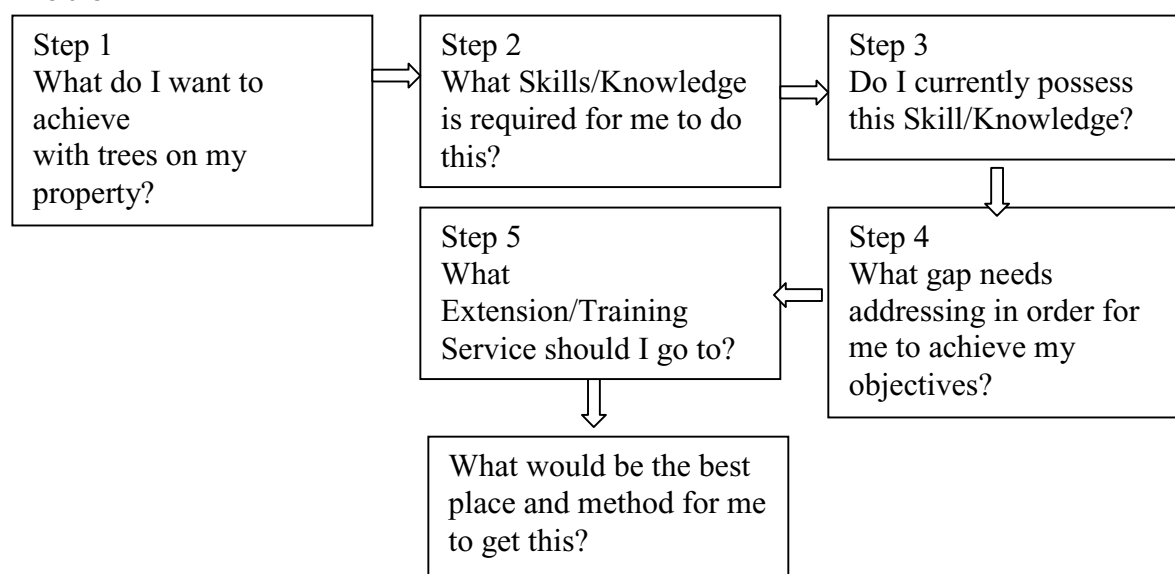
achieve their desired objectives. If for arguments sake, people decide that they need to know more about pest management, the next step would be where to find such knowledge and through what sort of medium they might access this. Any tool will need to include an up to date (or constantly updating) guide which clearly links them with a provider or program suited to their needs, location and maybe even budget. This will require the cooperation of all providers. The tool should be seen as complimentary to existing extension and training activities and would provide improved access from a wider range of people.

What form might such a tool take?

As part of the research for the Training Needs Project, a quick reference tool was put together which people could look at, and dependent on their existing level of knowledge and interest, could then be directed through an entry point matrix on to an extensive list of extension and training services through various regions in the state. (**See example in Appendix 2**) The compilation of information for this tool raised the issue that asking people what their current level of knowledge and skill is may not be such a simple question. There seemed to be scope for a similar type of tool, which based on listed information and pertinent questions, could be used to assist farm foresters with identifying their gaps in skill and knowledge.

Simplicity is the key word when designing a tool to be used by a wide range of people with differing needs. Whilst it would need to have all required information on it, navigation through to areas of relevance would need to be quick and easy. Table 1 below illustrates a possible step-by-step approach that people could adopt when trying to determine their own needs on site.

Table 1



Step 1 is for the person to ask what it is they wish to achieve. This question could be posed on any level and apply to a wide range of scenarios, from a person with a bare piece of land who wants to grow trees for firewood right through to someone with an existing plantation who is having issues with pest control. Either way the objective in the mind of the person will be the starting point. A wide breakdown of possible objectives could be provided. A tick against one would refer the person to a section with the skill/knowledge areas needed.

In Step 2 the person would then refer to these core skill areas and their related national competency standards to determine the range of requirements needed for this job to be achieved. These skill areas and competency standards are included in **Appendix 1**. These were originally put together to establish a base for determining the essential needs in terms of skills and knowledge associated with Farm Forestry. With updating and modification they could easily serve as part of the tool. It has to be acknowledged that there is a large amount of information to be looked through here. The tool is going to have to be extremely user friendly. Wisdom would dictate that a contact number, hotline or even email address be included to provide assistance at any step.

After seeing the listed skills and knowledge the person will then be in a position to compare this with their own existing level (Step 3). If they already possess these skills then they can act with greater confidence. If they feel that they require certain things to fill the skill gap identified (Step 4), they will then look at the tool for links and contacts to appropriate programs and training (Step 5). The entry points diagram and training provider matrix in **Appendix 2** could be modified slightly to show appropriate pathways into various extension services and training programs to suit the level needed.

What future implications could such a tool have on the way extension is carried out?

A Self Assessment tool like the one speculated on should be seen as a complimentary device, working in support of existing services. During the Training Needs project the quality and commitment of people working in the area of providing training for farm foresters was obvious and impressive. This proposed tool could make the process of entry into this training easier and more student focussed. Clearly, with future changes in technology and in particular the way people obtain information, this approach could also lend itself to being used as a web based package. Maybe a series of web pages attached to a central point where all providers would be contactable. In spite of the high tech possibilities, the key to success will still lie in simplicity. The self assessment tool will have to be very easy to use, speak the language of it's principal target group and ultimately deliver. The end result must be people finding the training, which matches their own unique needs.

Conclusion

A great deal of time and money is spent on endeavouring to make extension and training activities relevant and timely. Current training and extension demonstrates

that ensures that there is a wide range of options available for people at varying levels of experience and interest. The Self Assessment tool could act as a useful adjunct to these services by linking in more people and making the whole process of learning about trees on farms more centred on the grass roots needs of those in the industry. Wide dissemination of such a tool, could also have a beneficial impact in terms of marketing and making the process of learning more accessible to people from backgrounds we don't normally associate with Farm Forestry. A focus on the training needs of the grass roots will be sure to be reflected positively through future achievements within the industry.

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Appendix 1

Competencies Relevant to Farm Forestry

Forest Growing and Management Competency Standards

FOR1	Follow occupational health and safety policies and procedures.	FPGOHS1A
FOR2.	Clean up following application of chemicals & Biological agents	RUAAG2010CH.
FOR3	Employ personal protection	PUAL3827
FOR4.	Maintain supplies of chemical and biological agents	RUAAG2008CH.
FOR5	Apply chemicals and biological agents	RUAAG2009CH
FOR6.	Operate a computer to gain access to and retrieve data	BSATEC202A.
FOR7.	Operate a computer to produce simple documents	BSATEC203A.
FOR8.	Collect data from sample area for assessment	FPGFGM075A.
FOR9	Collect analyse and organise info basic	FPGG20A
FOR10	Manage finances within a budget	LGMT403.97
FOR11	Interpret and solve numerical problems	FPGG31A
FOR12.	Prepare and implement an establishment plan	FPGFGM049A.
FOR13.	Develop implement and review operational plans	LGMT604.97.
FOR14	Market products and services	RUHHRT608
FOR15	Design –plantations	FPGFGM129A
FOR16	Extract seed	FPGFGM006A
FOR17	Conduct seed collecting operations	FPGFGM008A
FOR18	Propagate plants	RUHHRT324
FOR19	Work within environmental constraints	FPGFGM145A
FOR20	Undertake direct seeding	C6, 5
FOR21	Select trees	FPGFGM065A
FOR22	Tend forest nursery plants	FPGFGM016A
FOR23	Plant trees by hand	FPGFGM052A
FOR24	Respond to fire	PUAL15
FOR25	Prepare site for forest establishment using tracked or wheeled equipment.	FPGFGM047A
FOR26	Undertake tree selection	FPGFGM065A
FOR27	Fertilise plantation trees	FPGFGM054A

Forest Growing and Management Competency Standards

FOR28	Prune trees	FPGFGM067A
FOR29	Trap and bait pests	FPGFGM148A
FOR30	Undertake Brush cutting operations	FPGFGM110A
FOR31	Use basic hand held tools	FPGG41A
FOR32	Hand sharpen knives and blades	FPGG42A
FOR33	Maintain properties and structures	RUHHRT217
FOR34	Undertake operational maintenance of machinery	RUHHRT318
FOR35	Trim & Cross cut felled trees	PFGFGM069A
	Fall trees manually intermediate	FPGFGM112A
FOR36		
FOR37	Conduct non commercial thinning operations	FPGFGM116A
FOR38	Fall trees manually basic	FPGFGM141A
FOR39	Reduce wild fire hazards	PUAL219516
FOR40	Shift materials for site preparation and maintenance	FPGH416A
FOR41	Carry out basic fencing operations	RUAAG2521DYA
FOR42	Manage stand health	FPGFGM063A
FOR43	Manage stem improvement	FPGFGM117A
FOR44	Conduct a pest and disease assessment	FPGFGM131A
FOR45	Conduct a stocking assessment	FPGFGM132A
FOR46	Conduct a wood volume/yield assessment	FPGFGM133A
FOR47	Conduct a site factor assessment	FPGFGM134A
FOR48	Assess felled trees and logs for grade and recovery	FPGH408A
FOR49	Manage stand nutrition	FPGFGM118A
FOR50	Implement sustainable forestry practices	FPGFGM130A
FOR51	Plan timber extraction activities	FPGFGM143A

Rural Business Management Competencies

RB1	Process records	AG3200BMA
RB2	Arrange purchases and sales	AG4200BMA
RB3	Collate information	AG4201BMA
RB4	Operate within a budget framework	AG4204BMA
RB5	Budget for farm production	AG4205BMA
RB6	Establish and maintain effective working relationships	AG4206BMA
RB7	Implement a property improvement plan	AG4207BMA

Rural Business Management Competencies

RB8	Monitor and maintain stocks of material and produce	AG4209BMA
RB9	Review the strategic directions of the business	AG5200BMA
RB10	Market products	AG5201BMA
RB11	Administer the business	AG5202BMA
RB12	Develop a business plan	AG5203BMA
RB13	Monitor and evaluate business performance	AG5204BMA
RB14	Manage physical and natural resources	AG5207BMA
RB15	Manage machinery	AG5208BMA
RB16	Manage borrowed funds	AG6200BMA
RB17	Plan succession retirement and an estate	AG6203BMA
RB18	Trading in commodity product and price	AG6204BMA
RB19	Install a Total Quality Management System	AG6205BMA

Horticulture Units of Competencies

HOR1	Crop establishment	HOR206
HOR2	Pest and Disease control	HOR330
HOR3	Tree Planting programs	HOR424
HOR4	Project co-ordination	HOR338
HOR5	Treat trees for a range of problems	RUHHRT211
HOR6	Protect trees	RUHHRT215
HOR7	Operate and maintain chainsaws	RUHHRT222
HOR8	Plan a tree planting program	RUHHRT404
HOR9	Assess trees	RUHHRT507
HOR10	Manage business capital	RUHHRT607

OTFE Agriculture Competencies

AG1	Operate Tractors	RUAAG2102EOA
AG2	Manage physical and natural resources	RUAAGG5207BMA01
AG3	Prepare paddocks for chosen land use	RUAAG3350GRA

Specific Farm Forestry Tasks and the Relationship to Competencies

Task	Activities	Competency Codes				
Need	Environmental need for Trees	FOR50 FOR47	RB14 RB7	AG2 AG2	RB7	
	Market options for tree crop.	FOR14 FOR35 FOR28	FOR6 RB2 FOR43	RB3 RB10	RB12 RB18	
	Growers objectives.	RB9 RB11	RB12	RB7	RB17	
Planning	Determine broad Silviculture that links all The needs.	RB12 FOR47 HOR8	FOR12 FOR50	FOR15 RB7	FOR19 RB9	
	Decide what is a needed	RB12 FOR50 HOR8	FOR6 RB7 AG2	FOR19 RB9	FOR47 RB12	
	Decide on own ability to do works.	RB6	RB12	HOR4		
	Determine local legal requirements.	FOR6 RB12	FOR15	FOR19	RB7	
	Analyse option (financial and other).	FOR19	FOR47	FOR50	RB3	
	Identify options to complete work.	FOR12 RB7	FOR15 RB9	FOR19 HOR8	FOR47 AG2	

Planning cont.	Budgeting	RB16 RB3 RB13	FOR6 RB4 RB16	FOR10 RB5 HOR8	RB1 RB11
	Financial management	HOR10 RB3 RB13	FOR6 RB4 RB16	FOR10 RB5 HOR8	RB1 RB11 AG2
Site Identification	Match all needs	FOR15 RB9	FOR19 RB12	FOR47	RB7
	Determine site characteristics.	FOR15 RB7	FOR19	FOR47	FOR50
	Identify issues to be managed.	FOR12 FOR50	FOR15 RB7	FOR19 RB9	FOR47 RB12
Site Preparation	Nurseries	FOR16 FOR22 HOR5	FOR17 HOR1 HOR6	FOR18 HOR2	FOR20 HOR3
	Preparation clean up	FOR25	HOR1	AG3	
	Cultivation	FOR3	FOR25	HOR1	AG3
	Weed control	FOR2 FOR6 AG3	FOR3 FOR25	FOR4 HOR1	FOR5 HOR6
	Plants	HOR1	HOR3		
Site	Planting	FOR20	FOR23	FOR25	FOR45

Preparation Cont.		HOR1	HOR3	AG3	
	Fertiliser	FOR25 AG3	FOR27	FOR49	HOR1
	Pest control	FOR2 FOR25 FOR44 HOR6	FOR3 FOR29 HOR1	FOR4 FOR41 HOR2	FOR5 FOR42 HOR5
	Fire protection	FOR24			
Maintenance	Later age weed control	FOR2 FOR6 HOR9	FOR3 FOR25	FOR4 FOR30	FOR5 FOR42
	Later age fertiliser.	FOR25	FOR27	FOR49	HOR9
	Pruning	FOR21	FOR26	FOR28	
	Non commercial thinning	FOR21 FOR38 RB10	FOR26 FOR42 HOR7	FOR36 FOR43	FOR37 FOR45
	Stand health and identification of Diseases / Pests.	FOR2 FOR25 FOR44 HOR9	FOR3 FOR29 HOR2	FOR4 FOR41 HOR5	FOR5 FOR42 HOR6
	Fire protection.	FOR24			
	Noxious weed control.	FOR2 FOR25	FOR3 HOR6	FOR4	FOR5

Maintenance Cont.	Assessment	FOR6	FOR8	FOR26	FOR44
		FOR45	FOR46	FOR47	FOR48
		FOR49	FOR51	RB3	RB7
		RB13	HOR2	HOR5	HOR9
Marketing	Harvesting	FOR3	FOR6	FOR21	FOR26
		FOR35	FOR36	FOR38	FOR42
		FOR43	FOR45	FOR46	FOR48
		FOR51	RB2	RB10	HOR7
	Transport	FOR51	RB2	RB10	
	Markets	FOR14	FOR35	FOR28	FOR43
		FOR46	FOR51	RB2	RB18
		RB19			
	Supervision	RB19	HOR4		
	Environmental	FOR6			

Generic Farm Forestry Tasks and the Relationship to Competencies

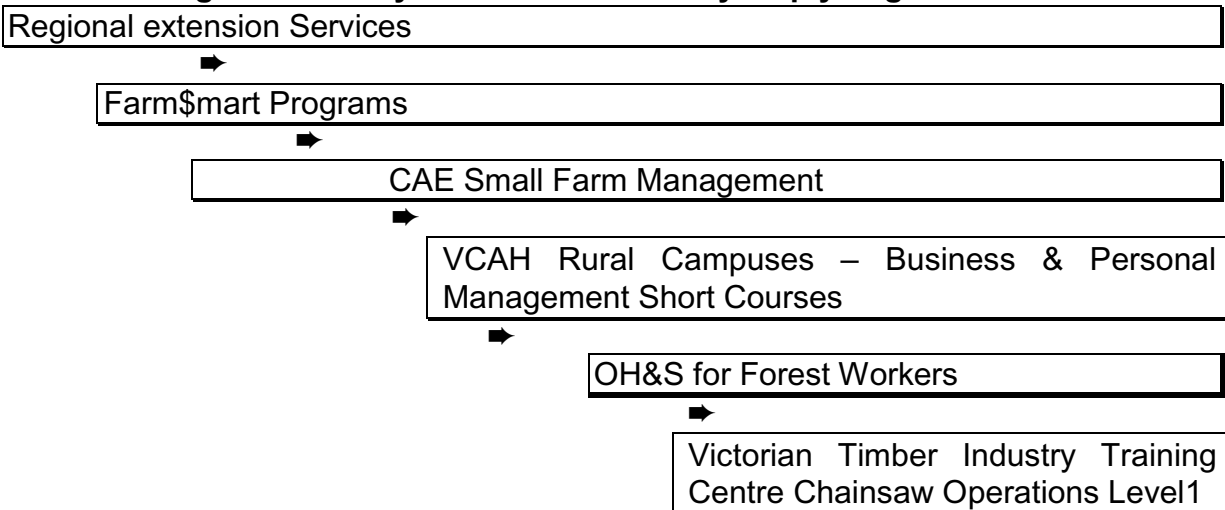
Admin	Marketing	RB10	RB12				
	Budgets	RB1	RB3	RB4	RB5	RB8	RB11
		RB12					
	Finance	RB1	RB3	RB4	RB11	RB16	HOR10
	QA	RB19					
	OHS	FOR1	FOR13	RB1	RB3		
	Human Res. Mgt	RB17					
	Stocks	FOR40	RB1	RB3	RB5	RB8	RB11
	Legal	RB11					
	Database	FOR9	RB1	RB3	RB5	RB11	
	Planning	FOR13	RB1	RB3	RB4	RB5	RB11
		RB12	RB19				
Field skills	Machinery	FOR19	FOR34	HOR7	AG1		
	Buildings	FOR33	FOR40	RB14			
	Fencing	FOR33	FOR40	RB14			
	Environment	FOR19	RB14				
Personal	Computer	FOR7	FOR9	RB1	RB3	RB5	RB8
		RB11					
	Reading						
	Maths	FOR11	RB3				
	Report prep.	FOR7	RB3	RB4	RB11	RB12	
	Public speaking	RB6					
	Hand tools	FOR31	FOR32				
	Inter personal	RB6					

Appendix 2

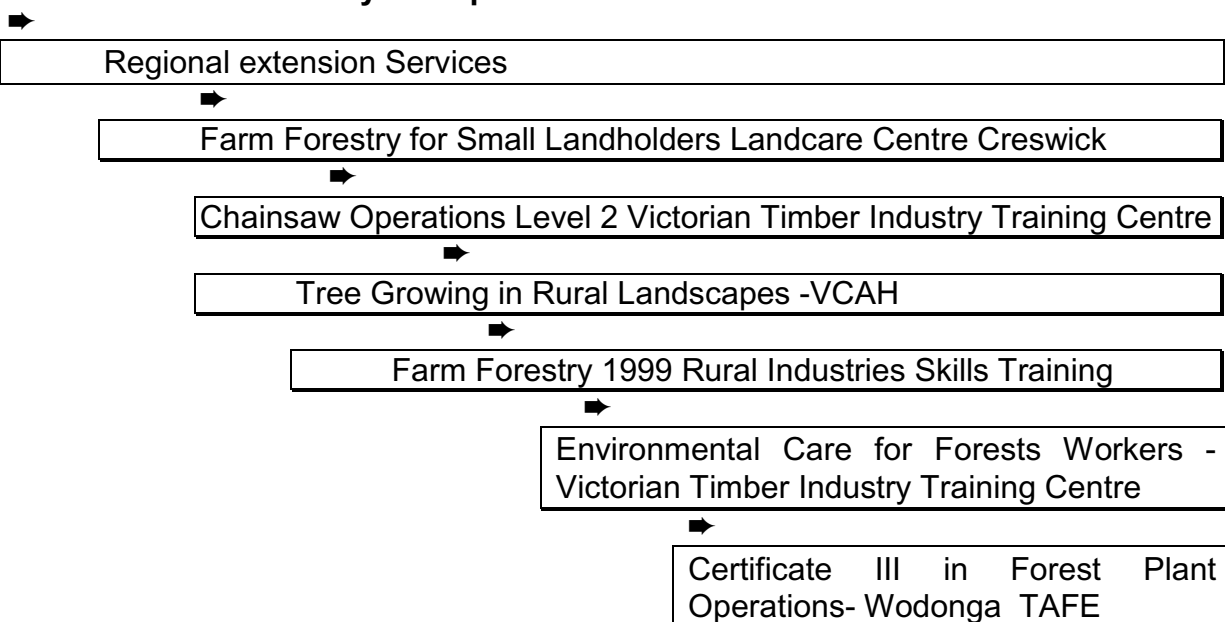
Entry points into Farm Forestry Training/Advice

Interested in Farm Forestry?

The following Introductory Courses/Advice may help you get started.



▲
If you already have experience with Farm Forestry the following introductory courses and advice maybe helpful.





If you have completed the introductory courses or have lots of experience in Farm Forestry the following advanced Courses/Advice may be useful.



Regional extension Services



Australian Masters Tree Grower Program - School of Forestry Creswick



Certificate IV in Natural Resource Management – VCAH Various Regions, Gippsland Institute of Tafe



Diploma in Natural Resource Management – VCAH Various Regions, Gippsland Institute of Tafe, Ballarat University



Farm Forestry (Short Course) School of Forestry Creswick



Farm Harvesting (Short Course) School of Forestry Creswick



Native Forests silviculture (Short Course) School of Forestry Creswick



Pest Control & Management (Short Course) School of Forestry Creswick



Plantation Forestry (Short Course) School of Forestry Creswick



Diploma in Forestry (Industrial and Farm Forestry) School of Forestry Creswick



Bachelor in Forest Science
University of Melbourne



Graduate Certificate in Forest
Science Farm Forestry
University of Melbourne

Courses/Advice in the Green Triangle Plantation Region

Course/Advice provider and location	Courses/Advice to help get you started in Farm Forestry	Introductory courses/advice in Farm Forestry	More advanced courses/advice relating to Farm Forestry
DNRE Hamilton Green Triangle Plantation Committee	Local extension/advice services		
Victorian Farmers Federation All regions	Farm\$mart		
Council of Adult Education Melbourne	Small Farm Management		
VCAH Rural campuses	Business & Personal mgmt short courses covering topics of value to people interested in getting started in Farm Forestry		
Wimmera Institute of TAFE Horsham	Chainsaw Operations Level 1		
VCAH Glenormiston Moriac,		Tree Growing in Rural Landscapes	
Rural Industries Skill Training Hamilton		Farm Forestry 1999	
University of Melbourne Various regions			Australian Master Tree Grower Program
VCAH			Certificate IV in Natural Resources Management
VCAH			Diploma in Natural Resource Management

FARM FORESTRY POLICY AND EXTENSION: WHAT'S IN IT FOR AUSTRALIA? WHAT'S IN IT FOR FARMERS?⁵

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Abstract

Most of Australia's forest and agricultural land is privately owned or managed. Consequently, the management decisions of farmers have important implications for wood production, land and water degradation, and the maintenance of ecological values, which often have impacts that extend to the broader community. The Commonwealth Government has invested substantially in farm forestry and vegetation management over the last fifteen years. During this time, there has been much change in the policy landscape, in interests reflected in government policy, and in the range of instruments being explored to address natural resource management issues. Firstly, it reflects on the development of policy and program objectives as they relate to forestry extension at the national level. It highlights the changing context in which policy is being formulated and extension services delivered. The aim is to identify the key factors that drive government policy making, so that stakeholders can better understand their impact on forestry decision-making for industry, community and the environment.

In recent years, the concept of delivering environmental services as a commercial proposition has gained prominence. Often expressed through the language of 'credits' (eg carbon, salinity, biodiversity and water credits), this way of conceptualising environmental issues is likely to have a significant impact on ideas about what and how policy might be developed in the future. It may also help to better focus the policy dialogue among landholders, conservationists, industry and governments. Secondly, the paper explores the nature of the differences in expectations that governments and landholders might have about extension and what it should deliver. It notes that the interests of government and those of landholders do not necessarily always coincide. The paper provides some insights into the nature of this relationship with the aim of assisting all stakeholders to identify mutually beneficial arrangements for delivering agreed forestry outcomes.

"It is not necessary to travel far, or to know much about botany or dendrology, to understand the magic of trees. Poets, painters, writers have all paid them homage."
(Boyer, 1996)

⁵ The views, opinions and interpretations presented in this paper are the author's own and do not necessarily reflect nor should be taken to represent the official views of Environment Australia or the Commonwealth Government.

Introduction

Most of Australia's forest and agricultural land is privately owned or managed. Australia's *State of the Forests Report* has identified that approximately 70% of the nation's forest resources⁶ are privately owned or managed (NFI, 1998). These forests, both native and planted, have many values and fulfil a multitude of functions and purposes. Consequently, the management decisions of farmers have important implications for wood production, land and water degradation, the conservation of biological diversity and the maintenance of ecological values, which often have impacts that extend to the broader society, environment and economy.

The Commonwealth Government has invested substantial amounts of money in farm forestry, native vegetation management and landcare over the last fifteen years. During this time, there has been much change in the policy landscape, in the range of interests reflected in government policy, and in the range of instruments being explored to address natural resource management issues. This paper provides an overview of these policies and their evolution, including the emerging concept of ecosystem services and its possible relevance to forestry and extension.

The title of this conference is *Forestry extension: assisting forest owner, farmer and stakeholder decision-making*. Its purpose is "to better define the role of private non-industrial forestry extension and to support and explore ways in which extension can contribute to improving landholder decision-making and stakeholder participation in these decisions" (<http://www.mtg.unimelb.edu.au/iufro/aboutconf.htm> accessed 20 September 2001). The aim of this paper, then, is to identify the key factors that drive government policy making on private non-industrial forestry⁷, consider the nature of the relationship between policy and extension, and provide some insights that may assist all stakeholders to better understand the dynamics of decision-making and identify mutually beneficial arrangements for delivering improved forest management outcomes.

Overview of national policies affecting farm forestry in Australia

Under Australia's federal system of government, prime responsibility for land use, forestry and conservation matters rests with the eight State and Territory Governments. However, the Commonwealth Government has certain powers and interests, which can have significant implications for land use management practices. Amongst other things, it is responsible for coordinating a national approach to industry development and environmental issues including in the area of forest, land and water management. In practice, responsibility for policies affecting decisions on land use and the environment is shared between Commonwealth, State, Territory and local Governments.

Over the last two decades, there has been increasing concern about the condition of Australia's natural resources and the ecological sustainability of our farming, forestry

⁶ Forests as defined by the National Forest Inventory include areas of trees often described as woodland.

⁷ The term 'farm forestry' is used in this paper to refer to private non-industrial forestry, and covers private forestry activity on farm lands for all its uses and values.

and land management systems. Commonwealth involvement in natural resource management policy has increased substantially since the early 1980s as recognition of the scale and complexity of the issues has grown. Current national policy drivers for farm forestry and vegetation management can be summed up in five words:

1. Salinity
2. Water
3. Carbon
4. Biodiversity
5. Production

Each of these drivers has its own particular policy lineage; its own history and rationale for being, its own objectives, programs, institutional structures, networks, ministers and bureaucracies. They have largely been concerned with rectifying perceived market failures and lack of production of public environmental goods. A characterisation of these drivers in the policy framework of ecosystem services is outlined at Figure 1, while the lineage or history of each strand of policy is shown at Figure 2. Salinity and water are shown together under the heading of landcare to highlight the policy approach adopted in relation to farmers in recent years.

Figure 1. Ecosystem service characterisation of policy drivers

1. Salinity}	Landcare	}	Ecosystem services
2. Water }		}	
3. Carbon		}	
4. Biodiversity		}	
5. Forestry		}	

Governments have a range of policy instruments available to them to promote natural resource management for the public good. These include traditional 'command and control' regulation, education and provision of information, and the provision of economic incentives such as through taxes, subsidies, grants and market-based instruments (OECD, 1999; Commonwealth of Australia, 2001). The following discussion refers mainly to Commonwealth Government programs, which can be viewed broadly as extension programs that have a focus on education and incentives.

Biodiversity

Policy making for farm forestry at the national level in Australia really began in 1982 with the establishment of the National Tree Program in the Department of Environment. It had the objective of "conserving and establishing trees and other vegetation for community and private benefit throughout Australia" (DASETT, 1988). This followed the rise in community concern over rural tree decline and the promotion by the United Nations Association of Australia of a 'Year of the Tree' to draw attention to the problem (Oates et al, 1981; DASETT, 1988). Greening Australia was also formed as a non-government organisation in 1982 as a direct result of the 'Year

of the Tree' initiative and became a key player in the delivery of the National Tree Program.

Figure 2: National farm forestry policies and programs⁸

Year	Landcare	Biodiversity	Forestry	Carbon
2002	Natural Heritage Trust II: Land, Vegetation, Water, Coasts			
2001	National Action Plan for Salinity and Water Quality			
1999				Greenhouse Gas Abatement Prog
1998	National Greenhouse Strategy			
1997				Bush for Greenhouse
				Safeguarding the Future
	NHT National Landcare Program	Natural Heritage Trust Bushcare	NHT Farm Forestry	
1996	National Strategy for the Conservation of Australia’s Biological Diversity			
1995				Greenhouse 21C
1992	National Landcare Program (incl One Billion Trees & Save the Bush Programs)		Farm Forestry Program	
	Decade of Landcare Plan			
		National Forest Policy Statement		
	National Greenhouse Response Strategy			
	National Strategy for Ecologically Sustainable Development			
1989	National Soil Conservation Program	One Billion Trees & Save the Bush Programs	National Afforestation Program	
	Our Country, Our Future: Statement on the Environment			
	National Soil Conservation Strategy			
1987				National Afforestation Prog
1986				National Forest Strategy
1984	National Conservation Strategy for Australia			
1983	National Soil Conservation Prog			
1982		National Tree Program		

⁸ Shaded areas represent national policy statements or strategies. Unshaded areas represent funding programs.

The National Tree Program was later expanded and replaced by the One Billion Trees and Save the Bush programs in 1989 as key elements of the Prime Minister's landmark statement on the environment *Our Country, Our Future* (Prime Minister of Australia, 1989). They had a clearer focus on biodiversity conservation and were later supplemented by initiatives like the Corridors of Green program and the Wet Tropics Tree Planting Scheme in North Queensland. These were all then incorporated in the Bushcare program with advent of the National Heritage Trust in 1997.

Over this time, funding for program delivery increased from about \$3 million over the first five years to over \$350 million over the five year period 1997 to 2002. The National Tree Program provided initial support for Greening Australia and state based committees, the employment of state-based coordinators, national coordination and information and community based demonstration projects. As more funding became available, investment in extension, advisory and facilitation services, and on-ground activities like tree planting and fencing of remnant native vegetation increased markedly.

Landcare: land, water and salinity

The impact of the National Tree Program was quickly superseded in profile by the emergence of the National Soil Conservation Program and then landcare. As Cary and Webb (2000) have observed: "As a consequence of the growth and success of community landcare, the community-based participatory model approach to rural resource management has become the dominant policy paradigm in Australia."

The National Soil Conservation Program commenced in 1983, in the Commonwealth Government's agricultural agency, the then Department of Primary Industries. It was established in recognition of the national dimensions of the problem of soil and land degradation caused by past land uses and management practices, especially agriculture. While initial funding was directed only to state agencies to supplement their efforts, the focus of the program shifted fairly quickly to provide support for community landcare projects. The program soon formed the cornerstone of the Commonwealth's 'Decade of Landcare' plan (Prime Minister of Australia, 1989; SCARM, 1995; Cary and Webb, 2000) and was the progenitor of the National Landcare Program, which received an in-principle ten year commitment for substantially increased levels of funding from the Commonwealth. The National Landcare Program, which also incorporated elements of the former Federal Water Resources Assistance Program, was established in 1992 with a much broader focus on natural resource management, including whole farm or property management planning.

The National Landcare Program embraced catchment management as a way of coordinating government and community activities across whole catchments. Of greater significance, however, was its encouragement of community involvement in rural land degradation issues and its emphasis on a self-help approach (SCARM, 1995). In essence, the concept of landcare provided a way of integrating several

strands of natural resource management policy within a social context of community development.

The public face of the program was expanded by the establishment of the One Stop Shop process to incorporate the community grants component of the One Billion Trees and Save the Bush programs. Despite this, the programs continued to be administered separately by the Department of Environment. In the context of the aims of the National Landcare Program, the management of vegetation and tree planting were mainly seen as part of a suite of options available to farmers to conserve and maintain the productivity of land and water, not as commercial or nature conservation ends in their own right.

Most recently, landcare objectives are again to the fore under the National Action Plan for Salinity and Water Quality (access via www.affa.gov.au under National Action Plan). The plan provides a strategy to guide and influence the decision making and actions of governments, landholders, communities and industry for managing natural resources in rural and regional Australia for the next 10 to 15 years. Its goal is to motivate and enable regional communities to use coordinated and targeted action “to address salinity, particularly dryland salinity, and deteriorating water quality in key catchments and regions across Australia.”

Key elements of the plan include:

- setting targets and standards for natural resource management;
- developing and accrediting integrated catchment/regional management plans developed by the community;
- capacity building for communities and landholders to assist them develop and implement integrated catchment/region plans, including provision of technical and scientific support; and
- an improved governance framework to secure the Commonwealth-State/Territory investments and community action in the long term, including property rights, pricing, and regulatory reforms for water and land use.

In large measure, these elements represent an attempt to move beyond the traditional landcare approach and adopt a wider range of policy instruments and set specific on-ground outcomes and targets for water quality, salinity and other natural resource management so as to guarantee a return on the Commonwealth's investment. In relation to extension, or capacity building in communities, the aim is to reorient the facilitator and coordinator support network developed through the National Landcare Program and the Natural Heritage Trust, to support integrated catchment/regional management planning and its implementation and provide better data and information on natural resources. The development of management and technical skills of land managers and other stakeholders is seen in the context of ensuring wider adoption of sustainable land and water use.

Plantation farm forestry and sustainable private native forest management⁹

Forestry policy in Australia has always been principally concerned with wood supply. Until the 1980s, forest policy in Australia largely focused on reserving and managing native forests for the supply of either hardwoods or water. Government policy also focused on investing (mainly) public funds in the supply of plantation softwoods, which were naturally scarce, through state forest agencies, to encourage self-sufficiency.

Since the late 1980s, the development of plantation farm forestry policies by the Commonwealth has occurred mainly in the context of the community debate over native forest and woodchip exports, though there has always been recognition of the broader public environmental, greenhouse and regional employment and development benefits of plantations. Promotion of plantations recognised the negative regional social and economic impacts of decisions taken by governments to reduce access to public native forests for wood supply and the need to augment traditional sources of supply. It was seen as part of the ecological – social trade-off required in a transition to ecologically sustainable forest development (Commonwealth of Australia, 1992a and 1995b; Rolley, 2001).

In 1987, the National Afforestation Program was established by the Commonwealth to stimulate an expansion of the commercial hardwood timber resource and to assist in land rehabilitation and degradation control through afforestation. Funds, totalling nearly \$15 million over three years, were targeted mainly to the large state and private industrial growers, though the program was also the first production forestry initiative that directly sought to engage private landholders. However, the program was not really designed to address the needs of non-industrial forest managers and lacked a supportive policy framework through which to address underlying social, economic and institutional impediments to plantation development (Donaldson, 1998).

In 1992, the Farm Forestry Program emerged as a Commonwealth initiative under the National Forest Policy Statement and was the first to have an explicit focus on working with farmers (Commonwealth of Australia, 1992a). The program subsequently received substantially increased funding through the Wood and Paper Industry Strategy and the Natural Heritage Trust, including investment from the Bushcare program. The goal was to expand, enhance and diversify the plantation resource base, recognising that while Australia has ample cleared land suitable for commercial tree growing, most of this is privately owned or managed, including by farmers who have traditionally not been involved in the forest industries (Commonwealth of Australia, 1995b, c).

The approach adopted under the Farm Forestry Program has been one of developing a regionally integrated approach to farm forestry, working in partnership with state and local government, regional organisations, industry, farmers, researchers, and community and landcare groups (Commonwealth of Australia, 1995b; Donaldson, 1998; Black et al, 2000). In many ways, the program builds on

⁹ The term 'plantation farm forestry' is used in this context to refer to plantings established mainly for commercial production purposes.

the foundation provided by community landcare movement and has had the aim of facilitating the exchange of ideas, knowledge and information leading to mutual changes in attitudes, practices and behaviour of all stakeholders. Whilst it involves the 'transfer of technology' through practical demonstrations and provision of technical information, the program has been as much about fostering ideas, discussion and debate amongst farmers, governments, industry and researchers about the paths forward at the regional, state and national levels (Donaldson and Gorrie, 1996; Donaldson, 1998).

Since 1995, projects have been funded under three main components: regional plantation committees; regional farm forestry projects; and national strategic projects. To a large extent, the program has provided an opportunity for regional stakeholders to customise extension and planning activities to meet their own needs and circumstances. It has also tried to link these regional projects with a range of strategic national support projects designed to enhance research and development, communication, information dissemination and networking. Examples include the Master TreeGrower Program (Reid and Stephens, 2000), the National Farm Forestry Roundtable and Facilitator, CSIRO's seed and information support project, and development of a National Farm Forestry Information Service.

In relation to extension, as Black et al (2000) have noted, the Commonwealth does not engage directly in extension and advisory activities but, rather, works to support various state agencies, Greening Australia, Australian Forest Growers and regional groups in these roles. Black et al (2000) note that extension strategies under the program have been developed by applying components from a range of models, from the technology transfer approaches of demonstration sites and information dissemination through to the use of group participatory principles and formation of strong communicative networks.

Since 1997, under the Natural Heritage Trust, the regional and local component of the Farm Forestry Program has been delivered through the One Stop Shop. But like the biodiversity related programs, it has really been administered quite separately.

In 1997, in an explicit partnership between industry and government, the *Plantations for Australia: the 2020 Vision* strategy was formulated. It aims to develop plantation growing and processing industries which are commercially oriented, internationally competitive and sustainable and set a target of trebling the plantation estate by 2020 (Plantation 2020 Vision Implementation Committee, 1997). The *2020 Vision* lists boosting the availability of suitable land for plantations as a strategic imperative and identifies the need to improve the tree growing skills of farmers through the Farm Forestry Program. However, in relation to farmers, it has been criticised as being too narrow in its focus on an industrial model of plantation forestry and not taking sufficient account of the different range of needs and motivations of farmers (Reid, 2000; Cummine, 1999).

The National Forest Policy Statement also contained specific commitments to improve the management of private native forests for nature conservation, catchment protection and wood production or other economic pursuits (Commonwealth of Australia, 1992a). While nature conservation aspects have been addressed through

the Save the Bush and Bushcare programs, with the possible exception of Tasmania, few other private native forest initiatives had been implemented until the scope of the Farm Forestry Program was expanded Natural Heritage Trust in 1997.

Over the last decade, while there has been greater recognition of the wider range of policy interests for plantation farm forestry, to date, the main policy objective has always been wood supply. However, with more attention being given to the potential role of plantation farm forestry as a cost-effective method of achieving revegetation targets for salinity and water quality outcomes, especially in lower rainfall regions, the balance in policy emphasis appears to be shifting. Two possible future emphases for farm forestry policy could be:

1. providing a commercial production (or economic) driver for environmental revegetation (principally salinity control); and
2. providing ecosystem services: salinity, water, biodiversity, and greenhouse.

Carbon

The potential role of carbon sinks as part of Australia's response to the greenhouse effect was first formally recognised in the Prime Minister's 1989 statement on the environment (Prime Minister of Australia, 1989). It then became incorporated in the National Greenhouse Response Strategy of 1992, with funding to extend the One Billion Trees program, provide interim support for the Farm Forestry Program, and undertake a 'land cover change project' provided in the Greenhouse 21C policy statement of 1995.

So there has always been recognition of a strong synergy between achieving greenhouse outcomes and forestry actions taken for natural resource management and production purposes. However, it was not until the Prime Minister's statement of November 1997 *Safeguarding the Future: Australia's Response to Climate Change*, prior to negotiation of the Kyoto Protocol, that funding was made available for specific greenhouse sink and carbon accounting programs. These initiatives were the Bush for Greenhouse program, which aims to enhance Australia's sinks by encouraging greater private sector investment in revegetation for environmental purposes, and the National Carbon Accounting System, which seeks to account for land based greenhouse gas emissions reduction and sink enhancement programs.

More significantly, with the negotiation of the Kyoto Protocol, a cap has been placed on Australia's total allowable greenhouse gas emissions, the potential contribution of sinks as an abatement measure has been recognised, and carbon trading has been endorsed in-principle as a means for helping to achieve greenhouse gas targets at lowest cost. There is now enormous interest in the prospect of producing carbon credits as an ecosystem service. While many issues still need to be resolved, the decisions taken at Kyoto have created the necessary pre-conditions to put an economic value on carbon sequestered in forests and 'internalise an environmental externality' (Donaldson, 1999). In turn, this has stimulated much policy research and thinking on how to use similar market-based instruments to achieve salinity, water and native biodiversity conservation outcomes.

In relation to extension, Bush for Greenhouse is being designed to build the capacity of the community, industry and government to deal with carbon sequestration issues, especially in relation to improving their ability to define, measure and monitor carbon sequestration at the project level but also to deal with related administrative and legal issues. To date, its main mode of operation has been to produce information and develop accounting tools and procedures to assist potential clients, which places it within the 'technology transfer' paradigm of extension.

Ecologically sustainable development: towards policy integration?

It is clear that policies affecting farm forestry have evolved from four related but different perspectives and cultures: forestry, agriculture (landcare), conservation and greenhouse and bring with them their own unique legacies and objectives. At the same time, there has long been recognition within the community and government of the need to better "integrate conservation and development and emphasise their interdependence and common ground" (Commonwealth of Australia, 1984; WCED, 1987).

In response, governments have sought to extend and apply the principles of ecologically sustainable development to all areas of economic and environmental decision-making and have developed common overarching policy frameworks, such as the Prime Minister's 1989 statement on the environment *Our Country, Our Future* and the National Strategy for Ecologically Sustainable Development (Prime Minister of Australia, 1989; Commonwealth of Australia 1990, 1992b). And initiatives like the \$1.25 billion Natural Heritage Trust have been introduced with the aim of taking an integrated and long term approach to the conservation and sustainable management of Australia's land, vegetation, water and biodiversity. However, despite this, and the advent of streamlined grant application processes like the One Stop Shop, most policies and programs have maintained their own separate identities and been administered largely in isolation from each other, although innovations like 'devolved grants' have started to change this situation in some areas.

To date, it has been apparent that translating the desire for more integrated approaches to program delivery has proved problematical for a range of conceptual, policy, political and practical administrative reasons. For example, there has been discussion for some time now about the potential of plantation farm forestry to contribute to achieving natural resource management objectives (Abel et al, 1997; Donaldson, 1998; Reid, 1996 and 2000). But it has not been clear from a program design and delivery perspective how such integration might occur, trade-offs made, public and private costs shared, and what overall policy framework it would fit into.

Now, under the emerging concept of ecosystem services and with increasing interest in the use of market-based mechanisms, a common conceptual policy framework appears to be emerging in which consideration and integration of the various policy objectives can be attempted. This may represent a significant re-conceptualisation of policy thinking in natural resource management.

Ecosystem services

The term 'ecosystem services' has been coined "to describe the processes and conditions by which natural ecosystems sustain and fulfil human life," largely in an unrecognised and unpriced way (<http://www.cse.csiro.au/research/ecoservices/>). A good example is the supply of clean water. As the OECD (1999) notes, the fundamental problem in dealing with many natural resource issues like biodiversity conservation is that many of the benefits accrue to the public as a whole, and because of information, market and government failures, they are often utilised at levels that are not sustainable.

To overcome this problem, it is often recommended that incentive measures be developed to internalise the full costs of externalities caused by production activities, and that the necessary information, support and incentives be provided to foster more sustainable use of natural resources. From the point of view of economic theory, all values of natural resources would ideally be translatable into monetary terms" (OECD, 1999).

The CSIRO states that "ecological sustainability requires that decisions made on the use of natural resources be based on the full range of their functional and economic values," but, that apart from a few isolated examples, we have virtually no appreciation of the nature or the value of the services that Australia's ecosystems provide on which to base such analyses (<http://www.cse.csiro.au/research/ecoservices/>). The work on ecosystem services represents an attempt to commodify natural processes and provide a basis for internalising their delivery into markets. Consequently, much work is now underway to identify and (economically) value ecosystem services provided by natural systems in production landscapes and catchments in order to provide a conceptual framework to support natural resource management decision-making and policy.

Often expressed through the language of 'credits' (eg carbon, salinity, biodiversity and water credits), this way of conceptualising environmental issues is likely to have a significant impact on ideas about what and how policy might be developed in the future. It may also help to better focus the policy dialogue among landholders, conservationists, industry and governments by more clearly identifying priorities, opportunities for achieving complementary or multiple public good outcomes, and the trade-offs involved.

Related to the idea of ecosystem services is the rising interest in the use of market-based instruments to achieve public good outcomes. At its broadest, market-based instruments can be construed to refer to any mechanism that utilise market forces in their delivery. Examples range from the adoption of accreditation and environmental management systems, revolving funds, tender or auction systems, development offset arrangements through to the introduction of 'cap and trade' systems, as is envisaged with carbon trading. Of these, it is the auction and 'cap and trade' mechanisms that are of most interest as they directly seek to internalise environmental externalities.

Even if market-based instruments are not adopted in the way many envisage, the work being done on ecosystem services and the development of credit systems will improve our ability to identify natural resource management priorities and establish more objective, transparent targets for directing public funds. Work proposed under the National Action Plan for Salinity and Water Quality to set standards and targets is important in this regard and may help to set boundaries for future markets by defining the services being sought.

From an extension perspective, regardless of what program delivery mechanisms are adopted, there will be a need to assist landholders and others to:

- acquire the knowledge and skills to understand and analyse the issues involved;
- develop capacities to define, quantify and account for the ecosystem service;
- deal with the range of practical taxation, legal and contractual issues involved;
- develop innovative approaches which establish efficient administrative infrastructure and minimise transaction and compliance costs; and
- keep abreast of a rapidly changing policy environment and related market and technical developments.

Basically, to claim a credit will require in the end an ability to credibly demonstrate the extent of the benefit being provided and its security.

Regardless of the theory behind ecosystem services and market-based approaches, an underlying issue is that someone must pay for these goods and services if they are to become functional in the real product market economy. And that can be either from government, on behalf of the entire public of a jurisdiction, or some more targeted section(s) of the community under a form of the user or polluter pays principle. In the first instance, the main buyer of ecosystem services is likely to continue to be governments in partnership with landholders and possible third parties.

Extension: what's in it for Australia and for farmers?

An important theme of the conference is to foster an understanding of the role and purpose of extension, with an emphasis on its role in facilitating participation and supporting landholder decision-making. Against the issues discussed above, this section explores the nature of the differences in expectations that governments and landholders might have about extension and what it should deliver. It aims to provide some insights into the nature of this relationship and assist all stakeholders, including government, to identify mutually beneficial arrangements for delivering agreed forestry outcomes.

Government policies and extension programs in natural resource management have largely been concerned with rectifying perceived market failures and lack of production of public environmental goods. Landcare brought to the fore the idea of a

participatory, self-learning and community led approach as a critical element of natural resource management policy. In this approach, extension is seen as a 'helping profession' to assist the client to achieve the client's goals and is contrasted to the 'technology transfer' or 'diffusion and adoption' model (Barr and Cary, 2000).

In terms of the notion of extension as being to 'help farmers make their own decisions,' the national Property Management Planning campaign, which grew out of the National Landcare Program, was launched in August 1992. Its aim was to encourage producers to develop their farm business and management skills and enter a culture of continuous learning. It was defined as "an ongoing process for the total management of a farm business which assists producers to improve their profitability and achieve more sustainable natural resource use" (Commonwealth of Australia, 1995a). While encouraging a community-based participatory model, in effect, assistance to farmers was still provided within the context of promoting the ecological and economic sustainability of agriculture in rural Australia. Property Management Planning can be seen in some ways as an attempt to bridge the two forms of extension.

Barr and Cary (2000) report that the view of extension as a helping profession "... eventually became enmeshed in policy debates over public and private benefit from government funded extension and public and private goods." The result was a shift in focus from individual to group extension and on environmental (public) benefits rather than production (typically private) benefits.

Landcare has been characterised as a useful tool to promote changes advantageous to the farm system but with limitations as a tool to achieve significant outcomes in biodiversity conservation and controlling off site impacts (Barr and Cary, 2000). Cary and Webb (2000) noted that "while community landcare and the wider landcare movement have raised awareness of resource management issues among the rural community, adoption of more sustainable farming practices has been slow. Motivation, financial incentives, financial and skill capacity and appropriate technology are necessary before behavioural change can be expected."

A fundamental issue is whether farmers actually have the capacity to 'invest' in the environment when economic returns to farming are often marginal (Barr, 1999; Bouilly, 1999). Farmers need to strike a balance between the need to ensure profitability, so as to remain economically viable over the short-term, and the need to address biophysical problems to ensure sustainability over the longer term (Polkinghorne, 1999).

Cary and Webb (2000) sum up the policy dilemma fairly well:

"the problems of externalities and the inability of individuals to capture sufficient private benefits or to agree as a group on contributing to costs and sharing benefits are well-established characteristics of open access common property resource degradation;" and

"in situations involving common property resources and the public good the conflict between free market agricultural policies and the expectation that

farmers will do public good and public benefit work for little or negative financial return is problematic.”

Likewise, the OECD (1999) suggests that the greatest policy challenge in the implementation of incentive measures for natural resource management is work out how to take account of the private as well as to the public costs and benefits.

In their review of factors influencing the adoption of sustainable resource management practices, Barr and Cary (2000) concluded: “changed natural resource management practices are most likely to be achieved by promoting changes that provide private benefits to the landholder.” This observation supports the need for extension programs to adopt approaches which respect the fact that farmers have a diversity of resources, motivations and objectives for managing their forests and land rather than seek to impose any particular model of forestry (Byron and Boutland, 1987; Cummine, 1999; Donaldson, 1998; Reid, 2000). But it does not resolve the issue of how to increase the production of public environmental goods.

One of the purposes of community extension programs is to generate an awareness of market failures and thereby generate a favourable climate for the use of other policy instruments, which more directly, can influence behavioural change. There can be little doubt that the landcare movement and government programs have been successful in this regard and, as discussed above in relation to ecosystem services, the time may be right to introduce a mix of new regulatory and incentives approaches to policy.

From a policy perspective, any discussion of extension and its role needs to occur within the context that particular policy objectives need to be achieved, and that, in its most narrow form (of assisting farmers), it is just one instrument amongst several to be used. On reflecting on the future of community landcare, Cary and Webb (2000) contend that continued government financial support depends on maintaining general community (rather than exclusively rural community) support, which depends on urban acceptance of the ideals espoused in the landcare movement. Hence, government funded programs need to be seen to meet general community perceptions of what are desirable practices to enhance resource sustainability, rather than protect the status quo.

The issue of potential conflict between farmer and government goals has been discussed in some depth by Barr and Cary (2000). They note that family, personal and financial security are generally the highest priority goals of Australian farmers, certainly in comparison to resource condition issues. Farmers often face a conflict of interest in deciding whether to adopt more sustainable land management practices, as these often lead to increased management complexity, an increase in financial risk and have significant off-site benefits which are unable to be captured by the farmer.

It is apparent that the interests of government and those of landholders do not necessarily always coincide, and that in relation to extension, government programs need to adopt a mixture of the ‘technology transfer’ and ‘helping profession’

approaches as part of a broader suite of policy regulation and incentives. In a review of extension and advisory strategies for production farm forestry, Black et al (2000) suggest that a key objective of extension strategies should be the development of a culture of continuous learning about farm forestry so as to facilitate informed decision-making and successful adoption of farm forestry by landholders. They also advocate the need for extension activities to incorporate a range of approaches, from information access and technology transfer through to provision of one-to-one advice, group facilitation and empowerment, to more structured education and training. While this may be true, one of the challenges for governments will be to design approaches to extension that effectively complement and are integrated with other policy delivery mechanisms.

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THE BUGWOOD NETWORK: INFORMATION TECHNOLOGY SUPPORT FOR EXTENSION FORESTRY PROGRAMS IN GEORGIA, USA.

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Abstract

There are over 600,000 Non-industrial Private Landowners in Georgia who are supported by a variety of federal, state and university personnel. In the USA, each state has a single state Land Grant University that has responsibilities for providing educational programming and activities in support of private land- and homeowners. Georgia has 159 local governmental units (counties), and nearly every county has a local Extension office which functions as the local contact for private land- and forest-owners located within that governmental unit. University specialists are challenged with providing education and support materials to private and public clients through these many locations. We have utilized the World Wide Web, CD-ROMs and other information technologies since 1995 to deliver materials and information to user groups. In 2000, our web sites collectively received in excess of 2,000,000 hits and served over 260,000 unique visitors. In July 2001, we made an archive of over 6,000 high-resolution images available to users via a web interface for unrestricted educational applications. The Bugwood Work Group expands the traditional definition of Extension to a global audience through use of the World Wide Web. In this presentation, we will provide an overview of The Bugwood Network (<http://www.bugwood.org/>) with examples of how we utilize information technologies in our educational and information delivery strategies.

What is Bugwood?

Bugwood is a network of closely related web sites focused in the areas of forestry, entomology, invasive species and integrated pest management that promotes the use of information technologies in these areas. It is a joint project between the University of Georgia College of Agricultural and Environmental Sciences and Warnell School of Forest Resources with support from the USDA Forest Service and USDA Animal and Plant Health Inspection Service. The Bugwood web site began in 1996 to help promote the PhotoCD image products and to host Work Group publications (Douce, et al, 1995). Over the next few years, the Work Group began to develop custom content for the site and began to repurpose existing materials. Bugwood also hosts the Southern (USA) Forest Insect Work Conference site and has since expanded to host web sites for the Southeast Exotic Pest Plant Council, the Georgia Exotic Pest Plant Council and the Georgia Entomological Society. Specific

sites have been developed to host individual subject areas as well as work in East Africa and the South Pacific. The philosophy of the Network is the coming together of various disciplines and technologies working together toward a common goal (Barger, 2000).

The Work Group?

The Bugwood Work Group was formed in 1995 by Drs. Keith Douce and David Moorhead. Dr. Douce is a Professor and Extension Entomologist in The University of Georgia, College of Agricultural and Environmental Sciences. His responsibilities include forest entomology, coordinator for the United States of Agriculture, Animal Plant Health Inspection Service, Plant Protection and Quarantine (USDA-APHIS-PPQ) sponsored Cooperative Agricultural Pest Survey program and integrated pest management (IPM). Dr. Moorhead is a Professor and Extension Forester at The University of Georgia, Warnell School of Forest Resources. His responsibilities include forest regeneration, silviculture, forest management, prescribed fire, forest herbicides, forest IPM, and until recently, Christmas tree production. As Extension specialists, they provide educational information and training for Extension agents, landowners, foresters, and resource managers. The Work Group consists of Drs. Douce and Moorhead, a technology coordinator, a computer specialist, a digital archive specialist, secretarial support and a student worker. Work Group activities include development of projects using multimedia, web sites, and computer imagery to enhance their work in entomology and forestry education (Douce, et al. 1997a, b; Douce, et al. 1998b).

Bugwood: The Web Site

Bugwood now consists of fifteen unique, but related, web sites/URLs to break the content up into logical sections (Douce, et al. 1998a,b; Douce, et al. 1999). The current web sites are as follows:

University, state, regional and US-focused sites:

- The Bugwood Network Home – the "portal" into the network. <http://www.bugwood.org/>
- Forest Pests of North America – fact sheet based information related to pests of North American forests. <http://www.forestpests.org/>
- Invasive Organisms – general informational site on organisms that are considered to be invasive to US agricultural, forests, and natural areas. <http://www.invasive.org/>
- Forestry Images: The Source for Forest Health and Silviculture Images. <http://www.forestryimages.org/>
- The Georgia Cooperative Agricultural Pest Survey Site – fact sheet based information related to invasive species of importance to U.S. agriculture and forestry with specific focus on survey programs within the state of Georgia. <http://www.gacaps.org/>
- The Southern (USA) Forest Insect Work Conference – updated yearly to support the work conference activities. <http://www.sfiwc.org/>

- The Georgia Integrated Pest Management Network – commodity-based (principally annual agronomic crops) pest management and identification. <http://www.gaipm.org/>
- University of Georgia, Department of Entomology – the department web site. <http://www.ent.uga.edu/>
- The Georgia Entomological Society – supports activities and publications of the society. <http://www.gaentsoc.org/>
- Southeast (USA) Exotic Pest Plant Council – the information center for the council and its members. <http://www.se-eppc.org/>
- Georgia Exotic Pest Plant Council – the information center for the council and its members. <http://www.gaeppc.org/>

Sites focused on geographical locations outside of the United States – International focus

- Eastern Arc Mountains Information Source– to provide information and coordination for institutions and organizations working in the forested systems of the Eastern Arc Mountains of Kenya and Tanzania, Africa supported by the USDA Forest Service and USAID. <http://www.easternarc.org/>
- Africa – Forestry, Agroforestry, and Environment - to promote the protection, health and sustainability in African forests, agroforests and forest environments. <http://www.afe.org/>
- Tree Pest Management Network – to support the African Tree Pest Management Project. <http://www.atpmn.org/>
- Pacific Islands Regional Forestry Programme – to provide information and coordination for institutions and organizations working in forestry in the Pacific Islands as a prototype in cooperation with the Secretariat of the Pacific Community. <http://www.spcforests.org/>

These sites combine to include over 5,500 individual html pages and average over 250,000 hits each month.

The purpose of the Bugwood Network stems from the mission statement as illustrated above. Our primary goal is to educate our clientele and students in a quality, user-friendly manner. This will extend our reach in a timely and efficient manner and use information technologies as tools to reach this goal.

Key factors in the success of The Bugwood Network is the strong multi-disciplinary commitment and operational philosophy that the user is interested in quality content that addresses their individual needs. We believe that if the information presented is based upon sound biology and scientific principals and addresses the need of the users that the user really doesn't care who wrote it. Our operational philosophy includes insuring that the authors and their respective employers/agencies/universities receive full credit for the content and information that they generate. We also believe that it is important that the navigation within the sites, and the layout, or "look and feel" if you will, of the system be reasonably standardized and of high quality and professional in appearance (Andres, 1999; Flanders and Willis, 1998; Krug, 2000, Lynch and Horton, 1999). If we do not have the needed content, we identify other locations that might and point the user to those locations,

whether they are web sites, hardcopy publications or individuals or agencies that can assist the user. After all, these sites are sources of information, and the user is the important person. We are committed to providing the user with the best information set that we can package and deliver.

Our principle clientele consist of: University of Georgia, Cooperative Extension Agents and clientele located within the state of Georgia, USA. Secondly, our clientele are individuals located across the Southeastern United States with questions and informational needs similar to that of our Georgia clientele, as well as other state, regional and federal personnel. Additionally, we believe that just as the web is short for the World Wide Web (WWW), our audiences/clientele are likewise the population of the world. A Bugwood Network user can literally be located anywhere in the world ... we believe that it is our responsibility to keep that in mind as we develop content and provide information.

When the authors are faced with providing our users with information or are asked to identify causative problems, we ask ourselves:

1. do we have any information on our web sites?
2. if we do not have information on our web sites, should we?, and
3. if we should, how do we obtain appropriate content and then load it onto the appropriate web site so that it is available to anyone that might need it, not to just the one person that asked the question.

Drs. Douce and Moorhead routinely refer County Extension personnel, foresters, landowners, homeowners, etc. to the web site as part of their problem solving/educational process. Many of the County Extension personnel and other clientele now call **ONLY AFTER THEY HAVE CHECKED** the web sites for information and have not found the information that they needed. We believe that this is an effective way to **EXTEND** our educational impact!

Figure 1 shows the Bugwood Home Page (October 12, 2001). Note that there is content on a wide array of subjects and disciplines. Some of these are more populated than others, but our goal is to take care of at least 80% of the potential questions and problems using these technologies, so that we can more effectively spend our limited time and resources on addressing the more difficult issues and problems that really do require our expertise and attention. This home page changes from time-to-time as we identify items of particular concern, such as the mosquito transmitted West Nile Virus problems that were experienced in the Eastern United States during the summer of 2001. Additionally, we also change the "Feature Sections", those that are in the boxes (shaded) on the right hand side of the page. We invite you to visit and explore Bugwood (<http://www.bugwood.org/>).

The most recent, and perhaps the most significant addition to the Bugwood Network in the past year is Forestry Images released on July 9, 2001 (<http://www.forestryimages.org/>). Forestry Images is a web based, fully-searchable image archive and retrieval system that the authors developed in conjunction with the US Forest Service to serve Forest Health educational and support activities across

the US. This system has been under development since the mid-1990's. We recognized the need for quality photographs of forest insects and disease organisms to use in information technology applications, and began exploring ways to address this need (Douce, et al. 1996 a,b; Barger, et al. 1999). The concept subsequently expanded to include silvicultural images and to include photographs/images of a wide array of topics related to forest health and forest management.

The Forestry Images entry page (October 12, 2001) is depicted in Figure 2. Every photograph/image in the system can be found via several pathways: simple and complex keyword searches, menu searches, number searches, by photographer, etc. Four thousand five hundred (4,500) images taken by over 170 photographers were available to users on October 12, 2001. Several thousand additional images on a variety of topics taken by many other photographers are being processed and will be available in the system in the ensuing months.

The overall objective of Forestry Images is to provide an accessible and easily used archive of high quality images related to forest health and silviculture, with particular emphasis on educational applications. The database contains over 2,300 subject codes with scientific classification (Class, Order, Family, genus, species, identifier . . . etc. as appropriate). Approximately 225,000 pages of information were served to over 14,000 Forestry Images users during the time period of July 9 to October 10, 2001. The system has 1,085 members who have registered for full use of the system and for e-mail updates.

There is no charge for any educational application as long as credit is given to the photographer and/or to his/her agency/employer, and to Forestry Images as the delivery mechanism. The photographs and images in Forestry Images are either publicly-owned images, or have been released by "private" photographers to allow the images to be used with no royalty or fee charges in educational applications. For each image, we must receive legal release documentation stating that we, representing The University of Georgia, have the right to distribute the image without restriction as long as appropriate credits are given, and that the image may be used for educational purposes without royalties and fees. For commercial applications, the potential user must contact and obtain release from the photographer or contact person/agency. The photographer retains full rights to his/her images, The University of Georgia, for legal purposes, have copyright to the delivery/packaging process (Barger, et al. 1999).

We envision the image archive as being central to evolution of web-based educational information technology systems that will be developed and served by The Bugwood Network. We also believe that Forestry Images will be a valuable resource for educators, practitioners, regulators, students and scientists into the future.

Conclusion

Developing web sites usually involves many revisions as the web changes and as developers find new and better ways to do things. Traditionally, web sites have been

developed by very large, task or company-oriented teams such as Microsoft, Disney, Sony, etc. and often take considerable time and resources to carryout. Usually, computer scientists, marketing, sales or customer support are the central forces behind design, development, implementation and operation of these web sites.

In university environments, we have seen the dichotomy of web sites being developed exclusively by personnel in Computer Support or Information Technology Support units, with only minimal involvement of scientists and educators, or by individual scientists who have a vision of how information technologies might be of help in carrying out or dissemination of educational information. Both approaches have lead to some successes and well as to many mediocre results. Anyone can build a web page, but a lot goes into developing a quality, information/educational web-based information system.

The Bugwood Work Group works as a team: Authors Douce and Moorhead are entomologist and forester, respectively. However, our team is made up of computer scientists who include expertise in: computer technology in general, database design and applications, web design, implementation and graphics. We feel that it is extremely important that ALL of these expertise's and perspectives be included in the design, application and implementation phases of our projects!

The web is a very different media than Extension educators have traditionally used. It takes a different perspective on how users want to find information, and their willingness to spend time and effort searching for the information that they need. Additionally, the traditional concepts of academic departments and how academia operates is challenged by the needs of the numerous and diverse users and user groups of our Extension information. The authors feel that we have effectively evolved our approach to using the web to extend information to a larger audience and expand the traditional definition of Extension.

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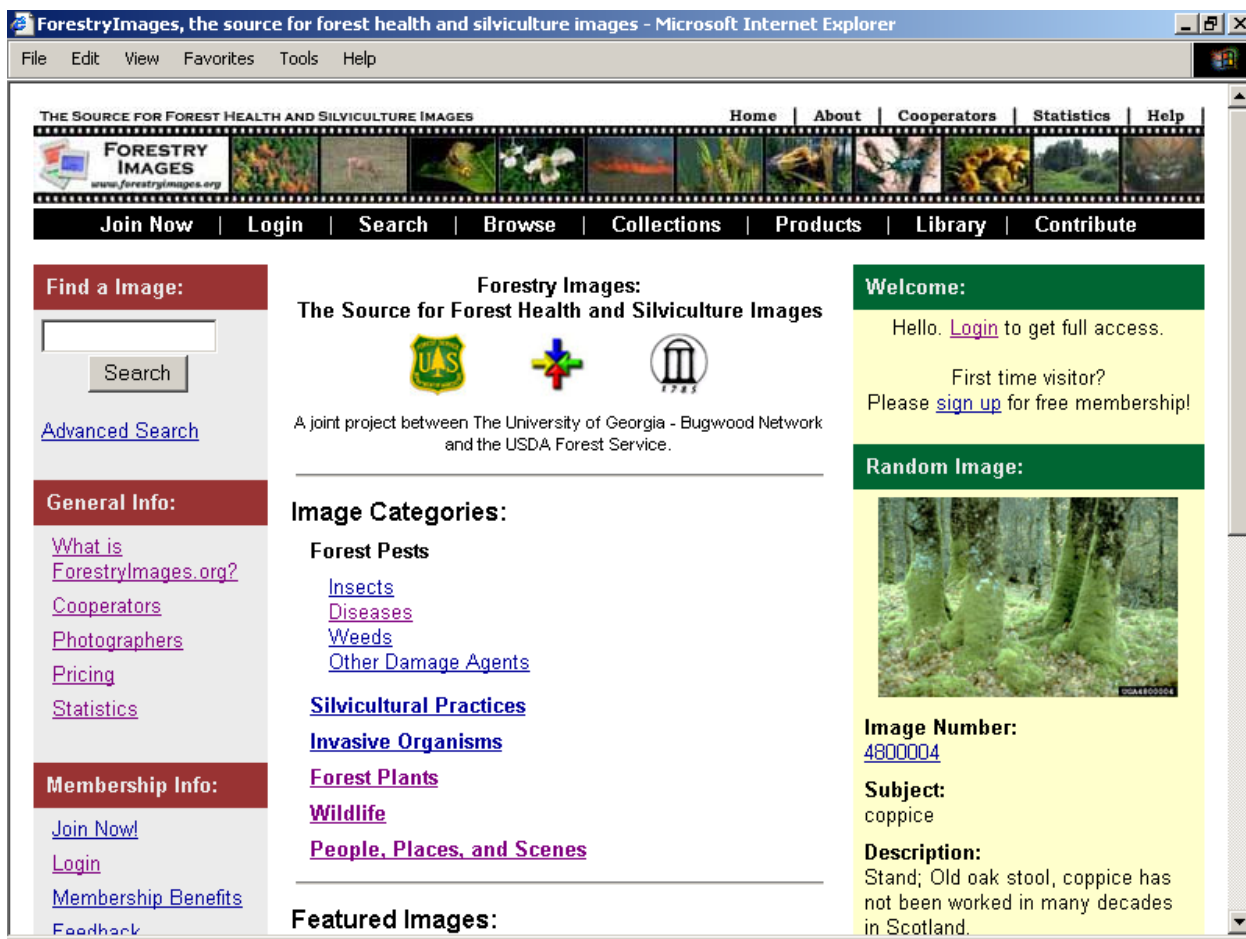
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Figure 1. Bugwood Network Entry Web Page (October 12, 2001)

Figure 2. Forestry Images web site entry page (October 12, 2001)



GENERAL VIEWS ON SILVICULTURE OF PROTECTION FORESTRY AND AGROFORESTRY POTENTIAL IN EGYPT

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Abstract

This paper describes briefly the silviculture particularities of forest trees on arid lands of Egypt. The management of protection plantations (eg. sand dune fixation, windbreaks, shelterbelts, etc.) with particular reference to sand dune fixation is described. The main objective of the management is sustainable protection. Production of other roles should be considered as by-products of sustainable protection, but the income they give should be contribute to maintenance. The second part of the paper deals with agroforestry potential in the arid region of Egypt and begins with a definition of agroforestry. The benefits obtained from agroforestry in arid lands are discussed and a review of the different traditional agroforestry systems is made. Finally, the paper exposes what should be done to improve and extend agroforestry in Egypt.

Note: A hardcopy version of the full paper may be obtained from the author.

CAPTURING INDUSTRY INVOLVEMENT IN FARM FORESTRY EXTENSION

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Introduction

Industry involvement in Australian farm forestry extension as participants and sponsoring agents has been limited to date, mostly due to the lack of perceived commercial benefit returned to the industry investor from such activities. Current industry involvement in farm forestry extension has included contribution to Landcare and National Heritage Trust projects, participation in regional committees and events such as the Agroforestry Expos as well as some involvement in local field days and Master TreeGrower Programs.

Industry has been heavily involved in farm forestry extension where:

- industry is acquiring land for plantation development
- industry is asked to justify its on-site actions and activities
- promotional benefits appear to be justified ie. sponsorship and participation in high attendance events

Definition of Industry

Industry will be defined for the purposes of this discussion as those involved in commercial business associated with forests and forestry for wood and non wood products, agricultural and forestry consultants, processors, contractors, marketers, brokers, exporters and transporters to name a few.

Why Has Industry Been Shy of Farm Forestry?

Industry has been slow to adopt farm forestry as a credible player due to:

- lack of industry understanding of farm forestry
- lack of confidence in farm forestry as an *industry*
- lack of obvious commercial focus of farm forestry
- lack of market information regarding farm forestry participation and players
- lack of knowledge of additional benefits of farm forestry
- fragmentation of farm forestry participation
- breadth of farm forestry participation

In other words, farm forestry is confusing to industry.

What is Farm Forestry?

If the participants in farm forestry finally decide on a sound definition for what they believe farm forestry is, the industry will probably be ready to listen. How is industry supposed to understand what farm forestry is, if those who are doing it can't agree?

Farm Forestry as an Industry

Is farm forestry an industry? Can farm forestry be segmented from, or attached to other forms of agricultural production? If so, does it have a voice or identity? Who are the public faces of farm forestry? What are the agendas?

These questions highlight the fact that farm forestry is regarded as an addendum to existing industrial players in both agriculture, forestry and perhaps other areas.

The Commercial Focus of Farm Forestry

If farm forestry was a credible commercial pursuit, statistics of production with associated figures of landholders, areas of production under trees, by species should be readily available. Since the nature of farm forestry need not be entirely focussed upon commercial returns, industry will logically ask; what's in it for us? Since farm forestry is considered a new movement (even though it isn't) industry is prepared to wait until some strategic strengths appear in the marketplace.

Other Benefits of Farm Forestry

If commercial timber benefits are not readily quantifiable, what are the other non-wood products and/or benefits that farm forestry can produce for industry to exploit and commercialise? These non-wood products need to also be quantifiable and standardised so that commercial values may be determined and trading may occur between parties.

Certainly there has been strong support for the planting and growing of trees in the past, and industrial companies such as BP and Toyota has been innovative in investing in some of these projects. These projects however, have been to the fringe of the farm forestry movement.

An examination of the list of sponsors of Landcare Australia (see Appendix 1) demonstrates that investment in non commercial outcomes is receiving greater attention by large multinational organizations (Landcare 2001)

The Farm Forestry Movement

Farm forestry is not yet perceived as an industry, rather it is seen as a movement. Like a political or religious wave, the leaders of farm forestry are heralded with the waving of the flag of the eucalypt, pine and wattle with the fervour of Ricki Lake fans.

But industry is not interested in Jimmy and Tammy Bakker fans unless there's a dollar left in it for industry.

The Farm Forestry Marketplace

The reality of the Australian farm forestry marketplace is that it is a large and growing market. Approximately 700 individuals have been involved in the Australian Master TreeGrower Program (Uni of Melb, 1999). The Australian Forest Growers Association (AFG, 2001) have 1387 members, the majority of whom are (alleged) growers of less than 100 hectares of trees according to the following divisions:

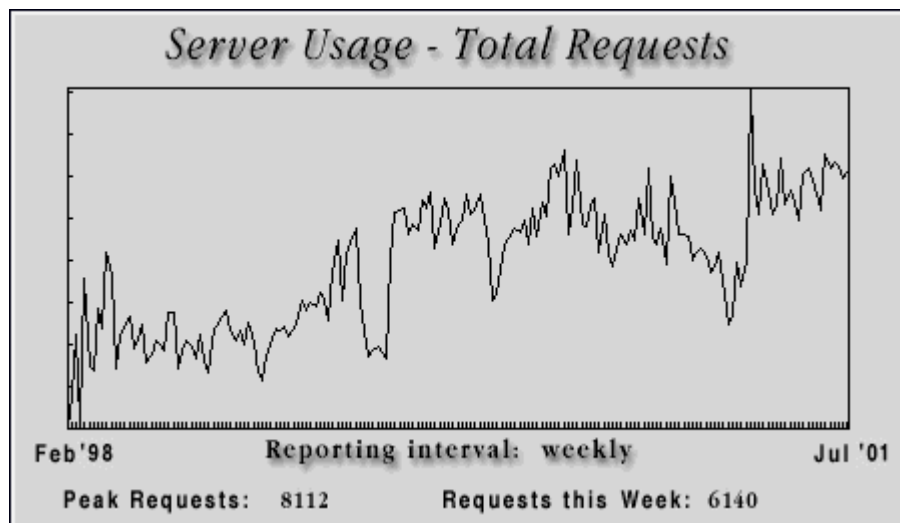
Table 1. Membership of Australian Forest Growers (AFG, 2001)

Category	Hectares Planted	No. of Members
Small treefarmer/farm forester	Up to 20	832
Medium treefarmer or grower	21-100	242
Substantial growers	101-200	45
Corporate		26
Subscribers (not growers)		242
Total Membership		1387

As a new movement, farm forestry is attracting new investment from non-traditional landholders seeking multiple benefit pursuits for a variety of reasons.

Indicators to support this growth include the Australian Master TreeGrower Website which is presently averaging between 5,000 and 6,000 hits per week (Uni of Melb, July 2001), up from 827 in February 1998.

Figure 1: Server Usage – Australian Master TreeGrower Website.



Elite Farm Forestry

For industry to capitalise on the emergence of this new marketplace, distinct market segments should be identifiable, locatable and quantifiable, depending upon the needs of the industry participants. Naturally most industry participants will seek to service the needs of the *elite* farm forestry players in terms of:

- Consistency of quality
- Reliability of production
- Certifiable product
- Value added product
- Ease of accessibility and communication

The identity of the elite farm forestry players is also crucial for the farm forestry movement to recognise in order to capitalise on internal existing strengths and opportunities.

Characteristics of the elite farm foresters might include:

- high disposable income, probably from off-farm sources
- strong interest in the land and sustainable land management
- interest in growing trees commercially
- long term investment perspective
- commitment to high quality management of trees (value adding)
- diversified agricultural and other investment portfolio
- interest in new potential markets and products.

The *elite* farm forester, might also be considered the first step champion after the primary innovator, the latter of whom may not have the resources to invest, in order to grow the farm forestry business to a commercial scale.

The Problem for Industry

The present attitude of industry to farm forestry is one of reservation, since most farm foresters are not part of this *elite* group. Most landholders who are involved in farm forestry fall outside this set of characteristics describing the *elite* farm forester.

The Opportunity for Industry

Despite the present lack of data available for farm forestry participation, production and profitability, it is recognised that farm forestry is gaining momentum. More and more landholders are establishing trees on their properties, or managing the existing trees for a variety of reasons and potential benefits. In addition, farm forestry is gaining improved recognition in the urban and semirural communities, where indeed urban forestry is also becoming recognised. The multiple benefits of farm forestry are being better understood by a wider range of audiences, a fact which fares well for the development of a *movement* into an industry.

How Does Farm Forestry Become an Industry?

Whilst farm forestry is recognised as a positive movement in Australia, it is the farm forestry community that needs to express itself as an *industry*. Farm forestry can do this by:

- marketing the vision
- providing reliable statistics for resource, process, product and profit
- differentiating farm forestry from forestry
- promoting new and high value products from farms
- developing a cooperative and consolidated marketing strategy
- developing and marketing a brand or market identity

The farm forestry community is alive and well with its characters and personalities, but who is the current face of farm forestry, the enigma, the dude. Dare we suggest that perhaps farm forestry needs a “Big Kev” to tell the industry that “I’m excited”.

Conclusion: Capturing Industry Involvement in Farm Forestry Extension

For industry to want to participate in any type of event, commercial returns and other benefits must be apparent. The farm forestry movement must therefore be prepared to sell itself in order to communicate these benefits to industry. In order for farm forestry to have an industry selling point, figures must be available to justify certain investment by external parties. These figures may then be supplemented through the provision of other benefits which may or may not have a perceived commercial value in the marketplace. Farm forestry must be prepared to commit to some serious sole searching in order to determine the best mechanism for encouraging industry investment into farm forestry extension.

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- University of Melbourne, 2001 Australian Master TreeGrowers Website
<http://www.unimelb.edu.au/stats/mtg/g-index.html>

Appendix 1: List of Sponsors of Landcare Australia

Alcoa World Alumina Australia
Amcor
Ansett Australia
The Australian Farm Journal
[Australian Home Heating Association Inc](#)
Australian Posters
Bank of Melbourne
Banrock Station

[Betta Stores Ltd](#)

[BHP](#)

[BP](#)

[Brite Solutions](#)

Castlepeak Homes

Challenge Bank

[Cotton Australia](#)

[Dow AgroSciences](#)

Duke Energy

Edison Mission Energy

Environment Australia

ESR Blinds

Ford

Freehill Hollingdale & Page

Fuji Xerox

Goodman Fielder

[Leighton Holdings Limited](#)

National Landcare Program

Nettleton Tribe

Neway

[OSRAM](#)

Pavillion Design

[Placer Dome Asia Pacific](#)

Plantmaster Products

[PWCS](#)

Rail Access Corporation

[Rice Growers of Australia](#)

Rio Tinto

Scholastic Australia

[Team Poly](#)

Telstra

Visy Recycling

[Weedbusters](#)

[Western Power](#)

Westpac

SOWING THE SEEDS FOR CHANGE: THE USE OF NETWORKS TO AMPLIFY EXTENSION PROGRAMS

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Abstract

The creation of Agroforestry Networks has become an accepted feature of agroforestry extension practice in Australia. Such networks are in a position to strongly influence extension staff and the delivery of extension services within their region. Personal observation of one such network has found they can considerably improve the effectiveness of extension efforts. This paper discusses how these observations correlate with some current theories of adult learning and effective extension practice.

Introduction

The 1990s saw a considerable rise in interest in farm forestry throughout much of south-eastern Australia. This interest was driven by several factors including the need to reduce salinity, improve water quality, increase farm diversification and improve stock shelter. Due to the high degree of perceived public good in the integration of trees into traditional farming systems, a substantial amount of public investment was made into farm forestry extension. This led to the wide spread appointment of extension officers and the funding of extension activities.

A significant feature of this period was the formation of "Agroforestry Networks". These networks consisted of groups of like minded people keen to increase their knowledge and understanding of farm forestry, become involved in commercial tree growing and facilitate and encourage others to share this interest. Whilst some networks were short lived and some evolved and developed in different ways over time. For the most part these networks are still in existence some 10 years on. Unlike Landcare groups that were also a popular feature of the 1990s, networks are not based on small well-defined geographic areas such as a sub catchment or local community. In particular networks are very strongly focussed on the issue of farm forestry and information distribution as opposed to on ground works for a range of environmental objectives. Interestingly network members will often also be active members of a local Landcare group.

The Wimmera Agroforestry Network

One such network is the Wimmera Agroforestry Network (WAN) which formed in 1996 and is located in western Victoria. Prior to WAN's formation a number of extension staff were operating in the area promoting revegetation for a variety of public good reasons. As one of those extension officers it was largely up to me to determine what extension events were run including when and where.

The idea of forming an agroforestry network was suggested and facilitated by extension officers. It was seen as the logical “next step” and in keeping with practices in other areas. Whilst there may have been a vague notion that having a network might improve our extension efforts there was no in depth analysis of how or why at the time.

On its formation WAN very soon took on an independent life of its own. Members began selecting their own topics of interest and initiated events when and where it suited them. They have held field days, published leaflets, sought and obtained external funding and carried out trials and investigations. Whilst the network looked to me for technical support in organising these activities and readily accepted any input I made at meetings, I clearly had only one vote in the decision making process.

From the onset, WAN also determined to charge an annual membership fee of \$20 per person. At the time this seemed quite high as most other networks were either free or had only a nominal joining fee. However the members argued quite strongly that this would give both greater credibility in the community, and minimise their dependence on the government for assistance with administrative activities. Despite my concerns about the level of this fee, each year the membership grew with very minor losses of past members. Currently it has over 70 members. Interestingly many other networks have since increased or introduced membership fees.

At first this gave me a strong feeling of losing control as I was presented with the choice of following WAN’s lead or working without their support. As the later seemed untenable I opted for the former. To begin with my concerns seemed verified as chiefly committee members attended field days and evening seminars. This concerned the WAN committee also, prompting them to conduct a member’s survey. The results surprisingly were that the bulk of members were most satisfied with WAN’s performance, and were more interested in receiving regular mail outs than in attending field days. For many the purpose of joining WAN was simply to keep abreast of agroforestry developments.

Since those early days I have developed a strong working relationship with WAN and have found that by working with WAN I have been able to greatly expand my contacts and reach a far wider audience. Furthermore there is evidence to suggest that these extension activities are now more effective and better linked to the target groups needs and wishes.

Extension styles

What is the role of the extension officer once a network forms? Have they become redundant? No! In fact they have a crucial role to play in supporting the network through obtaining and interpreting information, coordinating activities, liaising between agencies, and facilitating the development of the network as their skills and abilities evolve.

Let us consider the different approaches to extension found in Australia. These can broadly be divided into three categories (Hartley 1992). Without going into detailed descriptions of each category, I found that working with WAN effectively led to a shift away from the more traditionally used “Interventionist”, and towards the “Co-learning” style of extension. The “Co-learning model” of adult learning is where an environment of equals is formed that allows the extension officer and the farmers to learn together. Learning of this type is self-directed and generates a high level of ownership amongst the participants.

This process of adult learning whilst one of the most difficult for an extension officer to work with is the most powerful (Hartley 1992). Hartley also mentions that many extension officers feel uncomfortable with this approach because they are not “in control” of the situation. This comment tallies well with my own initial experience with working with WAN.

Adopter categories

It has been theorised that as not everyone adopts innovations at the same rate it is possible to plot the percentage of people who adopt innovations against time. The result of this is nearly always a bell curve with a normal distribution (van den Ban & Hawkins 1988). By classifying people according to how far from the mean they vary it is possible to create a number of “adopter categories” (Figure 1, Rogers 1983).

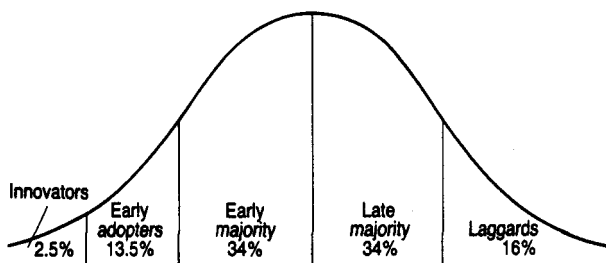


Figure 1: Adopter categories (Rogers 1983)

If one accepts this theory, that farming communities can be divided into categories based upon their readiness to adopt new technologies with “early adopters” forming a relatively small proportion. It is then reasonable to assume that those inclined to join networks will also be early adopters. The network is therefore gathering the people most inclined to listen and adopt the practices you as the extension officer are trying to transfer. Networks are thus a useful filtering device to ensure that resources are being effectively used eg avoiding the message falling on deaf ears.

Does this mean we should ignore the majority of the landholder population and target only the 16% inclined to adopt? No. In the Wimmera we have found that we still need to target extension activities at the broader community. However the existence of the network allows us to better discern the early adopters from the greater population. This in turn has allowed us to develop two differing styles of extension targeted at the two groups respectively. Practical and personal activities leading to skill development

and detailed knowledge enhancement are devised for the early adopters, in the network. Whilst simple generalised community messages aimed at awareness raising are aimed at the broader community. It has also been possible to discern a smaller group who could possibly be placed in the “innovator” category. These are those network members who are actively involved in running and steering the network. These people have reached a point where they have taken on a training and monitoring role for other members of the community. It has been interesting to observe their development as they take on a large part of what had earlier been my own earlier role with the community. Thus allowing me to concentrate increasingly upon their continual development.

Decision making circles

One might suppose that a drawback of this approach, is that only a small proportion of the community will ever adopt the practices you are seeking to have adopted on a broad scale. However, here again networks can assist the extension officer, who, by concentrating resources on this small subsection of the community is in fact increasing the infiltration of their message into the wider community.

Landholders place the greatest credence on new technologies already adopted and proven by other members of their community (Whale et al 1989). Even when people seek advice from an “expert” they typically seek to validate and evaluate it with close friends, neighbours or family. Often the extension officer is seen as a good source of technical information but not practical application, this is better sought from another farmer in the same district. As early adopters, network members are providing their local community, friends and family with this contact for verification. Rogers (1983) described networks as important interpersonal networks for conveying information about new ideas to decrease uncertainty about their use.

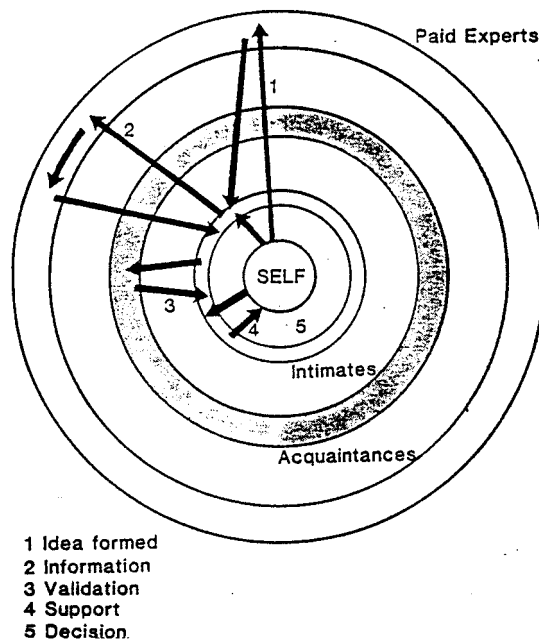


Figure 2: Learning (Petal) diagram (Phillips 1985)

Philips (1985) found that the degree to which farmers use people as a source of information depends upon the perceived social distance between them. From this he developed the Learning (Petal) diagram (Figure 2). Each group plays a specific and quite different role in assisting the learner and their development. The paid experts were used as sources of information whilst intimates provided validation and approval for the decision to apply the new information.

Extension officers in fact tend to be on the outer limits of the decision making circle for most landholders. This fact is often not apparent to the extension officer as there are often sufficient “early adopters” to occupy their time and create a perception of widespread community demand. Networks allow the extension officer to overcome this barrier in two ways:

1. By sowing skilled and motivated landholders across the landscape, who in turn will provide a source of practical examples, validation and support to their local community; and
2. By working closely with a small group of people for a length of time the officer may build relationships of sufficient intimacy that they can move inwards from the outer circle (Figure 2).

Thus by concentrating on the smaller group the extension officer is in fact gaining indirect influence of many times this number of people. These are people who in normal circumstances would not be receptive to their message. Furthermore they are creating the opportunity to increase their degree of influence over this same group so that the relationship should become increasingly productive from an extension viewpoint.

Conclusion

As earlier stated the understanding of why we formed WAN was somewhat limited. Since then I have had the opportunity to further consider the role of networks and form a better understanding of their place in agroforestry extension programs.

To summarise, the establishment of a network has allowed us to improve our agroforestry extension program in three ways:

1. It has facilitated a move towards the use of the more effective “Co-learning” extension style;
2. It has more clearly delineated our clients in terms of their readiness to adopt thus allowing better-designed and targeted extension programs; and
3. But most importantly it has sown a large number of agroforestry practitioners amongst the rural community, who in turn will act as advocates and stimulate further interest amongst their immediate peers.

By understanding the theories of adult learning and extension processes it is possible to see how the development of WAN has not only broadened the scope, but potentially increased the effectiveness of our extension efforts in the Wimmera.

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THE SUGAR GUM STORY: THE MARKETING SUCCESS OF A HUMBLE SHELTER TREE

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Background

Sugar gum, (*Eucalyptus cladocalyx*) is a medium-tall tree, endemic to South Australia. The best growth and form trees occur in the southern Flinders Ranges towards the top of the Spencer Gulf where it sometimes attains 35m in height with a dbh of 1-1.5m. The mean annual rainfall where it naturally occurs is around 380-650mm with a winter maximum. Sugar gum grows well on a range of soil types from deep sands and ironstone gravels to heavy clays on the basalt plains of western Victoria. However, it can be frost sensitive when young and it does not tolerate waterlogging.

The first direct seeded sugar gum plantations in western Victoria were established in 20-60m wide belts by J.L. Currie in 1876. Sugar gum was chosen by early settlers as the principal species after it proved it could flourish and out live most of the other species trialled in this region. These plantations were principally established for much needed shelter on the naturally treeless, western plains, but sugar gum was also valued for its excellent firewood and was occasionally used for fence posts, rails and various other on-farm uses. Sugar gum continues to be planted across a range of sites as experimentation with species by landholders and researchers reaffirm the early settlers knowledge that it is one of the best performing hardwood species in the medium to low rainfall regions of western Victoria. The Corangamite Farm Forestry Project, (CFFP) estimate that there are over 3000 hectares of sugar gum plantations originating from the early settler and Forests Commission plantings and that hundreds of hectares have been planted over the last decade.

The Multi Purpose Tree

Over the past decade, sugar gum has unfolded as a species which has many excellent environmental benefits and wood properties as outlined below:

- ◆ It has excellent drought and fire tolerance and it has the ability to coppice prolifically.
- ◆ According to tree growing expert, Dr. Rod Bird, the typical 20 metre wide sugar gum belts established on the western plains are one of the most effective designs for providing shelter over long distances due to their height and permeability⁽¹⁾.
- ◆ A Victorian Study of Firewood Properties rank sugar gum as equal to yellow box, (*Eucalyptus melliodora*) and superior to red gum, (*Eucalyptus camaldulensis*), in terms of it's available heat output/unit volume⁽²⁾.

- ◆ The mature heartwood of sugar gum produces a strong, dense timber with an air dry density of 1100 kg/m^3 at 12% moisture content, after reconditioning,⁽³⁾ making it similar to red ironbark, (*Eucalyptus sideroxylon*).
- ◆ Sugar gum produces an attractive, tan coloured timber of fine, uniform texture, commonly with an interlocked grain which is generally free of defect.
- ◆ Results from a 25 year durability study ranked the mature heartwood of sugar gum as durability class 1 for both above and below ground application⁽⁴⁾. This is the highest Australian durability classification.
- ◆ Sugar gum is one of the handful of Eucalypts, which the Commonwealth Scientific and Industrial Research Organization, (CSIRO), are commending for its favourable sawing and drying properties as a young age eucalypt. Senior wood scientist, Dr. Gary Waugh, rates sugar gum highly and sees it as a high priority species for further research⁽⁵⁾.
- ◆ Sugar gum timber is highly suited for use as electric fence droppers. According to Dr Gary Waugh, it has electrical resistance conductivity properties very close to those of other well accepted insul timbers; yellow stringybark, (*E. muelleriana*) and grey ironbark, (*E. paniculata*)⁽⁵⁾.
- ◆ Being strong and durable, sugar gum produces timber suitable for heavy construction purposes. It also produces structural timber of very high strength and low defect for use in the building trade eg. as posts and beams. Sugar gum is also being used for indoor and outdoor furniture, flooring, panelling, benchtops, tables, cupboards, doors and as a craftwood.

Marketing Sugar Gum for Firewood

Across western Victoria and South Australia, sugar gum has been highly prized as a firewood species for many years. In the Corangamite Region, where around half of the western districts' sugar gum plantations lie, half a dozen or so woodcutters cut sugar gum firewood on a regular basis under a system where the woodcutter would harvest and clean up the plantation and the landholder was paid a royalty of \$2-5/m³ for split, stacked firewood. The firewood was left for 6-9 months to dry and then sold in small lots of 2-5m³ delivered to regional towns and outlying areas for an average price of around \$45-50/m³, mostly on a cash-in-hand basis. Some landholders were reluctant to harvest their plantations due to bad experiences with some unscrupulous woodcutters or failure of the plantation coppice to survive. Furthermore, there were few options available for alternative ways of harvesting and marketing plantations and there was a lack of information on how sugar gum plantations should best be managed to maintain shelter and wood production.

Until recently, sugar gum was virtually unknown as a firewood species outside of western Victoria and South Australia, as is evident from a survey of over 80 wood merchants undertaken by the CFFP in 1997 through southern Australia⁽⁶⁾. From this survey, a handful of woodyards responded that they would be interested in trialing sugar gum but most were concerned about marketing an unknown species and the potential problem of establishing continuity of supply. After follow up phone calls, visits and deliveries of firewood samples to some of the more enthusiastic firewood merchants, we chose one merchant, Peter Daliosio at Thomastown Woodyard to

become our first sugar gum firewood retailer in Melbourne. We focussed on Peters' woodyard because;

- He was willing to pay more than that which was generally being obtained for sugar gum firewood in regional Victoria, (approximately \$67/m³ in Melbourne compared to \$45-50 /m³ locally).
- His woodyard was well positioned with good access to help minimize transport costs and he was able to take at least 20m³ loads at a time.
- He was willing to take dry firewood split or unsplit.
- He was a relatively small scale operator who was not locked into having to source all his firewood from one supplier, hence, he was able to be somewhat opportunistic in the way he sourced his firewood and the issue of continuity of supply was not a significant limiting factor for him.
- He could see the advantage of selling a plantation-grown product which was unavailable anywhere else in Melbourne at that time.

Coinciding with our promotional work with woodyards, CFFP conducted a survey of 315 firewood-using householders in the Ballarat area. Results indicated that 94% of those surveyed said that they would be more likely to buy plantation-grown firewood, where available, due to the perceived environmental benefits ^[7]. A similar survey undertaken in North east Victoria by Bruce Sonogan, (pers. comm.)^[8], also confirmed consumer preference for plantation firewood.

The CFFP started to promote sugar gum through regional radio stations, newspapers and farmer targetted magazines emphasizing the species key attributes as follows;

- ♦ "environmental friendliness",
- ♦ excellent burning properties;
- ♦ suitability as a farm forestry species for the low to medium rainfall zones of western Victoria.

Although it was tempting to promote sugar gum firewood widely in Melbourne, we decided on a small targeted campaign, as we were unsure if the supply would be able to keep up with the potential level of demand that might have been generated. Hence, we made contact with various environmental groups, some of whom had already been questioning the sustainability of existing firewood harvesting in public and private native forests and remnant trees. Through these groups we found that there was a real demand for quality plantation-grown firewood as many environmentally conscious consumers had been looking for such a product.

So here we had a source of plantation firewood that was readily available, (or so we thought), we had a well established group of professional and part time firewood cutters, a demand generated for plantation firewood that was not being met in the marketplace and a product that was good enough to compete with the other traditional firewood species. With the higher returns being offered for bulk loads of sugar gum in Melbourne it seemed logical that woodcutters would be interested in selling at least some of their firewood into this new market. However, this was not the case. Many of the woodcutters were suspicious of dealing with distant

middlemen and preferred to continue to market their firewood locally on a small scale. Other issues also came up with the woodyards regarding, presence of ants and retention of bark on the firewood that hadn't been concerns in the local markets.

Finally, a couple of entrepreneurial landholders began arranging their own harvesting operations and the first loads of sugar gum firewood began rolling into Thomastown woodyard in 1998.

Nowadays, the average royalty paid to landholders for sugar gum firewood has risen to \$5-10/m³, the number of woodcutters have increased and the harvesting has become more efficient through increased mechanisation. The traditional system of paying by the stacked m³ is still common, however, a number of landholders and woodcutters are now trialing other harvesting and marketing systems that will increase their share of the profit. Having compared the costs and returns of the various harvesting and marketing options available to him, one landholder is currently paying woodcutters to cut his sugar gum plantations on a per cubic metre basis and is arranging the transport and marketing of sawlogs and firewood into Melbourne himself. Others are now offering their plantations for harvesting on a tender basis.

Plantation grown sugar gum is now retailing in Melbourne at the same premium price as yellow and grey box. Firewood merchants in Melbourne are home delivering small lots of split, dry sugar gum for as much as \$140/ m³. Higher prices are paid for speciality products such as small diameter firewood for wood-fired pizza ovens. Currently, Melbourne merchants are paying around \$80-\$85/m³ for 30cm lengths of dry, sugar gum firewood delivered to the wood yard. In regional centres around Colac, Ballarat and Geelong consumers are paying around \$60-\$65/ tonne for home delivered, split, dry sugar gum in small lots where cartage distances are generally less than 50 km.

Demand in Melbourne for sugar gum firewood, through at least 5 wood yards, and through local merchants and other outlets currently outstrips supply.

Marketing sugar gum sawlogs

CSIRO research data released in 1996 identified sugar gum as being of the highest durability rating for in-ground use and the species was also given the green light for its suitability as an insul timber, confirming some of the anecdotal information we were hearing from landholders about the species. This information opened up another potential market and hence we set about promoting the species to fencing and landscaping companies around Victoria. At least one local sawmill, Hutton's at Barongarook, is now producing and marketing insul timber and a number of other products for high durability application.

Over the last few years, millers and researchers started looking into the wood properties and milling potential of sugar gum and CSIRO milling trials commended sugar gum for its favourable sawing and drying properties as a young age eucalypt. Farm forestry networks and research bodies have been actively promoting the species as it was virtually an unknown species in the timber and manufacturing

industries. Interest in obtaining sugar gum logs and sawn timber increased as we worked closely with all stakeholders from landholders and firewood cutting contractors, to the millers (who had generally had little to do with the species), right through to the furniture manufacturers and potential consumers. A number of high quality sugar gum products such as drawers, bedsteads, tables and bowls were produced and used at farm forestry field days and at meetings with furniture manufacturers to help illustrate the species potential.

A timber marketing report commissioned by the Central Victorian Farm Plantations committee confirmed that there was a lack of knowledge about sugar gum in the market place. However, most of the 80 or more respondents were very interested in the species after they examined the sample cabinet door and the consultants concluded from their research that sugar gum had "immediate market appeal"⁽⁹⁾. This research has further helped to raise the profile of sugar gum.

Contact with environmental groups such as the National Parks Association and the Wilderness Society has helped raise the profile and demand for sugar gum for all its wood products assisted by the fact that it is one of the only Australian-grown, plantation hardwood sawlog species currently available.

Given the relative scarcity of the availability of sugar gum sawlogs, (CFFP roughly estimate that there are around 30 000 m³ of millable standing sugar gum sawlogs in western Victoria at present), most of the CFFP's effort in marketing has been aimed at the smaller millers and furniture manufacturers. The smaller mills tend to be more flexible with the species and the quantities that they process. Promoting sugar gum amongst the high quality furniture manufacturers has the advantage that if, as a timber species sugar gum can gain acceptance in the high quality end of the market, then it should also be able to hold its own in the middle to lower end of the market if and when it becomes a mainstream plantation timber in the future. Being such a dense, heavy timber we believed that it was necessary to provide some of the leading high quality furniture manufacturers with small complimentary quantities of kiln dried sugar gum to experiment with. Feed back from a recent CFFP survey of six manufacturers and marketing organizations who have worked with sugar gum has been very encouraging. They all felt that the favourable environmental credentials of sugar gum was a selling point, though wood colour and quality were the key attributes that consumers based their choices on initially. Some of those surveyed will only promote or sell wood that is either recycled or plantation-grown. Other markets see the scarcity of supply of sugar gum as an actual marketing advantage, for those who want something really different from the rest.

As for the landholder, unfortunately there are still plenty of good quality logs going up in smoke but the tide seems to be turning. Through regular articles in regional newspapers and forestry magazines we seem to be getting the message across that sugar gum is a multipurpose tree with an end value greater than just \$5/m³. More and more landholders are seeking advice on how to best harvest, market and manage their plantations in order to get the most out of them. Competition for sawlogs is growing and we now have a list of over 12 millers and furniture manufacturers, keen to purchase sugar gum sawlogs and/or sawn timber. In 1998, a group of landholders harvested 20m³ of sugar gum sawlogs and sent them to a mill

in Central Victoria for processing and drying. They anticipate that they will see a final profit of \$600/m³ (10). Many other landholders are now looking at extracting sawlogs prior to or as a part of their firewood harvesting operations.

A few years ago sugar gum was only harvested for firewood, returning the landholder \$5/m³. A recent tender saw sugar gum sawlogs fetch a standing price of \$100/m³.

Picking your market

A common belief in farm forestry is that the market will only deal with timber when it is available in large quantities and that we should narrow the focus on growing and marketing a small number of species. However, that thinking ignores the fact that people will pay for a high quality product and that maybe the relative scarcity of availability, coupled with the species "green" plantation-grown credentials is a real marketing advantage. In the case of sugar gum, we have targeted those smaller processors and manufacturers who have the flexibility and marketing skills to deal with and potentially capitalize on the story behind the tree, in some cases turning the perceived exclusivity of marketing or owning a piece of sugar gum furniture into a marketing advantage.

Find your allies, work with them and be prepared to start small, this will set the scene for larger scale marketing to follow on.

New plantations

The CFFP recently lead a group of American and Australian investors to illustrate the potential for establishing new sugar gum sawlog plantations in the mid to low rainfall zones of western Victoria. The idea is now being marketed to power generation companies in both the U.S. and Australia. It is expected that establishment of new investor funded sugar gum plantations will commence over the next two years to compliment the increasing level of landholder initiated sugar gum plantation expansion happening across western Victoria.

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USING A MULTIDISCIPLINARY, INTERAGENCY APPROACH FOR EXTENSION TRAINING IN AGROFORESTRY: FACILITATING LANDOWNER DECISIONS

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Introduction

Agroforestry is a form of sustainable land use that combines trees and shrubs with crops and/or livestock in ways that increase and diversify farm and forest production while also conserving natural resources. In the U.S., five temperate agroforestry practices are recognized--alley cropping, silvopasture, forest farming, riparian forest buffers, and windbreaks (Gold et al., 2000).

In the state of Missouri as elsewhere, family farms are suffering from some of the lowest commodity prices in history. This suggests a need for a shift from traditional monoculture commodity production – that may be viable for large farms but overlooks the needs of family farms – to more non-traditional approaches including agroforestry. Agroforestry practices can help improve economic stability for small and medium-sized operators through the diversification of farm and woodlot enterprises. By using agroforestry practices, landowners are also taking pro-active measures to help protect the water, soil and wildlife resources on their land.

While the benefits of agroforestry are apparent and recognized in the tropics, the five practices are not well-known in the U.S. In order for landowners to make decisions to adopt agroforestry, new extension efforts are necessary. At present, the primary sources of information and technical assistance for new approaches to farming are natural resource and agriculture extension professionals. Yet, they are as unfamiliar with agroforestry as are the farmers they serve. One of the actions recommended by the U.S. Department of Agriculture (USDA) Commission on Small Farms (1998) was that the service providers such as agricultural extension, the Natural Resources Conservation Service and forestry professionals make greater efforts to promote and support agroforestry as part of an economic and ecological strategy for a healthy agriculture.

Lack of understanding, access to information and limited outreach programs have been identified as major impediments to the wider adoption of agroforestry (AFTA 2000, 1977; Garrett et al, 2000). Part of this is due to the multidisciplinary nature of agroforestry. Attempts at developing extension and outreach programs have been hampered by the fact that academics and resource professionals tend to work only within their respective disciplines. To develop an effective agroforestry technology transfer and extension program requires a unique approach that incorporates the forestry, agriculture, horticulture, conservation and economic components of the

various practices and brings together natural resource and agricultural extension professionals who otherwise would not usually work together.

In most of the U.S., agriculture and natural resource professionals are the first contact point for the farmer and, in general, farmers trust them. In an effort to equip natural resource professionals with the skills in agroforestry to provide technical assistance to farmers, the University of Missouri Center for Agroforestry (UMCA), through their technology transfer and outreach program, is building partnerships with natural resource professionals in local, state and federal agencies in Missouri. The technology transfer and outreach program focuses on three primary areas. First, is the building of inter-agency and inter-organizational partnerships to provide technical assistance. The second is devoted to information dissemination, including an agroforestry professional training program. And the third is socio-economic research devoted to understanding benefit/cost analysis of agroforestry and what factors facilitate or constrain adoption of agroforestry practices. This paper discusses the design of the agroforestry extension program utilizing regional agroforestry teams, the agroforestry technical assistance training program, and informational materials to support technical assistance in the field.

The Technology Transfer and Outreach Program at the University of Missouri

Building partnerships

Just over four years ago, the University of Missouri Center for Agroforestry (UMCA) established a technology transfer and extension outreach program to foster the adoption of agroforestry in Missouri. A faculty position in the Center was created specifically for the purpose of developing, implementing, and directing the extension program. The position also directs the UMCA's social science research program related to agroforestry adoption.

It was realized early on—given the multidisciplinary nature of agroforestry—that a cooperative effort would be required to assist farmers in developing agroforestry practices. University outreach/extension, while able to provide assistance with agronomy and livestock, for example, did not have expertise in forestry. Conversely, foresters do not have training in agronomy and livestock management. Horticulturalists could provide expertise on vegetable or fruit crops, but perhaps not livestock and forestry. Other resource professionals, such as those in the Natural Resources Conservation Service of the U.S. Department of Agriculture (which has offices in each state) or local soil and water agency technicians, have expertise in conservation practices but may not have forestry or agriculture skills. To achieve this partnership, the director of the technology transfer and outreach unit began to develop “regional teams” of resource professionals with representatives from the agencies mentioned above.

At present, there are six teams throughout the state of Missouri representing different ecological regions. The purposes of the regional teams are to:

- provide an interdisciplinary approach to planning and implementation of the

temperate agroforestry practices in Missouri;

- develop partnerships among agencies and organizations to maximize resources and share information on techniques for designing practices as well as available incentives/subsidies;
- identify training needs for natural resource professionals and to train “trainers” to extend agroforestry;
- implement field demonstrations of agroforestry practices in collaboration with natural resource professionals and landowners/farmers; and
- assist in the design of the practices by creating templates for each of the agroforestry practices with species specific to each ecological region.

The teams are anchored primarily by staff from the University of Missouri Outreach and Extension (U/OE), the Missouri Department of Conservation, Forestry Division (MDC) and the Natural Resource Conservation Service (NRCS), although there is other participation which varies by team. Some teams have farmers, others have community development specialists, members of conservation/environmental groups or agricultural lenders. These regional teams have an additional advantage aside from interdisciplinary planning of the agroforestry practices. This is the number of farmers and landowners that the team members can reach, as a group, versus solely through their own agency. The teams learn about agroforestry together and design the practices together and then each goes out to work with their respective client base. This increases the opportunity for extending agroforestry because each person who is on the staff of an agency or institution has a client base.

Agroforestry technical assistance training

Agroforestry training has been an important technology transfer activity of the UMCA. The first step in the process was to hold six regional one-day introductory courses for natural resource professionals throughout Missouri. They provided suggestions for further training needs. In response to their suggestions, a second, two-day, in-depth course was held. During the course, natural resource professionals were organized into regional teams so they could design practices with species appropriate to their respective regions. Most recently, in 2000, a third course was held and a new segment added: the economics of agroforestry. Natural resource professionals were provided with user-friendly worksheets for use in the field to assess the benefit/cost analysis of shifting from a monoculture operation to an agroforestry practice. Training natural resource professionals in multidisciplinary regional teams establishes a special cadre of individuals who can assist each other in designing practices in similar ecological zones.

During the most recent UMCA training program, a prototype of a new temperate agroforestry training manual was tested. This manual is being revised and should be completed in 2002. It is designed to be used as a generic agroforestry training template and can be adapted for most temperate zones. In fact, the provincial agroforester in British Columbia, Canada has already modified the UMCA manual to fit their training needs. The manual covers the design and implementation of the

practices, the economics of agroforestry, how to design a case study and a framework for setting up a technology transfer and extension program for agroforestry.

Response from the three primary agencies involved in sending resource professionals to the agroforestry training has been very positive. In fact, UO/E has integrated agroforestry into its state base program for agriculture and natural resources. This planning document outlines educational objectives and anticipated impacts/results from activities such as agroforestry. Funds have been committed by the MDC to support research in tree improvement for agroforestry as well as providing support for technology transfer activities at UMCA. The NRCS works closely with the UMCA in the design of forested riparian buffers and windbreak design.

In addition to workshops, in-field training is also offered. Over the last several years, on-site training has been conducted on the design of silvopasture practices, forested riparian buffers and alley cropping. Most in-field trainings are held on the property of a landowner who is interested in establishing agroforestry and has agreed to an extension visit also functioning as a training opportunity. Resource professionals who have attended previous agroforestry training often participate in the presentations. Over 150 resource professionals have been trained throughout Missouri.

Information dissemination

To assist technical activities in the field, UMCA has developed a number of support materials. The *Agroforestry-in-Action* series is a technical agroforestry publication for use by both natural resource professionals and landowners. Titles include Growing Pecans, Propagating Walnuts and Pecans in Missouri, and Trees, Shrubs and Forages for Agroforestry Practices in Missouri. Two issues are devoted to the economics of agroforestry—Economic Budgeting for Agroforestry and Tax Considerations for the Establishment of Agroforestry Practices. While the economic publications focus on Missouri, they have application for other U.S. states.

A five-video series is also being produced. Alley cropping and silvopasture are completed with windbreaks scheduled for fall 2001, forested riparian buffers and forest farming for 2002. Each video discusses the design and maintenance considerations for the practice and features farmers who have adopted agroforestry practices discussing why they did so.

In order to continue networking amongst resource professionals in the state, a list serve has been developed specifically for those trained in agroforestry. A Resource Directory has been published containing the names of all natural resource professionals who are trained in agroforestry. They are listed by county with their respective disciplines. Landowners who adopted agroforestry are also listed with their specific practice. Using the resource directory, natural resource professionals and landowners will be able to contact others who are familiar with, or practicing, agroforestry in the state.

The UMCA has an active agroforestry field research program at the University's 660 acre Horticulture and Agroforestry Research Center (HARC) which supports the Center's technology transfer and extension effort. Extension and outreach activities identify farmer's needs and provide a feedback mechanism to help prioritize research efforts at HARC. In an iterative process, data from current agroforestry research is fed back to landowners through extension. Some examples of research activities include forage studies under several shade regimes, the effect of forested riparian buffers in mitigating run-off from adjacent land-use into water resources, specialty mushroom production in woodlots, cultivar selection for growing walnuts and pecans and the flood tolerance of plants used for riparian plantings. Field days held at HARC provide an excellent opportunity for farmers and resource professionals to see agroforestry designs.

Finally, UMCA has a website (www.centerforagroforestry.org) which is being revised. In the near future, the site will list the Center's mission, personnel, research activities, and links to other temperate agroforestry sites. A special section will be devoted to landowners who are practicing agroforestry. An interactive map of the state of Missouri will show a landowner's location and when clicked, a photo of the type of agroforestry being practiced and information on how to contact that particular landowner, if they are agreeable.

Conclusions

As the number of agriculture and natural resource professionals trained in agroforestry increases, adoption should become more wide-spread. Their training, the provision of technical support materials and a demonstration site such as HARC, is critical in preparing these professionals to assist landowners. Having a cadre of professionals trained specifically in agroforestry and prepared to deliver technical assistance to design and implement the practices is one of the first steps in facilitating a landowner's decision to adopt agroforestry.

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FARM SOURCED TIMBER: THE RESTRUCTURING OF THE TIMBER INDUSTRY IN KENYA – OPPORTUNITIES AND CHALLENGES.

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Introduction

Farmers may be keen to grow timber trees for savings (Chambers & Leach, 1989) if they have no superior strategy for savings, while rejecting growing of trees for cash income if they already have a successful strategy for earning cash income from off-farm labour or crops (Warner, 1995). However, with the decline in commodity prices of farmers principal cash crops e.g. coffee, farmers are increasingly viewing timber as an active cash generating farm enterprise. This trend is further spurred by the decline in plantation and forest cover in tropical countries, opening opportunities for greater involvement of the small holder sector in timber production. Small scale farmers, when considering timber as an enterprise, seek for a multipurpose tree that will complement other enterprises on the farm, yet yield timber as a final product, e.g. *Cordia africana* - fodder and timber; *Grevillea robusta*, fuelwood and timber (Michael Gitonga, *Pers com.* 2001).

There are several generic issues arising from this shift to small holder growing and these include:

Quality: how to match market demand with what is feasible and possible to produce on farm, given farmers multiple objectives;

Farmers' organizations/joint ventures: how farmers who are interested, can form groups to facilitate marketing, transportation and accessing of appropriate technical advice;

Potential contribution of timber to farmers' financial portfolio: What potential role can timber play as a cash enterprise in a farmer's range of enterprise options? In what ways can timber enhance and complement existing enterprises on farm?;

Environmental concerns: the richness of diversity of species; watershed functions; niche, above and below ground interaction of trees on farm, and in the landscape; larger national and global environmental concerns.

Recognizing the emerging dynamic in the timber industry, the Meru timber marketing programme was initiated in 1999. This programme implemented by Forest Action Network, Ministry of Agriculture and ICRAF combines research, extension and advocacy activities to address emerging issues in the sector. Interlinked activities include: the recording radio programmes and facilitating workshops to discuss forest policy as it relates to effects farm produced trees; timber felling and movement permits; training farmers in tree valuation and pricing, piloting the formation of farmers timber marketing groups, farmer-led market analysis and enterprise development, and improved market orientated silvicultural tree practices; documenting and analyzing the structure of timber markets linked to farms, identifying the range of potential market niches for farmers and developing a range of timber production protocols that would contribute to the financial objectives and enterprise portfolio of farmers in coffee based systems.

The first section of the paper describes the current status of the forest sector in Kenya and introduces the study area. Subsequent sections present a market chain schematic for timber from farms and preliminary findings from a timber business census conducted in June this year. Sustainable production of timber from farms and challenges to extension are discussed in the latter sections of the paper.

The forest sector

The total area of Kenya's closed canopy indigenous forest is 1.24 million ha. (Wass, 1995). The best estimates of plantation cover date from the 1991 inventory: 165,000ha. This estimate does not include private plantations. The area of gazetted forest cover, is therefore barely 2.5 % of the country. These gazetted forest areas are under continuous threat of forest excisions for uses including: agriculture(17%), settlement (35%), and regazetted as national park (35%) (Wass, 1995). The speed of excision is accelerating. In a survey of 63.3 % of the forest estate conducted in 1999 it was found that 50,000ha in the west of the Rift Valley, and 5,700 hectare in the east of the Rift Valley had either been excised or proposed for excision in the last five years. In addition it was found that the general state of management in the plantation sector was low, with *none* of the forest blocks visited having a management plan (Njuguna et al. 1999).

There is however a strong tradition of agroforestry in the country, with the planting and retention of a variety of multipurpose trees on farms. Biomass inventories reveal regular density of 7.5m³ per ha in the central agricultural areas of the country; with this rising to 17.07m³ per ha, in mixed stand agroforestry systems in a matter of years with extension support in the provision of seeds, silvicultural advice etc. (Njuguna, Holding & Munyasya, 2000).

Bearing the above context in mind, please refer Tables 1 and 2 projecting demand and supply of wood products as compiled in the Kenya Forest Master Plan (KFMP 1994).

According to KFMP estimates, if the then current trends continued, then by the year 2010, the majority of timber and poles would be coming from the farm estate. The

Masterplan proposed a comprehensive set of measures to facilitate improved management of the forest estate. This included indications such as:

"Closer linkages between industry and farm tree growers that could provide the rural population with increased earnings from sales of wood and other industrial raw material and from the various steps in tree-product harvesting, transport and processing" (KFMP 1994).

However, the revised forest bill that would underpin the raised efficiency of the sector has yet to be passed and most of the Masterplan recommendations have yet to be implemented. The current scenarios as described in the Masterplan have actually accelerated (White, 1997), and in late 1999 a temporary ban on logging in the plantations and forest estate was enforced in an attempt to control and assess the situation. The ban is still in force. We have reached the situation already today where the majority of timber is being sourced from farms. This can present certain opportunities to farmers, to have access to an additional income from their farms. However, there are certain concerns with this situation as farmers did not originally plant or retain the trees on farm with the market in mind.

These concerns range from the following:

Practical: trees planted on sloping unproductive land, that it is difficult to access; little if any silviculture management, poor conversion and low recovery rates.

Organisational: the supply has changed from forest blocks to being scattered over many small farms, (some businesses are able to adapt, some are not); farmers are not organised for the market, are unaware of its pricing and demand, and have little negotiating ability if they function as individuals selling 3 -5 stems at a time. Farmers are not aware of the value of their trees, and are selling at very low prices. The market system is also not organized to receive produce from farms.

Environmental: initially when timber sourcing from farms started in earnest (1999), the agricultural department was actually encouraging the felling of *Grevillea robusta*, the tree most commonly used for shading coffee trees around Mount Kenya. The department indicated, that in their view, there were too many trees on farm; such that a micro-climate had been created favouring an environment for fungal attacks on coffee. However, due to external influences on both the supply (low coffee prices, and little alternative income sources for farmers) and demand (the logging ban) the pace of clearing has accelerated to such an extent, that there are concerns as to environmental degradation and eventual increases in poverty in this previously high potential agricultural area.

Table 1: Accessible sustainable wood supply, *Current trends* ('000 m³)

	1995	2000	2005	2010	2015	2020
Indigenous forests						
Timber	518	508	498	488	478	468
Pole	259	254	249	244	239	234
Fuelwood	1166	1143	1120	1098	1076	1053
Woodlands & bushland						
Timber	119	118	117	116	115	115
Pole	535	531	527	523	520	516
Fuelwood	10585	10508	10430	10352	10274	10196
Farmlands & settlements						
Timber	956	1205	1465	1724	2014	2292
Pole	335	422	513	603	705	802
Fuelwood	6146	7746	9418	11079	12947	14731
FD forest plantations						
Timber	1591	1870	1584	1624	1711	1992
Pole	177	208	176	180	190	221
Fuelwood	354	416	352	361	380	443
Total						
Timber	3184	3701	3664	3952	4318	4867
Pole	1306	1415	1465	1550	1654	1773
Fuelwood	18251	19813	21320	22890	24677	26423

Table 2: Accessible sustainable wood supply, *Current trends* ('000 m³)

	1995	2000	2005	2010	2015	2020
Wood demand						
Industrial wood	1058	1209	1378	1543	1709	1961
Poles and posts	1219	1435	1689	1989	2335	2736
Fuelwood	<u>10107</u>	<u>23947</u>	<u>27693</u>	<u>31720</u>	<u>35880</u>	<u>40133</u>
Total wood demand	<u>22384</u>	<u>26591</u>	<u>30760</u>	<u>35251</u>	<u>39924</u>	<u>44830</u>
Accessible sustainable supply						
Indigenous forests	1942	1905	1868	1830	1793	1755
Woodlands and bushlands	11240	11157	11074	10992	10909	10827
Farmlands and settlements	7437	9373	11396	13406	15666	17825
Forest plantation	<u>2121</u>	<u>2494</u>	<u>2112</u>	<u>2165</u>	<u>2281</u>	<u>2657</u>
Total sustainable wood supply	<u>22740</u>	<u>24929</u>	<u>26450</u>	<u>28393</u>	<u>30649</u>	<u>33064</u>
Non-sustainable wood supply	283	414	544	671	794	912
<i>Fuelwood substitutes</i>	2011	2395	2769	3172	3588	4013
<i>Total wood supply</i>	<u>25034</u>	<u>27738</u>	<u>29763</u>	<u>32236</u>	<u>35031</u>	<u>37989</u>
Surplus/deficit	2650	1147	-997	-3015	-4893	-6841

The study area

The study area is dominated by Mount Kenya, with a contiguous range of agroecological zones from lower semi arid midland livestock and millet zone, with average annual temperatures from 21 -24 C to tropical alpine and glacier zones. The study area focuses in the main coffee zone on the eastern slopes of Mount Kenya, but also extends slightly up slope into the tea zone, and slightly down to the marginal coffee zones to the limits of where woody materials are sourced for the market. The coffee zone, is a semi humid zone with bimodal rainfall and averages of between 950mm and 1200mm per year. The mean temperatures of 18 - 21 C and altitudes range from 1,280 - 1,340 metres above sea level, and the terrain is moderately sloping. The soil is deep nitisol of medium fertility.

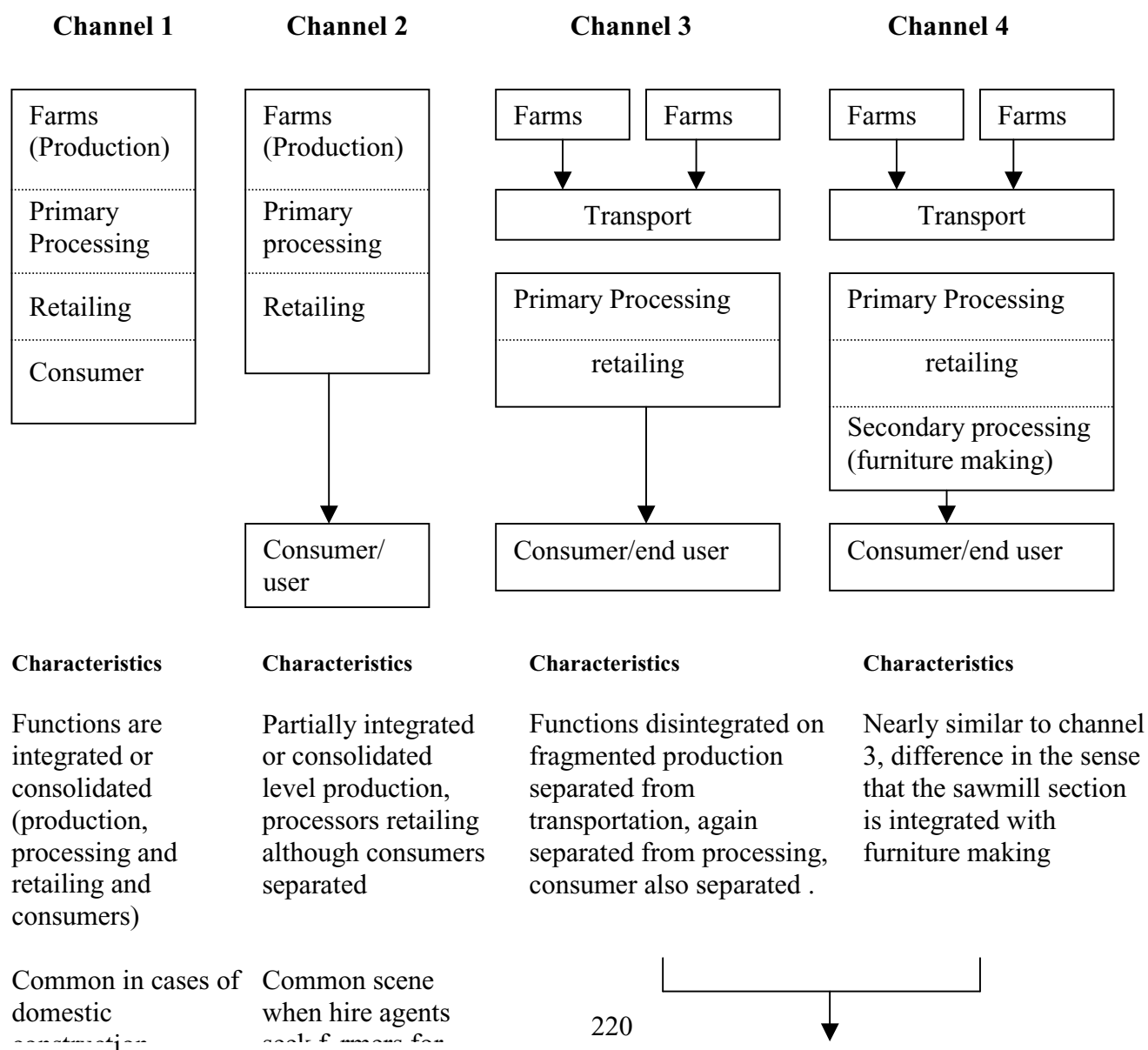
The land is held in private family farms, average farm title is 3.4 hectares and the average household's portion of the title is 1.7 hectares, or 4.2 acres (Tyndall, 1996). The majority tribe is the Ki-meru. Coffee has been the main cash crop in the past. With the slump in the price of coffee, new enterprises such as the contractual growing of green beans for the export market to UK are being welcomed by farmers. The farms are mixed cropping with maize, beans, bananas, dairy cows and different tiers of plants and trees providing fruits (avocados, mangoes), nuts (macadamia), medicines, shade etc. It is not uncommon to find 19 different tree species on one farm. In a survey conducted earlier this year by Njuguna, Van Oijen and Holding (and for which the data is still being analysed) approximately 200 different tree species

were identified on farm. The dominant timber species on farm are currently: *Vitex keniensis* (Meru Oak); *Cordia africana*, *Newtonia buchananii* and *Grevillea robusta*. Species found in gazetted government plantations on the slopes of Mount Kenya are *Cupressus lusitanica*, *Pinus patula*, *Vitex keniensis* and *Eucalyptus grandis/saligna*. Mount Kenya forest is categorised as tropical montane forest and its dominant species are *Juniperus procera* (Cedar); *Prunus africana*, *Hagenia abyssinica*; *Podocarpus falcatus* (*P. gracilior*); *Podocarpus latifolius* (*P. milanjanus*) and *Ocotea usambarensis* (Camphor) (ICRAF, 1992). Camphor and Cedar being the species principally extracted for timber.

Market chains for timber from farms.

The Meru timber marketing programme commissioned an initial survey into the marketing chain for *Grevillea robusta* from farms. The survey documented the following chains (Opanga, 2000):

Figure 1: Schematic view of *Grevillea* market structure & distribution channels



The first two channels are those that supply the mobile sawmillers, the second two channels are those that supply the established or (fixed) sawmills. In the first two channels primary processing is done by the mobile sawbenches on site. In the second two channels the sawmillers transport whole logs to the sawmills in town for processing. The marketing chains documented by Opanga (2000), indicate the emerging complexity in the supply network for the timber industry, and contrast sharply with the system of sawmill licensing and block felling that existed previously.

Timber business census

In June this year a timber business census was conducted:

The timber business census had two objectives:

- to develop the sample frame for more detailed market chain analysis; and
- to obtain preliminary information on the structure of the market.

The census recorded businesses on the eastern slopes of Mount Kenya, from Ena in N. Embu District to Isiolo, on the edge of the northern semi-arid zone of Kenya. Some towns near the forest boundary (e.g Chuka, Chogoria) have grown with the timber industry, others are market centres where furniture businesses have located. Several forays were made into the agricultural zones on both sides of the road, but no substantive businesses were located. Large sawmills on the edge of the forest have closed. This section summarises some of the findings of the business census.

The census identified, and recorded the principle characteristics of 252 businesses, 184 of these were interviewed. All these businesses no matter from where they were previously sourcing (forest, plantations or farms) were now sourcing from farms. The census identified the type and size of businesses, the species utilised, stock, customers and trends in sourcing and demand. The final question invited business owners to suggest what species they would recommend farmers to plant for future supply of the timber market.

The category of businesses surveyed were sawmill; timber yards; furniture shops; joinery/roofing contractors; piece work, machine shops, firewood and charcoal sellers. Please refer table 3. However most enterprises were conducting two or more activities and the full range of activities is also captured in the second level of Table 3. We also found that due to the mobility of fuelwood sellers, and the largely hidden nature of the charcoal business that we did not obtain a full accounting of those businesses in this round of the survey work. Therefore these categories and the category "other" are not included in the subsequent discussions.

The census results showed that the businesses fell roughly into three categories, those that used to source from the forest, those that used to source from plantations and those that used to source from farms. The census results showed that each group of businesses is coping and strategizing differently with regard to the forest and plantation logging ban. Table 4 summaries the results from the semi-structured interviews, that describe how these three different groups of businesses are in

transition. Note a change in species being utilised by the business indicates a change in location and a change in network of actors and methods in sourcing timber. The 43 businesses that previously sourced from the plantations have found it most difficult to adjust to the changed circumstances. In addition to those surveyed, many plantation based businesses had already closed. It was observed, that most of these businesses had heavy investments in machinery and relied on regular and large volumes of softwood timber from the plantations destined for the construction industry. It would appear that they are currently unable to obtain adequate and regular supply of farm sourced timber to maintain machinery and workers. Other businesses, with lower machinery investment such as the 16 medium and 14 smaller timber yards interviewed are decentralizing their operations nearer to the source of supply on farms.

Table 3: Number of activities per business categories¹⁰

<i>Principal activity by business category</i>									
<i>Business type</i>	<i>Sawmill</i>	<i>Piece work</i>	<i>Timber yard</i>	<i>Furniture shop</i>	<i>Joinery</i>	<i>Furniture showroom</i>	<i>Machine shop</i>	<i>other</i>	<i>Total</i>
<i>Principal activity</i>	14	7	30	168	10	11	2	9	252
	<i>Summary of all activities conducted by wood product businesses. Each business has a principal activity, as well as supplementary related activities</i>								
<i>All business</i>	19	34	40	202	34	52	6	23	417

¹⁰ In this table there is no direct relation between the first and second rows.

Table 4: Previous sourcing, species demanded and used, sourcing network and main products.**4a: Previously sourcing from forest (85 businesses censused)**

Description	Prior to logging ban (1999)	Currently
Species demanded by customers	<i>Ocotea usambarensis</i>	<i>Ocotea usambarensis</i> , <i>Vitex keniensis</i> , <i>Cordia africana</i> , <i>Grevillea robusta</i>
Species used by the businesses	<i>Ocotea usambarensis</i>	<i>Ocotea usambarensis</i>
Network of actors	Licensed sawmillers, timber yards	Forest timber: Illegal forest felling, night tractor logging and brokers. Farm timber: mobile benches, transporters, brokers, farmers,
Main product	Furniture	Furniture

4b: Previously sourcing from plantations (43 businesses censused¹¹)

Description	Prior to logging ban (1999)	Currently
Species demanded by customers	<i>Cupressus lusitanica</i> , <i>Pinus patula</i> and <i>Ocotea usambarensis</i>	<i>Cupressus lusitanica</i> , <i>Ocotea usambarensis</i>
Species used by the businesses	<i>Cupressus lusitanica</i> , <i>Pinus patula</i> , <i>Cordia africana</i> and <i>Ocotea usambarensis</i> .	<i>Grevillea robusta</i> , <i>Newtonia buchanii</i> and <i>Cordia africana</i>
Network of actors	Licensed sawmillers, timber yards	Farm timber: mobile benches, transporters, brokers, farmers.
Main product	Construction industry	Construction industry

4c: Businesses previously sourcing from farms (41 businesses censused)

Description	Prior to logging ban (1999)	Currently
Species demanded by customers	<i>Cordia africana</i> , <i>Grevillea robusta</i>	<i>Cordia africana</i> , <i>Cupressus lusitanica</i> , <i>Grevillea robusta</i>
Species used by the businesses	<i>Grevillea robusta</i> , <i>V.keniensis</i> , <i>Cordia africana</i> and <i>Cupressus lusitanica</i>	<i>Cordia africana</i> , <i>Grevillea robusta</i>
Network of actors	Mobile benches, brokers and farmers	mobile benches, transporters, brokers, farmers.
Main product	Furniture and local construction industry	Furniture and local construction industry

¹¹ Many other businesses that previously sourced timber from plantations were already closed, and we were unable to obtain any reliable information.

An additional 67 businesses in the towns of Meru, Igoji and Nkubu have had multiple sourcing strategies for a period of time, and a range of soft and hardwood products for the construction and furniture industries depending on customer demand and orders. Those businesses were consequently less easily categorised. Detailed market chain analysis studies (sampling from the various categories, location and sourcing strategies of businesses recorded in the census) have started with documenting in more detail these more complex multi-sourcing businesses.

It can be observed that those businesses sourcing from the forest, with marketing channels linking them to customers demanding hardwood species are having the most difficult time in sourcing materials of adequate quality. Much of the raw material supply is currently illegally sourced from the forest. Businesses previously sourcing from plantations, and supplying the construction industry are relying heavily on *Grevillea robusta* from farms. However, this is not a species or quality with which their customers are familiar. Businesses sourcing from farms continue to do so, but are experiencing increasing competition in accessing supplies. As the research progresses indicative data from the timber business census will be verified quantitatively by species, volumes and prices of timber traded, in a series of market chain studies of the timber sub-sector.

Sustainable production of timber from farms.

The semi-structured interviews also included a session when the business owner or foreman was asked if farmers were to supply the timber industry in the future, what species should they consider planting and why. A variety of responses were recorded, and the dominant trend was that farmers should plant:

Ocotea usambarensis[♠], *Cordia africana*[♠], *Vitex keniensis*[♠] for furniture work. *Grevillea robusta*^Σ and *Cupressus lusitanica*[∇] for construction.

From a survey of 58 group, individual and private nurseries, most commonly found species in Meru district nurseries are *Dovyalis kaffra* (hedging species), *Grevillea robusta*; *Calliandra calothyrsus*, *Cupressus lusitanica*, *Azadirachta indica* (neem) and *Mangifera indica* and *Passiflora edulis*. Hardwood timber species for furniture making only appeared in a few nurseries: *Vitex keniensis* (4 nurseries), *Eucalyptus saligna* (5 nurseries). All other species were either hedging, fast growing exotic softwoods or fruit trees (Muriuki and Jaenicke, 2001). However, many of the hardwood timber species on farm (*Prunus africana*, *Cordia africana*, *Vitex keniensis*) regenerate naturally and are transplanted within the farm. So nurseries alone are not an adequate indicator of future supply of timber on farm. Further research is required on the rate of natural regeneration of key timber species on farm and the level of preservation and utilization of that regeneration. The survey mentioned earlier

[♠] *Ocotea usambarensis* : Indigenous hardwood - forest.

[♠] *Cordia africana*: Indigenous hardwood - farms

[♠] *Vitex keniensis*: indigenous hardwood - forest and farms

^Σ *Grevillea robusta*: introduced species - farms. High popularity as agroforestry species due to compatibility with crops e.g. coffee.

[∇] *Cupressus lusitanica*: introduced early 1900s for plantation production, also grown by farmers until cypress aphid attack in early 1990s. Farmers now less willing to plant.

(Njuguna, Van Oijen and Holding), documenting volumes and species of timber on farm, indicated that despite the predominance of *Grevillea robusta*, there is a vast diversity of species that continues on farm in the coffee zone¹². Previous extension efforts around eastern Mount Kenya have, in accordance with the approaches at that time, tended to focus on number of trees planted on farm, with little regard to use, function or on farm diversity. Future extension efforts would be wise to recognise and build on this existing diversity to provide farmers with a "basket of options" for the long term economic and environmental sustainability of farm households and their land (Scherr, 1995). Though the timber businesses are not necessarily aware of the growing conditions of specific species (e.g. *Ocotea usambarensis*, is a forest species that will not grow in open farm conditions), they are recommending a combination of fast growing exotics, and slower growing hardwoods. The extension and research activities would be wise to take note of this indication that the market is seeking both hard and softwoods from farms. Activities focused on enriching diversity and sustainable production on farm would also be wise to balance germplasm supply from nurseries (which tends to be exotic softwoods, hedging and fruits), and germplasm availability from enhancing the protection and utilisation of natural regeneration on farm (which tend to be indigenous hardwoods).

Challenges to Extension.

In the course of the design and implementation of the Meru Timber Marketing Programme, several stakeholders meeting have been held. This section draws in particular on the proceedings of the stakeholder meetings held in Meru in July 1999 (Akinga 1999); and in Nairobi in June 2001 (Holding & Carsan, 2001)

In the first meeting (Akinga, 1999) farmers and sawmillers identified a series of problems and solutions with regard to farmers entering the market for timber. Farmers said they lacked valuation techniques; lack of knowledge of tree management; lack of knowledge of the market; poor prices received; siting of trees in places that are difficult to harvest (e.g near a house); sometimes there are conflicts with family or neighbours in felling trees; permits required from the administration before trees can be felled and transported; and transportation. Sawmillers cited accessibility; red tape from the administration; poor quality of logs; no information on quantity or location of timber; economic distance to farms; presence of nails and other obstacles in the logs leading to damage of machinery; as their main problems.

As solutions the farmers requested that the forest department provide information on pricing and techniques of valuation and tree management; that the farmers themselves form some kind of organisation to facilitate market linkages. The sawmillers suggested that farmers should clear access paths; that farmers are provided advice on management for improved quality; need for improved farm planning; farmers to group themselves around one collection point.

¹² Research on tree species diversity and sustainability of biological diversity on farm has been conducted by Ard Lengkeek of tree Domestication Programme, ICRAF for the past three years, in the same localities as the research described in this paper. Results from Lengkeek, will be relevant and complementary to the on going timber marketing research.

The stakeholders meeting in June 2001 (Holding & Carsan, 2001) identified some additional emerging issues. Even if farmers are provided with the silvicultural advice for quality and optimum harvesting sizes, according to the farmers prevailing strategy of trees as savings, trees are likely to be harvested when the farmer requires cash, and not when the tree will obtain the best return in the market. Harvesting of trees accelerate in times of need, such as the current prolonged downturn in coffee prices. There is thus a disparity between farmer decision making based on poverty and decision making based on optimal silvicultural decision that are possible when a household is financially stable.

In addition, the AIDs pandemic has hit Meru communities very hard. Meru Central District started recording HIV/AIDs related deaths in 1999. Of a total population of 500,000 of which 186,085 are the 20-49 age group, the number of deaths reported from Aids in 2000 was 218, more than double the 88 recorded the previous year. There are 940 adults recorded as being HIV positive in the District, but as the statistics only record those who have visited hospitals this is likely to be an under recording (Ministry of Health Statistics, Meru Central District). The villages in which we are working have the highest number of HIV positive cases recorded in the district. Though, we have not collected specific data to this effect, it is certain that the costs of healthcare, and loss of adult labour in households is making an already precarious financial situation, even worse.

The second issue of concern was a reduction in tree cover on farms. There is currently no record of the number of mobile sawmills currently active in the region, but it is estimated in the hundreds. Though not effectively enforced, there was a system in place of licensing sawmills harvesting from the forest estate, so approximate records of volumes harvested were possible. There is currently no mechanism to monitor the activities of mobile sawmills, and no record of the volumes of timber being harvested from farms.

The key skills required by the extension service(s), or whichever agency(ies) are facilitating farmers linkages to the industry, were therefore identified as:

- Market assessment – skills in analysing the opportunities and constraints of various market options available to farmers in the technical, social, economic aspects of market analysis and the sustainability of the resource;
- Mensuration and valuation techniques; and
- Formation of farmers groups and joint ventures linking with industry.

No one agency currently serving farmers has this range of skills. If timber sourcing from farm is to be a viable source of supply for the industry, and viable addition to the farmers basket of livelihood options, innovative mechanisms that are a break from conventional extension, such as joint venture schemes with business and industry (Curtis & Race, 1998; Desmond & Race 2000), are required. To facilitate this transition greater cooperation between the arms of government responsible for extension with farmers (agriculture departments), and those responsible for the forest estate (forest departments) will be necessary. Streamlining of agricultural, forest and

environment policies with legislation applying to tree growing on farms would be an important first step in this direction.

Acknowledgments

A programme such as the Meru Timber Marketing Programme that addresses research, advocacy and extension has many stakeholders, too numerous to mention here. This paper describes the work in progress within the research component of the programme and the authors wish to acknowledge the contribution of Peter Mungai; Michael Kinyanjui and Sammy Carson as field assistants. Collaborators within the extension component who are crucial in this endeavour, and who have a strong role in keeping the research on its toes and relevant to farmers are the Provincial and District offices of the Ministry of Agriculture and Rural Development; the Provincial and District offices of the Forest department, of the Ministry of Natural Resources; of respectively: Eastern Province and Meru Central District, Kenya. In particular we would like to acknowledge Mary Mwaura, Daphne Muchai and her Divisional team for frank and open interactions. The authors would like to thank Dr. Steve Franzel, Senior Economist at ICRAF for his extensive comments to earlier drafts of this paper.

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UNDERSERVED FOREST LANDOWNER WORKSHOPS: AN OPPORTUNITY FOR BOTH LANDOWNERS AND EXTENSION

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Abstract

Twenty-nine county-level Underserved Forest Landowner Workshops were conducted from 1998-2000 to address the needs of minority, female, and other underserved landowners. These workshops were sponsored by the MSU Extension Service, local County Forestry Associations, state and federal agencies, and others. Each workshop required a diverse local planning committee to plan, promote, and conduct the workshop. Speakers included tree farmers, foresters, and an attorney, and addressed the following topics:

- Legal and ownership issues
- Marketing and environmental issues
- Economics of forestry
- Sources of assistance.

The workshop concluded with a 30-minute question-and-answer session, a brief written evaluation, and a meal.

The workshops effectively reached many people “new” to extension. County Agents regularly felt that 50-70% of participants were new contacts. Workshop evaluations reveal that:

- 2,934 people attended (101 people per workshop);
- 60% of participants were either minority or female landowners;
- landowners valued the information obtained at \$21.3 million (\$7,240 per participant);
- 35% of landowners have used a professional forester in the past; but 96% of landowners plan to use a professional forester in the future.

The success of these workshops resulted in funding for more county-level workshops in 2001, and this project has been expanded to a regional (5-state) effort. This model program has international implications in areas with significant numbers of private, non-industrial forest landowners

Introduction

Mississippi is in the southeastern United States. Forestland ownership in Mississippi and the southern U.S. is a significant family asset. The economic opportunities available to landowners are the result of several factors:

- an extensive forestland base with 61% (7.5 million ha) of Mississippi's land area in forestland (Hartsell and London 1995);

- forest ownership dominated by private non-industrial forest (PNIF) landowners, who own 66% of the forestland in the state (Hartsell and London 1995);
- highly productive forests, with 43% of Mississippi's forests classified as "highly productive", whereas only 13% of forests nationwide are classified as "highly productive" (Hartsell and London 1995, Powell et al. 1994);
- diverse timber markets available to landowners (e.g., pulpwood, chip-n-saw, sawtimber, veneer logs, and poles); and
- opportunities for agroforestry, fee hunting, and other alternative use enterprises available to forest landowners.

Approximately 175,000 individuals own at least 4 ha of forestland in Mississippi (Doolittle 1996). Many of these landowners have limited forestry knowledge, and these landowners and their lands represent a wide spectrum of social, economic, and environmental conditions. Few landowners have large ownerships, possess considerable forestry expertise, and actively manage their forestland. Landowners often have small acreages of forestland, own land "in common" with other family members, do not realize their forests' economic potential, and are less likely to implement environmental protection practices (Mount 1997).

Because small PNIF landowners generally lack forestry knowledge and training, their lands are less productive and more often neglected than other ownership categories. This situation is particularly acute among minorities, females, and other landowners not generally served by current federal and state programs. Additionally, they are either unaware of, or perceive that they cannot afford to pay for, private consulting services. For the purpose of this project, we have identified these owners as "underserved forest landowners."

Underserved forest landowners are part of a complex and often confusing system involving the management, marketing, harvesting, regeneration, and protection of our nation's forests. The system includes forest landowners, foresters, loggers, contractors, wood dealers, industries, government agencies, and local communities. Underserved landowners tend to be passive participants in this system. If they were more knowledgeable and active in the system, their benefits from and contributions to this system would increase significantly, from both an economic and environmental perspective.

The factors that prevent landowners from realizing the full potential of their forestland are related to a lack of knowledge and consequent passive management strategies more so than inherently unproductive land. Fortunately, knowledge can be gained and landowners can adopt active management strategies if they so desire.

Objectives

Our goal was to develop a model educational program to enhance the management of forestland owned by underserved landowners in Mississippi. To reach this goal, we established a program planning effort with the following objectives:

- (1) identify needs of underserved landowners;
- (2) develop a strategy for addressing these needs;
- (3) plan and implement county-level programs in selected areas in Mississippi; and
- (4) evaluate and improve the workshop format and content.

This paper describes the 29 county-level Underserved Forest Landowner Workshops conducted from 1998-2000, as well as future directions.

Program Planning

Most traditional forestry extension programs focus on specific technical areas such as thinning, planting, wildlife management, herbicides, and other aspects of forest management. These programs are described in Monaghan (1997). Though helpful for many landowners, these programs often fail to address more basic obstacles faced by many underserved forest landowners. Using informal group meetings and personal contacts with landowners, agency personnel, and others, we identified several potential obstacles faced by this target audience. These obstacles include, but are not limited to:

- (1) complex ownership patterns that make it difficult, and in some cases almost impossible, to manage the land;
- (2) lack of familiarity and trust prevents landowners from utilizing professional forestry assistance;
- (3) concerns about economic returns from forest investments; and
- (4) landowners are unsure who to contact for various sources of technical, financial, and educational assistance.

Based on this input, we developed and refined a workshop agenda to address these needs.

Local Planning Committee

Each workshop required a diverse Local Planning Committee. The committee helped plan, promote, fund, and conduct the workshop, and was critical to a successful program. The committee consisted of 12-15 members from the local community, and included landowners, state and federal forestry/natural resource agency personnel, foresters, county supervisors, ministers, attorneys, bankers, and other key community leaders. It was important to obtain a broad spectrum of the community, including minority and female representation.

The planning committee, composed of local community members and leaders, had greater personal contacts than we in extension. This helped inform our target

audience of this workshop, added credibility to the overall effort, and contributed to the workshop's success. Committees met approximately three times prior to the actual workshop, so this did not require an inordinate amount of time from committee members. In most cases, the County Agent served as committee chair. Though not mandatory, this promoted consistency and enabled better communication between the committee and those in charge of the overall project.

Agenda

The agenda changed little since the first series of workshops. We made some minor refinements, but a typical agenda consists of the following:

- (1) Welcome and Introduction (local moderator, 10 minutes);
- (2) Landowners Perspective (local landowner, 20 minutes);
- (3) Ownership Issues (attorney, 30 minutes);
- (4) Marketing and Environmental Issues (forester, 30 minutes);
- (5) Economics of Forestry (forester, 30 minutes);
- (6) Question-and-Answer Session (speakers plus other resource personnel, 30 minutes);
- (7) Evaluation (5 minutes); and
- (8) Meal.

A 15-minute break occurred after the section on Ownership Issues. Immediately prior to the break, a representative from the local county forestry association (CFA) explained to participants what the CFA does, and how it benefits them through educational, informational, and other avenues. The dues structure is relatively minor, usually \$10 US per year. The CFA usually obtained 10-15 members during the break.

We conducted workshops in several different time periods, but our best success was with workshops conducted on Saturday morning. A typical program had registration at 8:30 a.m., the program starting at 9:00, concluding at 12:00, and followed by a meal.

Each participant received a folder containing about 25 publications dealing with wills, taxation, regeneration, Best Management Practices (BMPs), economics, wildlife management, and other forestry-related topics. Perhaps the most useful publication was a one-page "Sources of Assistance" document that listed names, phone numbers, and brief responsibilities for the county forester, county agent, Natural Resources Conservation Service contact, and the Farm Services Agency contact. These federal or state employees are important contacts for technical, financial, and educational assistance for landowners. The "Sources of Assistance" also briefly described the local county forestry association, the Mississippi Forestry Association, consulting foresters, and forest industry landowner assistance programs.

Publicity

This effort involved extensive publicity including direct mail, personal contacts, newspaper articles, flyers/brochures, church contacts, and radio. Direct mail required special efforts. To reach as many forest landowners as possible, we purchased tax rolls for every county in the state. Forestland is categorized as "uncultivated agricultural land" on the tax rolls, and enabled us to better identify forest landowners. When conducting a workshop in a county, we sent a letter to all landowners with 4 or more ha of uncultivated agricultural land. Landowners received these letters about three weeks prior to the workshop, and we required advance registration to plan the meal.

Results and Discussion

This effort has been a tremendous success. More than 2,900 people attended the 29 workshops conducted in this three-year period, for an average of 101 people per workshop (Table 1). The majority of the audience consisted of minorities and females, and most were "new" to the County Agent. Agents continue to receive calls from landowners as a result of this program.

The evaluation revealed that the vast majority of participants (81%) felt the workshop would help them earn more money from managing their timber (Table 1). Participants estimated the economic value from the information received at \$21.3 million, or \$7,240 per participant. This may be a conservative estimate because 1) not all participants completed evaluations, and 2) 50-60% of respondents indicated that the economic benefit, though positive, was unknown at present. Thus, the true economic impact could greatly exceed the \$21.3 indicated.

A real-life example illustrates how these workshops can benefit private landowners. In July of 1999 a woman attended a workshop. She had inherited 5.7 ha from her father, who had planted pines many years before. One month before the workshop she was offered \$8,000 US for the timber on this land and was ready to sign a contract. However, at the workshop she learned that she would benefit from professional help, so she contacted a consulting forester. After looking at the timber, he said he could get more than \$8,000 by requesting bids, so he conducted the timber sale for the landowner. The timber sold for \$54,000 US. Thus, the 3-hour workshop made this woman \$46,000.

Evaluations revealed that although 35% of the participants used a professional forester in the past, fully 96% plan to use a professional forester in the future (Table 1). This represents a considerable change in behavior. Even if partially realized, it will significantly benefit landowners. Munn (1996) analyzed almost 300 timber sales and found that consultants consistently outperformed laymen (landowners) by an average of 20%. With the average consultant fee of 8.5%, the net gain to landowners was 11.5%. This would likely be even greater for underserved landowners, who generally "sell" (as opposed to aggressively market) their timber. Additionally, many underserved landowners often cut their timber prematurely, when still rapidly accumulating volume and value (Mount 1996). Professional advice on

scheduling harvests could save landowners a considerable amount of money in the long run.

**Table 1: Attendance and Evaluation Summary for
Under-served Forest Landowner Workshops in Mississippi**

<i>Item/Question</i>	Total
Number of workshops	29
Total attendance	2,934
Average Attendance	101
Do you feel this workshop will help you earn more money?	1,237 (81%)
	17 (1%)
	<u>269 (18%)</u>
	1,523
If yes, how much?	\$21,243,100
Has a professional forester ever helped you with the management of your property?	550 (35%)
	<u>1,003 (65%)</u>
	1,553
Do you plan to use a professional forester in the future?	1,433 (96%)
	<u>61 (4%)</u>
	1,494
Do you have a written forest management plan? *	219 (17%)
	<u>1,130 (83%)</u>
	1,349
Approximately how many acres of land do you own?	178,724
How did you learn about this workshop?**	514 (55%)
Personal Contact	147 (16%)
Flyer / Brochure	66 (7%)
Newspaper	105 (11%)
Church	26 (3%)
Radio	8 (1%)
Other	<u>62 (7%)</u>
	931

*Question added to the evaluation form in 1999.

**This question was added to the form in mid-1999. Participants could have learned of workshop from multiple sources.

As expected, few people had written management plans. Birch (1997) found that 5% of forest landowners in the South had written forest management plans. Our results (17%) are slightly higher than that of Birch.

Having such a workshop is useful only if landowner know about the program. How people learned of the workshop was both important and revealing. Although numerous publicity efforts were used, the landowner letter, sent through direct mail, was the most effective. It was the most-frequently cited reason participants learned of the workshop (55% of participant responses). The next highest response was personal contact (16% of responses). This indicates the importance of direct mail and justifies significant postage expenses if such an effort is to succeed.

Future Directions

By the end of 2001 we will have conducted six additional workshops, and are planning more for 2002. This project will serve as a model that other states can use to reach underserved forest landowners in significant numbers. We have joined with four adjacent states; Alabama, Arkansas, Louisiana, and Tennessee, in developing a regional effort in underserved forest landowner research and education. This project has been funded, and we are beginning the research component to better understand what motivates the underserved forest landowner. The education component will involve workshops in each of the five states over the next two years.

Conclusions

Landowners not reached through traditional extension programs benefited from Underserved Forest Landowner Workshops. The workshops addressed some of the basic ownership, marketing, environmental, and economic issues faced by many landowners, recognizing that these issues must be addressed before more technical forestry issues can be discussed. The model program described has international implications, particularly in regions with significant number of private, non-industrial forest landowners.

Each workshop required a diverse Local Planning Committee to help plan, promote, and conduct the workshop. This "grass-roots" approach appears preferable to "top-down" solutions in which landowners and others have limited input. Special efforts were required to reach this target audience, with direct mail the most effective way to publicize the workshop. Due to the success of this model program, Mississippi and four adjoining states are conducting a regional research and education effort targeting underserved forest landowners.

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INTERACTIVE KNOWLEDGE SYSTEM FOR FAMILY ENTERPRISE FORESTRY

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Abstract

Modern forestry places severe demands on the private forest-owner. The decisions that must be reached are complicated and must cover not only ecological but also economic and technical considerations. There are also a number of different laws that affects forestry and logging, both directly and indirectly. One can hardly expect such a wide range of competence in private forest-owners. The need for qualified support adapted to the target group is, thus, greater than ever.

One form of support is a knowledge system. Expert advice is presented to the user in a pedagogical manner, mainly in order to function as support in decision-making. "Knowledge Systems for Forest-owners" is a development and cooperative project between the Swedish forest-owner movement, the forest management organisation, the Forestry and Agricultural Research Council and SkogForsk (Forest Research Institute of Sweden).

The vision is to collect old, well-trying, knowledge and new research information in order to coordinate current facts and information concerning management and economy in the relevant sectors. The approach used is characterised by simple and easily understood advice, and the forest-owner can rapidly find answers to why and how the forest should be managed, and how the different inputs, or lack of inputs, will affect the development and economy of the stand. The interactive parts are an important component, where the user can transfer his/her knowledge into practical inputs, or enter data on his/her forest and thereby obtain management recommendations adapted to specific situations.

The importance of knowledge

Modern forestry places severe demands upon the private forest-owner. The decisions that must be reached are complicated and must include not only to ecological but also to economic and technical considerations.

Forest management includes numerous complex decisions. Depending upon the natural conditions and the previous management the opportunities vary, and with them the various management alternatives. There is no universal solution; there are no easy answers.

During the establishment and juvenile phases of a stand, decisions are reached that will affect the forest for decades to come. The decisions made will therefore have major economic consequences. In addition, the forest-owner must be capable of reaching decisions compatible with legislation relating to consideration to nature. The

forest-owner should also be aware of what laws that influence forestry and the practical work concerning logging.

Knowledge is important, but the lack of knowledge among forest-owners is sometimes considerable. Even if they have the knowledge required it is important that it is handled correctly. There is a major problem in making the collective knowledge available to all those who need it, when they need it.

During recent years the development of the Internet has exploded and it has become a new public medium and a channel where a large number of people can be rapidly and easily reached. The web can now be used in effective dissemination of knowledge.

Valuable knowledge, of professional and specialist nature, can be released and spread. In this way, we can approach SkogForsk's vision of knowledge dissemination: that every decision-maker in each individual situation shall have access to decision-making support that helps the task at hand and improves its quality. The technology used for this has been called a *knowledge system*.

What is a Knowledge System?

Decision-making support

A knowledge system provides assistance and support in decision-making – often in the shape of a computer program – that contains expert knowledge within a subject area. The knowledge is presented to the user in a pedagogic manner, mainly in order to function as support in decision-making.

Knowledge systems can be used, for example, to:

- give advice or provide support in decision-making – what is the best thing to do in this situation?;
- accumulate knowledge – the system is always supplied with the latest research results;
- place diagnoses and make searches for errors; and
- make prognoses.

Some systems can accumulate knowledge in the form of experiences and, with time, often become more knowledgeable than their creators as the system is supplied with data from several experts. Research has shown that an effect of building knowledge systems is that participating experts have often developed into better experts having completed a project. For the first time, they might have seen their knowledge in a structured presentation, and identified gaps in knowledge, etc.

Perspectives – long experience in medicine

Within the field of medicine there are several knowledge system than can assist doctors and laboratory staff to diagnose symptoms, pathological changes and illnesses.

In some systems the doctors can reject the conclusions of the system and “criticise” the system by entering their own diagnosis and stating how their conclusions have been reached. As a result, there are medical knowledge systems that reach their “own” conclusions on the basis of fairly inadequate in-data since the system has built up a base of experience founded on problem descriptions and solutions.

It should be emphasised that considerable advances have been made in medicine in this sector, but nonetheless the systems are used mainly in research and education. The answers given by the system still only provide support for a diagnosis, mainly because responsibility for a patient cannot be transferred to the system.

Experiences from forestry

When are knowledge systems needed in forestry? They are needed when the benefits exceed the costs, i.e., when the correct decision is important for the completion of the process with regard to quality and/or time.

Today, there are only a few examples of knowledge systems in forestry. However, in some cases instruction manuals have been transferred onto CDs or placed on the Internet.

Systems that search for breakdowns in forest machines are being developed. From there, the step to being able to obtain concrete advice on repairing the breakdowns will probably take a couple of years more.

Forest-owners obtain immediate knowledge***Developmental project***

Managing a forest generally requires qualified knowledge within widely different subjects. We cannot expect the individual private forest-owner to have such a wide competence. The need for qualified, target group adapted support is greater than ever.

A subject area that is suitable for knowledge systems is forest management, where questions concerning choice of method and the time to introduce different measures must be decided. One such knowledge system for forest-owners is being developed in a project between the Swedish forest-owner movement, the forest management organisations, the research council for forestry and agriculture, and SkogForsk. The system is similar to a manual where facts and information concerning different forest management inputs are compiled and supplemented with interactive extension and

practical exercises. The intention has been to improve the efficiency of disseminating information and results produced by applied research to the individual forest-owners.

Röjning
i barr- och blandskogar

SKOG FORSK Kunskapssystem för skogsägare

Guide Test Ordlista Skriv ut

Räkna på din röjning

Ut i röjningsskogen

- Varför röjning?
- Planera din röjning
- Räkna på din röjning
- Natur- och kulturmiljöhänsyn
- Skador i röjningsskogen
- Röjning i olika beståndstyper
- Röjningsmetoder
- Dina val i röjningsskogen
- Uppföljning
- Frågor & Svar
- Eftersätta bestånd
- Teknik och utrustning
- Röjningsaktuellt

Röjning i praktiken - Hur bör din ungskog röjas? *

☐ Tall (>70%)

☐ Tall + löv

☒ Gran + löv

Vilken typ av mark ligger beståndet på?

☐ Svag mark

☒ Medelgod mark

☐ God mark

Vilken medelhöjd har beståndet?

☐ < 1,5 meter

☒ 1,5-2,5 meter

☐ 2,6-4 meter

☐ 4-6 meter

I tabellen här in till kan du se vilka stamantal som rekommenderas.

Du kan också läsa mer om de olika röjningsmetoderna i avsnittet [Ungskogsröjning](#).

	Svaga marker	Medelgoda marker	Goda marker
Norra Sverige, Tall	1600 - 1900	1900 - 2300	2200 - 2700
Gran	1500 - 1800	1800 - 2200	2000 - 2500
Mellan Sverige, Tall	1900 - 2200	2200 - 2600	2600 - 3100
Gran	1800 - 2100	2000 - 2400	2300 - 2800
Södra Sverige, Tall	2200 - 2500	2600 - 3000	2900 - 3400
Gran	1800 - 2100	2100 - 2500	2400 - 2900

Svar

* Har du höga plantantal av gran, vilket vanligen uppstår i självföryngringar, kan du nyttja lövet för att dana kvaliteten genom trängseffekt. Punktröjning innebär att röjningen koncentreras kring huvudstammarna genom att man röjer en cirkel med ca 0,5 meters radie. Cirkeln vidgas sen i takt med beståndets utveckling. Minst två röjningsingrepp krävs.

LRF Skogsägarna | SJFR | SkogForsk | Skogsvårdsstyrelsen

Figure 1: The knowledge system explains why cleaning is important. The system also enables the user to test his/her own stand and get practical advice.

As another part of SkogForsks systems for decision-making you find one system about different laws that directly or indirectly affects forestry, and one about rule concerning safety and the practical work around felling and logging timber, etc.

The Swedish forest-owner

Individual forest-owners are an important group in Swedish forestry. About 50% of the country's forestland is privately owned and today there are almost 350 000 Swedish forest-owners. The average forest-owner is a 51-year-old man, but in pace with urbanisation this group has changed from formerly mainly consisting of rural inhabitants to a situation today where it consists of a very heterogeneous group with representatives of varying professions, backgrounds, academic knowledge, age and gender. Consequently, it is difficult to use campaigns and other information inputs to reach this large and varying group with different opportunities, needs and interests.

Internet and the forest-owners

In July 2001 the number of Swedes surfing the net amounted to 4,4 million persons, i.e., 61,7 % of the population between the age of 12 and 79 years. However, to get a more correct picture of the forest-owners in Sweden we should look at the activity in

the 35-79 year-old age group. In this case, the share of Internet users was 49%. Many forest-owners report that they never use the Internet in their forestry activities. On the other hand, the Internet is used relatively often in searching for information.

During December 1999 the first module in the knowledge system was evaluated. The results of this evaluation show that most people considered that the Internet was a very good channel for spreading information on forest management. Those who were doubtful, or had no opinion, were mainly people who had little skill in using the Internet.

IT-based extension advice and support in decision-making

The intention is to create an IT-based channel for information and extension advice dealing with forest laws, work safety, management and economy in privately owned forestry enterprises. Here, the forest-owners will be able to find answers to all the problems they may encounter during the different phases of the forest's development. The natural conditions of the forest stand, its history and status, as well as the long-term and short-term intentions of the owner should be weighed together in a diagnostic part of the system that requires good in-data and that will result in support in decision-making.

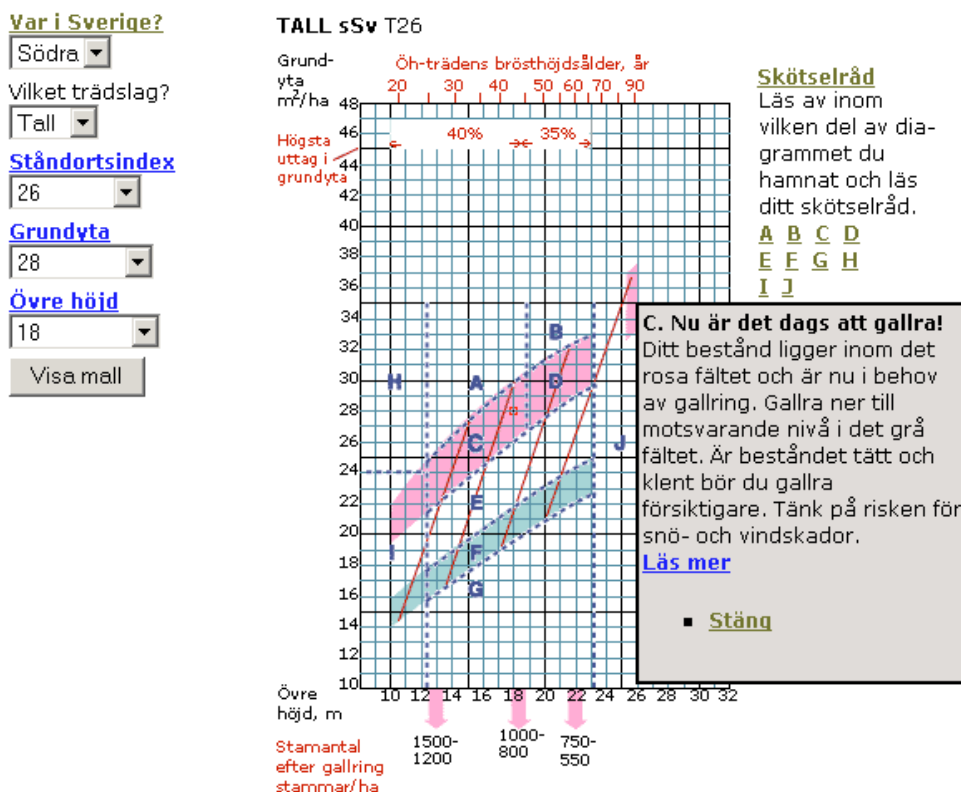


Figure 2: The forest-owner has entered data on a pine stand. The advice given is to thin and to reduce the ground area from 28 to 21. The user can also see that this means a reduction in the number of stems to about 800-1000/ha.

Today there are systems for management of broad-leaf forests, cleaning and thinning. There are plans for an additional module for final felling and reforestation. As a first step in the work with the last management system SkogForsk has developed a system for choosing the proper plant material.

The possibility for interactive operations distinguishes manual from on-site extension advice:

- calculations
- diagnoses
- prognoses
- pedagogical support in decision-making and practical exercises
- local/regional adaptation

However, forestry is not an exact science and it is important that the user does not experience the system's recommendations as being universally applicable; at the same time the user must feel confident that the system's recommendations are reliable. This is a fairly difficult pedagogical problem.

The user is not only provided with support in decision-making, but also with knowledge. As a result of the design of the system the user can obtain an explanation of how the conclusion was reached at the end of a consultation. One example is the possibility to vary different in-data in the interactive parts of the knowledge system and observe the variations in results. The system thereby provides the user with the possibility to see and understand relationships between different factors and thus the user can form his/her own opinion of the relevance of the recommendations.

It is also important that there are several levels of knowledge in a knowledge system – we must be able to get quick results but also be able to understand the theory behind the interface, e.g., research reports and other compilations.

Design of the knowledge system

The base of the system is found in static HTML pages that are supplemented with database functions. The technical level has been adapted to the user's conditions, which generally means poor links and weak computers.

The interactive parts are designed around imaginary situations where the system states how the forest should be managed in the different cases. Using the data supplied by the user the suitable alternative answers are collected from the database.

Editing and up dating of the texts and illustrations in the static pages is done directly in the source code using Macromedia Dreamweaver.

The system's glossary, enquiry function and knowledge test are linked to an Access database. Maintenance of these functions is made easier through a simple web interface. This administration tool can then be used to arrange the different chapters and courses as required. For example, the chapters on the forest-owner's own activities in the different courses can be compiled into a new course.

Experiences emerging from the project

The results of evaluations show that the knowledge system is experienced as being simple, informative, interesting and engaging. The design is well adapted to the user's needs and level of knowledge, and most people consider that they will return for similar services in the future.

Sweden is a country with considerable geographic variations as regards forest production. Thus, it would be desirable to adapt the information to the different parts of the country. Increased features of interactivity and problem-based learning should also be aimed at in subsequent modules.

The original ambition to reach all forest-owners is today regarded as unreasonable and no longer desirable. Instead, emphasis is concentrated on the younger forest-owners where the Internet functions as a natural channel of information, and also the other forest-owners with a certain amount of Internet awareness and interest, e.g., the increasing number of people who no longer live on their forest or farm properties. In addition, the target group has been widened to include also other people who influence management of the forests.

Complete knowledge system for forestry

This is only the start of the development of support for decision-making. In SkogForsk's vision everybody in every decision-making situation will be able to obtain advice on how to do their work in the best possible way. Regardless of whether you are going to build a road, plant a clear-cut or repair a machine you will not have to wonder how to do it, or even worse, make mistakes costing money.

For land-dependent industries such as forestry, where numerous different people with different levels of competence face similar problems, it should be profitable to cooperate around the creation of a knowledge system. Naturally, it will also cost money to design a complete system for forestry, and it will take time too. Instead, we will probably see a number of pioneer projects growing together via the web into a functioning form of providing support for decision-making in all possible situations.

Development possibilities for knowledge systems on the Internet

Evaluations of earlier knowledge system projects for "Broad-leaf Forest Management" and "Cleaning" show that the web is the obvious channel for spreading both theoretical and practical information on forest management.

This advisory service is found on SkogForsk's home page, www.skogforsk.se. It is open to everybody and is without charge. The advantage of offering information via the Internet is that the information is available to everybody and at times that suit the user. In addition, the system is easily updated when new research results arrive or when the need arises.

Learning should become even more engaging, and thus also more effective, since the forest-owner can test the theory behind his/her own situations in practice through interactive exercises. Web-based knowledge systems also offer the opportunity to get information "on demand", i.e., when and if the user asks for it.

In comparison with distribution on, for example, CD or DVD, the web-based system offers better access and the system is easier to up-date. If necessary, web-based knowledge can be burnt onto a disc and distributed. On the other hand, the knowledge must be distributed by disc if large numbers of animations, film sequences, etc. are used. The slow transfer speeds of the web imply large limitations but the problem can be reduced if the user downloads entire, or parts of, programs into an executive file.

Today, it is easy to integrate databases and web technology. This makes it simpler to build knowledge systems. In addition, the market is promoting development of decision-making support and interactive education using web technology. These systems are often classed as knowledge systems.

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TAXES AND LAWS: DO THEY CHANGE LANDOWNER BEHAVIOR FOR THE BETTER?

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Introduction

Private forest landowners (PFLs) consistently cite taxes and related laws as major impediments to forest management¹³. Nevertheless, PFLs have enjoyed tax and financial incentive programs since the 1936 Agricultural Reserve Program. In the 1950s the Soil Bank Program was the first major federal tree planting initiative (Cubbage 1996). Today forest-related incentive programs include the Forest Stewardship Program, Forest Incentives Program, Conservation Reserve Program, Forest Legacy Program, and the Environmental Quality Incentive Program. The programs include payments for forest regeneration, soil and water conservation, wildlife enhancement, and agroforestry practices. Studies suggest that the most cost-share and rental payment programs have met their goals and proved both effective and efficient (Sampson and DeCoster 1997, Kurtz et al. 1994, Moulton et al. 1995). On the negative side, some studies indicate that wealthier landowners are taking more advantage of the incentive programs than lower-income landowners (Gaddis 1996). The rationale for continuing these financial incentive programs include: a) reductions in timber supply due to environmental and social constraints, and b) the need to meet environmental objectives such as reducing soil erosion and preserving endangered species. Tax incentives for PFLs include capital gains treatment from timber sales, reforestation tax credits, special rules for expensing forest activities, and preferential tax treatment for forest properties. Conservation easements, one of the fastest growing tools to protect land from development, also entice PFLs with tax incentives. These set of incentives are intended to minimize the tax burden on PFLs and encourage their protection and management of forestland.

PFLs are liable for three types of taxes: a) federal income taxes from the sale of timber; b) annual property taxes on the assessed value of their land; and c) estate taxes on the net assets of a deceased owner. Income and estate taxes only occur when landowners sell timber or transfer land. Property taxes are recurring annual cost of owning the land, regardless of the management decisions. Property taxes are an important source of revenue for schools, roads, and other local government services. Property taxation is generally based on the real estate's fair market value (ad valorem) or "highest and best use." However, most states provide special taxation for farm and forestland as an incentive for owners to keep the land in these uses and to protect open space. A variety of special forest taxes are used by the

¹³ / Annual surveys carried out by the National Woodland Owners Association and other national groups such as the American Forest Foundation, rank tax issues as number 1 or 2 on their list of PFL concerns.

states, ranging from modified assessments based on productivity or current use values to yield taxes and exemptions (Chang 1996). This paper focuses forest property tax incentives and its influence on PFL behavior in Pennsylvania.

Pennsylvania's Preferential Forest Property Tax Program

Pennsylvania's Clean and Green program (also known as the Pennsylvania Farmland and Forest Land Assessment Act, Act 319) provides preferential tax treatment to PFLs with 10 acres or more. A key objective of the program, which has been in existence since 1974, is to maintain farmland and forestland as open space by allowing for taxation goes untaxed until the time of harvest. There are over 2 million acres of private forestland enrolled (17% of total private forestland) in the Forest Reserve category of Clean and Green (C&G) in 45 counties of 67 counties in Pennsylvania.

Giving PFLs a reduced property tax rate may also influence their decision to sell timber. Pennsylvania's forest products industry depends on the continued supply of wood from PFLs. By reducing the profitability of forest ownership, forest property taxes increase the incentives to convert forestland to other uses. Similarly, landowners are less likely to manage their forestlands for timber when the returns to such management are less competitive with other investments. Perhaps most important, landowners who might be inclined to manage their forestland for timber – and also those who are most likely to sell their timber – will become discouraged by low returns, and they will be more likely to sell their forestland to owners who's objectives do not include timber management.

To better understand the C&G program, an analysis of the profitability of the forestland taxation was carried out and three stakeholder groups were surveyed: county tax assessors, county commissioners, and forest landowners. All three groups identified significant concerns with the C&G program. County commissioners and assessors (public officials) had very similar views on most questions. Private forest landowners' (PFLs) opinions differed, but all three groups agreed that the program needed changes. This paper discusses one component of the study; how the C&G program influences PFL their behavior (for more details of the entire study please contact the author).

PFL Survey

Landowners from 21 Pennsylvania counties were surveyed to elicit their views regarding the C&G program. Lists of landowners were obtained from property tax records in each county. Fourteen of the 21 counties are classified as Metropolitan (or urban) areas (as defined by the Bureau of Census). Six of the 14 "urban" counties are over 50% forested. In 6 of the 21 counties more than 75% of the land is forested. The survey questionnaire asked PFLs about their forest property taxes, the C&G program, and their socioeconomic and management characteristics. A total of 2,473 surveys questionnaires were mailed. There were 1,398 usable surveys, resulting in a 56% response rate. A little over half the respondents (55%) have properties enrolled in the C&G program.

Socioeconomic characteristics

The socioeconomic characteristics are consistent with other surveys of PFLs (Birch 1996). As the data suggest, PFLs are a diverse group. It is difficult to single out specific trends, however, some characteristics warrant discussion. One may expect to find a higher percentage than what is shown of retirees and absentee owners (those not residing on their land), and those who inherited the land. This implies that there are many landowners out there purchasing both small and large tracts and using it as a residence, and not primarily to make income from it. Very little difference was found in the socioeconomic characteristics of those enrolled in C&G and those not except for two areas. Total household income and acreage owned was slightly higher for those enrolled in the C&G as compared to those not enrolled.

Management Characteristics

Only 10% of the respondents had an up-to-date written management plan. Forty-three percent had never harvested timber on their land, but 37% had done so in the last 10 years. Most important reasons why they owned their land were “preserving natural beauty” and “living in a rural area”, followed by “using the land as a personal residence” and “passing it onto heirs. Most landowners prefer not to allow outside use of their land, but 26% say that that outsiders may use the land with permission. Only 11% allow access without permission. This suggests that most landowners are not as interested in harvesting timber or developing the land as they are in non-timber uses such as recreation, aesthetics or just having the forestland being part of their home. This is consistent with other studies. One may have expected those enrolled in C&G to more actively manage their land but likely management activities of C&G enrolled PFLs show very little difference between those not in the program.

Attitudes toward property taxes in general

Landowners were asked whether property taxes would affect their decisions to do any of the activities listed in Table 1. “Selling some timber,” enrolling in a conservation easement” and “posting the property” were the decisions most likely to be affected by property taxes. Fifteen percent of those who said they were unlikely to harvest timber in the next ten years said that property taxes would make their decision to harvest timber much more likely. Across all activities about 10% of the respondents who were unlikely to do any of them said the affect of property taxes would make it more likely they would carry out that activity in the next five to ten years.

Furthermore, about 50% of these who were somewhat likely to do activities such as timber harvesting, sell or develop the land would be much more likely to do it because of property taxes.

Table 1: Degree to which property taxes affect forest management decisions
(1=not at all, 4=very much).

Activity	Mean (1-4)
Sell some of the timber	1.95
Sell all of the timber	1.44
Sell other forest products (e.g., firewood, ginseng, mushrooms)	1.46
Sell some of the land	1.56
Sell all of the land	1.49
Develop some of the property	1.49
Develop the entire property	1.33
Post the property	1.68
Lease property for hunting	1.31
Lease property for recreation (e.g., ATVs, hikers)	1.22
Convert the land to agriculture	1.30
Enroll in a conservation easement program	1.80

About half the landowners feel that their forest property taxes are too high. One-fifth are not sure about the whether their taxes are too high or low, and 29% say that their property taxes are about right. Many who said their taxes are too high believe that maintaining natural forest should be a benefit to the state and not a tax to the landowner. Many PFLs complained that they pay a disproportionate amount of taxes, compared to the services they receive: "We use no services except the roads to drive on." Many said forest landowners should not have to pay school district taxes. Another common concern was paying annual taxes but only cutting maybe once in one's life: "the per-acre price may not seem high, but when you calculate cumulative property taxes over the 70 to 80 year cycle, they are very high. It doesn't pay to buy very young timber." When asked why landowners were not enrolled in C&G the largest response was lack of knowledge about the program (30%), followed by concern about giving up property rights and control of the land (28%).

Attitudes toward Clean and Green

On a scale of 1-4 with 4 being most important, "tax savings" is the most important reason given for enrolling in C&G, while "keeping the land forested," "being able to retain ownership," and "preserving open space" were also identified as important reasons for enrolling (Table 2). This suggests that although tax savings may be necessary to help them retain ownership it is not sufficient alone. However, a number PFLs noted that C&G is a "savior," enabling them to keep the land. Some went as far as calling it a "bargain."

Table 2: Importance of reasons for enrolling in Clean and Green
(1=not important, 4=very important).

Benefits	Mean (1-4)
Tax savings	3.88
Preserve open space	3.32
Keep the land in forest	3.46
Retain ownership	3.51

Nearly one tenth of respondents said enrolling in C&G reduced their taxes by more than half; about one quarter of the respondents said enrolling in the program reduced their taxes by 26%-50%; and one-fifth said it reduces their taxes by 25% or less. A considerable number (41%) of the enrollees do not know how much C&G reduces their taxes.

Landowners enrolled in the C&G were asked how their decisions about different forest management activities would be affected if the program were eliminated. Results to this question were similar to the one on the likelihood of the effects of property taxes on their management decisions. "Sell some of the timber," "sell some of the land," and "post the property" were the most likely activities to be affected if the program were eliminated (Table 3). Almost 30% of those who said they would not be likely to sell timber or develop land were more likely to do so if the C&G program was eliminated. Eliminating the program would also make over 50% of those who were somewhat likely to harvest timber or sell land more likely to do so. While respondents indicated that they would be more likely to "sell some of the land," they were much less likely to "sell all of the land" if the program were eliminated. Similarly, the respondents indicated that they would be more likely to "develop some of the property" if the program were eliminated, but they would not be any more likely to "develop the entire property" if the program were eliminated. Interestingly, the respondents also indicated that they would be less likely to "convert the land to agriculture" and "lease the property for recreation" if the program were eliminated. Finally, all the landowners were asked about whether an alternative tax involving a flat annual payment with a yield tax at harvest should be considered. Thirty seven percent agreed that such an alternative should be considered, 22% were against considering this alternative, and 37% said they don't know.

Table 3: Likelihood of doing certain activities if the Clean & Green program were eliminated (-2 = much less likely, +2 = much more likely).

Activity	Mean (-2 to 2)
Sell some of the timber	0.69
Sell all of the timber	0.29
Sell other forest products (e.g., firewood, ginseng, mushrooms)	0.33
Sell some of the land	0.44
Sell all of the land	0.21
Develop some of the property	0.22
Develop the entire property	-0.01
Post the property	0.36
Lease property for hunting	-0.02
Lease property for recreation (e.g., ATVs, hiking)	-0.14
Convert the land to agriculture	-0.16
Enroll in a conservation easement program	0.29

Discussion

The PFL survey results suggest that taxes play an important role in landowner behavior. Over one-third who said they were unlikely to sell timber or land said they would be more likely to do so if the C&G program were eliminated. Other activities, especially posting the land or selling some land, would also be more likely if C&G was eliminated. PFLs indicated that they would be more likely to subdivide or sell part of their land without the C&G program, but they also indicated that they would try to hold on to at least some of their land even in the face of rising taxes. Most of the PFLs enrolled in C&G said their main reason for enrolling was tax savings. However, being able to retain ownership in the land was almost equally as important to them. This suggests that for a large number of PFLs tax programs such as C&G do provide an incentive to maintain ownership in land. On the other hand, the comments from the assessors' and commissioners' surveys strongly suggest that the penalties for getting out of the program are insufficient to discourage PFLs who want to sell or subdivide their land from doing so. Most of public officials surveyed said that C&G is preserving forest and farms to some extent, but that it does not prevent development.

Many PFLs were satisfied with their assessed values under C&G, expressing that without the program they would be unable to own the land. The most commonly raised concern specifically about the C&G program from PFLs was the disproportionate share of taxes they paid with respect to services received and the deferred income problem – i.e., only getting income from the land periodically while paying annual taxes. In many cases, even with the preferential assessment, the compounded value of the annual tax payments over an 80 to 100-year rotation is far greater than the revenues received from the harvest.

While most PFLs were satisfied with their assessed values under C&G, some thought the values were unfair. The C&G assessed values are current use values (i.e., "use values") based on forest type, stumpage prices, management costs, and discount rates. Use of a single, weighted-average value based on the forest type

make-up of the county results in landowners with a high-value forest types paying the same tax per acre as landowners with low-value forest types. Similarly, owners of land with valuable mature timber pay the same tax as owners of low-value cutover land, due to the nature of the productivity tax formula. On the other hand, especially near the edges of price-reporting regions, landowners with similar forestland that happens to fall on different sides of a county boundary may have very different assessed values.

Public officials had different concerns. Although saying it is a good idea to provide tax incentives to working farms and forests, the penalties for withdrawing are too low, and there are unintended beneficiaries who should not be allowed to enroll in the program. The overall study suggests that program needs changes. The tax incentive is an important tool for landowners to retain ownership of their forestland. Taking away the program likely would increase the sale of land for development and other uses, increase the sale of timber, and other activities. This suggests that the tax is actually reducing the amount of timber harvested compared to the amount that would be harvested without the tax. It seems logical that the thrust of the program must be to preserve open space given that most landowners are not primarily concerned with selling timber. Preservation programs such as conservation easements cannot preserve all the open space. Tax incentives should be complementary tool to preserve open space. Other tax incentive programs may be needed to encourage timber harvesting. Demographic changes and the movement of people to the countryside suggest that development of forestlands will continue. Pennsylvania needs policies that will effectively address this problem. The Clean and Green program is a weak instrument to achieve this. Perhaps a new approach is needed that is fair to taxpayers and protects open space for future generations.

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TOWARD A MODEL PROGRAM OF GRADUATE EDUCATION IN EXTENSION FORESTRY

James E. Johnson & Franklin A. Bruce, Jr.¹⁴

Abstract

A survey was conducted of the International Union of Forestry Research Organizations Extension Working Party to determine attitudes and opinions regarding a graduate education program in *Forestry and Natural Resources Extension Education*. Results, based on 60 responses from 17 countries received by September 24, 2001, indicated a strong need for graduate programs in this area. Barriers to working professionals pursuing a graduate degree included funding and time away from work and family. Seventy-three percent of respondents felt that a degree could be offered wholly or partially over the Internet, and 65% felt that a graduate program could consist of either a thesis or non-thesis option. A non-thesis option-only program was unacceptable to 77% of respondents. Respondents also selected proposed core and elective courses.

Introduction

Issues in forestry and natural resources management are becoming more important in many countries of the world. Increasing demand for wood products, clean water, biodiversity protection, recreational opportunities, and economic development based on sustainable management of natural resources is prevalent throughout both the developed and developing world. Concurrent with these issues is the need to expand educational opportunities for rural farmers, landowners, and the general public. Education is one of several policy alternatives that governments have to stimulate private behavior that is in the public's best interest (Reed 1999).

A well-trained, competent, and professional workforce is central to the development and delivery of extension education programs. But today the perception is that the vast majority of extension workers have not received university degrees specifically in extension subjects. Rather, the university education has involved subjects such as agriculture and forestry, with little to no emphasis on subjects more important to educational work in extension. In some countries, e.g., Nepal, extension work is even thought to be a second-class career choice (Baral 1998). University degree programs that emphasize extension could assist in creating a more highly trained work force and also bring a stronger measure of respectability to an extension career.

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While degree programs in agricultural extension exist in many universities, such is not the case in forestry and natural resources. An exception is the program currently offered at Oregon State University (see <http://www.cof.orst.edu/cof/studserv/gradpage.sht>). Clearly, the extension forestry and natural resources community could benefit from more emphasis on professional education in this field. The World Wide Web is also creating opportunities for all or portions of university degree programs to be taken at a distance. Internet solutions to educational problems are becoming more common, and may have a direct application in a graduate education program in extension forestry and natural resources.

Objectives

The objectives of this project were to:

- (a) Assess the interest of the Extension Working Party of the International Union of Forestry Research Organizations (IUFRO) in a graduate degree program focused on forestry and natural resources extension.
- (b) Determine the desired composition of such a degree program, with respect to structure, required courses, elective courses, mode of delivery, and barriers to success.

Methods

A four-page survey was constructed during the late summer of 2001. In August 2001, the survey was mailed to all members of the IUFRO Extension Working Party. This consisted of 500 individuals in 75 countries. In September 2001, a follow-up electronic distribution of the survey was completed to a subset of the full Working Party for those members who have Internet access with functioning e-mail addresses. The survey was sent as a Word file in an e-mail attachment. Members were asked to fill out the form and return it as an attachment, in lieu of returning the printed form. As of September 24, 2001, 60 survey forms had been returned, 14 as printed forms and 46 as e-mail attachments.

The survey consisted of 15 questions related to general interest in a graduate degree program in forestry and natural resources extension. Members were asked if they already hold such a degree or if they have a desire to pursue such a degree, and at what level, M.S. or Ph.D. They were also asked to identify major barriers to the success of such a degree program, including funding, language, time away from job or family, lack of available programs, etc. Members were also asked if they felt that the Internet would be a viable option for such a degree program, and if so, the desired language. The need for extension workers trained in extension methods was also assessed, and members were asked if their organizations or institutions have hired or plan to hire such workers.

IUFRO Working Party members were also asked if the proposed degree program should be a thesis option only, a non-thesis option, or a combination of both. Finally,

two proposed lists of core courses and elective courses were presented, and respondents selected whether or not they felt the courses should be included. Additional demographic data collected included country or state of the respondent, gender, type of organizational affiliation, and the name of the affiliation.

Results and discussion

Demographics

Responses came from 17 countries, as follows:

Country	Number	Country	Number
USA	34	France	1
Canada	5	Germany	1
Argentina	2	Honduras	2
Australia	2	Peru	1
Belgium	1	Slovenia	2
Chile	1	Sweden	1
China	1	Turkey	1
Colombia	2	Zimbabwe	1
Denmark	2		

Fifty-one of the respondents were male, nine female. Sixty-seven percent of the respondents worked for educational institutions, 32% worked for government agencies or research institutes, with the remainder employed by non-governmental organizations or as private consultants.

Interest in Graduate Education Programs

Respondents were asked if they themselves either now have a degree or desire to pursue a degree with a specialty in *Forestry and Natural Resources Extension Education*. Presumably, some of the respondents would be people who either are currently working, or desire to work in extension. If individuals desired to pursue a degree, they were further asked if they would be interested in either an M.S. or Ph.D. Twenty-three of the respondents, or 38%, currently hold a degree in *Forestry and Natural Resources Extension Education*. Of the 37 respondents who do not currently hold such a degree, 16, or 43%, indicated they would be interested in pursuing such a degree, 10 at the M.S. level and 6 at the Ph.D. level.

The primary barriers selected by the respondents included funding (57%) and time away from work and family (50%). Certainly a commitment to a graduate degree by an individual already working involves a significant investment in both money and time. The high responses to these two categories are likely a reflection of this reality. The next highest selected category was a lack of reward in current job. Certainly, if an individual does not stand to benefit in some meaningful way, the incentive to pursue a graduate degree would be reduced. Lack of available programs in the state or country was chosen by 22% of the respondents, language barrier by 10%, and lack of positions for individuals with graduate degrees was selected as an "other"

category by one person. Possibly the major barrier, funding constraints, could be somewhat overcome by the offering of graduate assistantships and fellowships for individuals who would otherwise be willing to pursue such degrees.

Forty-four respondents (73%) agreed that a graduate degree program in *Forestry and Natural Resources Extension Education* could be offered over the Internet. The majority, 70%, indicated that English should be the language used; however, there is a decided bias in this population since the survey was written in English. Non-English speakers would not be inclined to answer the survey in the first place. Two other languages, Spanish and Swedish, were also identified by at least two people. The primary barriers to an Internet program included the time it takes to complete the program (52%) and funding to support the effort (43%). Secondary barriers included lack of computer hardware (23%), quality control and lack of human interaction (15%), and language (8%).

Forty-five of the respondents (75%) indicated that their organization or institution has a need for more qualified professionals trained in *Forestry and Natural Resources Extension Education*. Furthermore, 43 respondents (72%) indicated that their organization or institution has hired one or more persons in the past three years with such a background. In 79% of these cases, the person or persons hired had a graduate degree, and 56% were in the area of *Forestry and Natural Resources Extension Education*. Only 7% of the respondents felt that their organization or institution did not need to hire more extension workers in forestry and natural resources, while 15% indicated that their organization or institution has not hired such workers in the past three years.

Composition of a Graduate Education Program

There are two generally accepted formats for graduate degrees, particularly at the Master's level. One involves a traditional research project and the development of a thesis based on the results of the research. The other is a non-thesis option, which usually requires the completion of a project paper, portfolio, etc., in lieu of a thesis. Respondents were asked whether they favored the former, the latter, or an option that allowed for either, using a Likert scale. Seventy-six percent of the respondents either agreed or strongly agreed that a thesis project should be included. Sixty-five percent either agreed or strongly agreed that either a thesis project or a non-thesis project would be acceptable, while only 17% agreed or strongly agreed that a non-thesis project only would be acceptable. Conversely, 77% disagreed or strongly disagreed that a non-thesis option only would be acceptable. These results clearly show that a successful graduate education program in *Forestry and Natural Resources Extension Education* should allow for a thesis option. An additional non-thesis option would be acceptable to a significant number of respondents as well. This second option would be preferable to those students who are taking a program over the Internet.

Respondents were asked to determine, from a selected list, whether prospective core courses should be included as required courses, elective courses, or not included at all (Table 1). The results, displayed in Table 1, are variable. The following courses

emerged as clearly favored for “required” status: Foundations of Forestry and Natural Resources Extension Education (85%), Principles of Adult Education (72%), Program and Curriculum Design in Extension Education (72%), and Instructional Delivery (60%). A second set of courses emerged as clearly favored for elective status, including International Development (75%), Youth Program Management (73%), Managing Volunteers (72%), Foundations of Vocational and Technical Education (62%), Organizational Psychology (62%), and Rural Sociology (62%). Very few respondents selected any courses to be eliminated from consideration, but the top candidates for elimination included Youth Program Management (17%), Educational Psychology (15%), and Managing Volunteers (15%). Other courses fared well, but respondents were split over whether the courses should be required or elective. For example, 55% of respondents felt that Educational Research Design and Analysis should be a required course, while 45% felt that it should be an elective course. Likewise, 53% of respondents felt that a course in Participatory Management should be required, while 50% felt that it should be elective.

Table 1. Responses to selection of core courses for a graduate degree in *Forestry and Natural Resources Extension Education*.

Course	Required Course?		Elective Course?		Do Not Include	
	N	%	N	%	N	%
Educational Psychology	30	50	25	42	9	15
Educational Research Design and Analysis	33	55	27	45	2	3
Educational Technology	33	55	26	52	2	3
Foundations of Forestry and Natural Resources/Extension Education	51	85	11	18	1	2
Foundations of Vocational and Technical Education	15	25	37	62	7	12
Instructional Delivery	36	60	20	33	4	7
International Development	14	23	45	75	2	3
Managing Volunteers	10	17	43	72	9	15
Organizational Psychology	21	35	37	62	3	5
Participatory Management	32	53	30	50	1	2
Principles of Adult Education	43	72	16	27	3	5
Program and Curriculum Design in Extension Education	43	72	18	30	0	0
Rural Sociology	20	33	37	62	5	8
Testing and Evaluation of Educational Programs	30	50	29	48	1	2
Youth Program Management	9	15	44	73	10	17

Additionally, one or more respondents nominated a series of additional courses to be considered for a core curriculum. These included:

Informational Technology	Foundations in Business
Survey Design and Analysis	Economics
Instructional Design	Needs Assessment Techniques
Advanced Communications	Program Marketing
Conflict Management	International Marketing
Environmental Policy Development	Community Development
Social Theory	Advanced Forest Ecology
Anthropology	Science Methods
Update in Forest Research	

In addition to a collection of "core" courses, a graduate degree program also requires a variable number of "elective" courses. In the United States, for example, it is common for M.S. degree requirements to include 30 semester credits. Typically 3 to 6 credits will be awarded for the thesis or special project, with the remainder coming from a group of core and/or elective courses. Respondents were generally favorable toward the list of suggested elective courses (Table 2), as it was rare for a respondent to recommend that a particular course not be allowed as an elective. The courses that were most widely selected for definite inclusion were Integrated Resource Management (75%), Soil and Water Resources Management (70%), Advanced Forest Management (67%), and Sustainable Forestry (65%). As with the core courses, there were mixed feelings about whether some courses should be definitely included or possibly included. For example, 45% of respondents felt that Biometry and Statistics should definitely be included as an elective course, while 50% felt that maybe it should be included, and 8% felt it should not be included. The following additional courses were recommended by one or more respondents to be included in the list of elective courses:

- Landscape Ecology
- Issues in Conservation Biology
- Forest Ecology
- Forest Tree Improvement
- Genetics
- Wood Products
- Business Applications
- Urban Forestry
- Forest Harvesting
- Project Management
- Multicriteria Analysis
- Ecosystem Management
- Systems Thinking
- Community Development
- Tropical Forestry
- Forest Regulation
- Forest Protection

Table 2. Responses to selection of elective courses for a graduate degree in *Forestry and Natural Resources Extension Education*.

Course	Definitely Include		Maybe Include		Do Not Include	
	N	%	N	%	N	%
Advanced Forest Economics	29	48	27	45	4	7
Advanced Forest Management	40	67	20	33	1	2
Biometry and Statistics	27	45	30	50	5	8
Development of Non-Timber Forest Products	34	57	25	42	2	3
Geographic Information Systems	35	58	25	42	3	5
Integrated Resource Management	45	75	15	25	1	2
Issues in Forest Certification	21	35	32	53	5	8
Principles in Agroforestry	33	55	27	45	2	3
Plantation Forestry	27	45	31	52	4	7
Remote Sensing of the Environment	15	25	41	68	4	7
Social Forestry	36	60	24	40	1	2
Soil and Water Resources Management	42	70	17	28	2	3
Sustainable Forestry	39	65	22	37	0	0
Watershed Management	38	63	22	37	3	5
Wildlife Management and Habitat Protection	34	57	26	43	1	2

Conclusion

In the United States, it is common at both the M.S. and Ph.D. levels for students to customize their own programs dependent upon their educational and career goals and the available offerings at the university. This paper identifies those courses and formats that may be considered, both by institutions seeking to develop a prepared curriculum in forestry and natural resources extension as well as for individual students seeking to customize their own programs in this area.

Given that funding and time away from work and family were identified as primary barriers to those seeking further education, it seems that graduate programs, particularly at the Master's level, that offer all or part of the coursework over the Internet hold great promise.

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IS THE 'TECHNICAL EXPERT' ROLE OF FARM FORESTRY EXTENSION AGENTS FADING? RECENT EXPERIENCES FROM AFRICA AND IMPLICATIONS FOR FUTURE EXTENSION PROGRAMS

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Abstract

The conventional meaning of extension has been changing to accommodate challenges presented by changes in extension policies and dwindling extension resources. Staffing rationalization programs have led to drastic reductions in number of extension staff. Financial resources for extension have dwindled to halting levels. The emerging trend is that institutional arrangements for extension delivery are being founded on facilitation, participatory and local capacity building principles. The challenge at hand is how to integrate responsibility of extension staff into community-driven extension approaches; yet the staff are accustomed to top-down extension service.

We have analyzed recent forestry extension experiences in selected countries in Africa. Factors on which the analysis has been based are: institutional arrangements for forestry extension with a focus on the role of extension staff, and extension policies and approaches. The roles of extension agents are changing. Participation of communities in extension is intensifying. Lack of clear methods for practical application of concepts like participation, empowerment and facilitation is hindering progress. But, where these concepts have been applied practically, communities have demonstrated a capacity to be responsible for extension service delivery. Extension workers will however continue to be important for successful community-driven extension but with new roles including being marketing agents and networking facilitators.

Introduction

In Africa, small-scale rain-fed agriculture continues to be the main source of livelihood security for most households. Promotion of technologies to improve production like farm forestry is particularly relevant to sustainability of the farming systems and livelihood security. The concept of livelihood security as used in this paper refers to the ability of farmers to meet their food and nutritional needs, economic ability to provide education for children, good housing, good health, access to quality water and a habitable environment.

Since inception of promotion of farm forestry in most African countries in the early 1970s, the main perceived beneficiaries have been the small-scale farmers. It is this

category of farmers who have limited economic ability to switch to substitutes of wood products. Because of economic constraints, use of yield increasing inputs is limited. Trees and shrubs with scope for improving soil productivity have been promoted. Medicinal plants have become equally important, as health services have grown to attract premium fees. Growing a variety of trees on-farm has therefore become an important strategy for sustaining livelihoods as well as protecting and conserving forest resources.

A review of forestry extension experiences was undertaken as a basis for analyzing the evolving farm forestry extension approaches, and implication of the emerging changes to the design and implementation of future farm forestry extension programs.

Experiences from 13 countries; namely Uganda, Botswana, Lesotho, Ethiopia, Eritrea, South Africa, Namibia, Zambia, Zimbabwe, Malawi, Burundi, Tanzania and Kenya were reviewed. It is anticipated that results from this analysis will generate debates and contribute to development of effective community –driven farm forestry extension.

Indications from this review are that community-driven farm forestry extension is relatively new in most countries in Africa. Changes in institutional structures and policies are fostering the sharing of extension responsibilities between extension agencies and community members (MORD, 1999; Kachala and Banda, 2000,).

Extension policy and conditions

Historical perspective

Policy guides decisions on allocation of resources. It determines how an extension program is designed, the target group, approaches used for implementation and participants in the process.

Attempts to address and contain causes of land degradation and arrest recurrent poor agricultural productivity for example have been guided by single sector-based policy and development intervention approaches. An illustrative case is the study by Rocheleau et al. (1995) on the Ukambani land degradation control in eastern Kenya.

The sector-focused model influenced the design of farm forestry extension projects. Hence during the early 1980s, such projects relied on a policy of service and material inputs delivery by providing free tree seedlings, paid cost of training, cash-pay for planted seedlings, and technical information to encourage farmers to adopt farm forestry. Many examples on extension experiences in a bibliography by Kaudia (1992) and other writings indicate that extension agencies relied on a supply-push extension policy (Smith, 1994, Enters and Hagmann, 1996). Under this model, extension workers had the role of delivering messages as prescribed to farmers who were assumed to be ignorant and needed the prescriptions to solve their farming problems. This situation has been changing. Extension service provision is no longer the domain of traditional forestry extension departments. Efforts to improve

farm forestry extension to achieve extensive adoption has started drawing the attention of major agencies in this field like the International Center for Research in Agroforestry (ICRAF). A recent workshop on scaling up the impact of agroforestry research by ICRAF yielded a list of conditions for successful extensive adoption of farm forestry (Cooper and Denning, 2000). The conditions referred to as fundamentals for scaling up the impact of innovations point to new roles for extension workers.

Emerging changes in extension policy and strategies

Some of the notable changes include:

1. Change in policy from material delivery and incentive package provision to demand-driven extension,
2. Extension agents taking a position of being facilitators of extension and not “expert marketing agents” or “messengers”,
3. Reduced resource allocation to extension (both financial and staff), and
4. An approach based on the principal of gradual coverage of a target area.

These changes and their implications are discussed case studies.

The emerging conceptual framework for extension can be simply described as one of cost-sharing and community capacity-development for sustainability and market oriented production. Hence ideas and courses of action are discussed and mutually agreed upon between the extension agents as “*technical experts*” on one hand and the farmers who are the “*recipients*” of the services on the other hand.

Participatory extension is however challenging. Methods for empirical application of the concept are largely lacking. Case studies in the following section illustrates some of the current experience.

Experience with community-driven extension approaches

Differences between countries are notable regarding the extent to which community-driven farm forestry extension is developed and operational. In counties like South Africa and her former “colonies” -Lesotho, Botswana, Swaziland, Mozambique and Namibia - where industrial forestry has been predominant, extension has been oriented to commercial production of trees as described by Arnold 1998. In this case representative of companies which contract the farmers to grow trees deliver seedlings and other production inputs. Farm forestry in this case has been a business activity (Arnold, 1998; Mabena, 2000). In frontline states neighboring South Africa (Zambia, Malawi, Zimbabwe and Tanzania), extension workers from government and non-governmental agencies have continued to play the role of “messengers” and “technical experts”.

In Malawi, Kachala and Banda (2000) report that the new forest policy published in 1996 encourages community participation. The Social Forestry Training and Extension project funded by the European Union since 1999 seems to be the

pioneering project with a focus on community-driven extension approach. The approach of this project has been to train Village Natural Resource Management Committees to serve as farm forestry extension facilitating agencies (Kachala and Banda (2000). In Zimbabwe, the Forest Extension Division of the Forestry Commission has had a lead responsibility in forestry extension especially after the setting up of the Rural Afforestation Project in 1982. But Choruma (2000) indicates that as yet, a comprehensive framework for farmers to take a responsible role in extension is lacking.

The situation in Zambia, reported by Tembo (2000) indicates that most projects still use the supply-push extension model. The Soil Conservation and Agro forestry Extension Project (SCAFE) in Zambia applies a participatory approach with aspects of farmer facilitation. Farmers raise their seedlings but the project provides technical advice on the growing of trees for soil conservation. Uganda is said to have set up the necessary policy and institutional framework at the community level for community participation in development. Through the decentralization policy, resources for development are allocated for control by local communities through local councils. It is plausible that under such conditions, community-driven extension programs will evolve.

Overall, there are few projects with practical experience with community-driven extension. In the following section, two case studies are described to illustrate the application of community-driven extension concept.

The Extension case studies

Case study 1: The Training of Resource Persons in Agroforestry for Community Extension (TRACE) Approach by CARE Kenya

Background

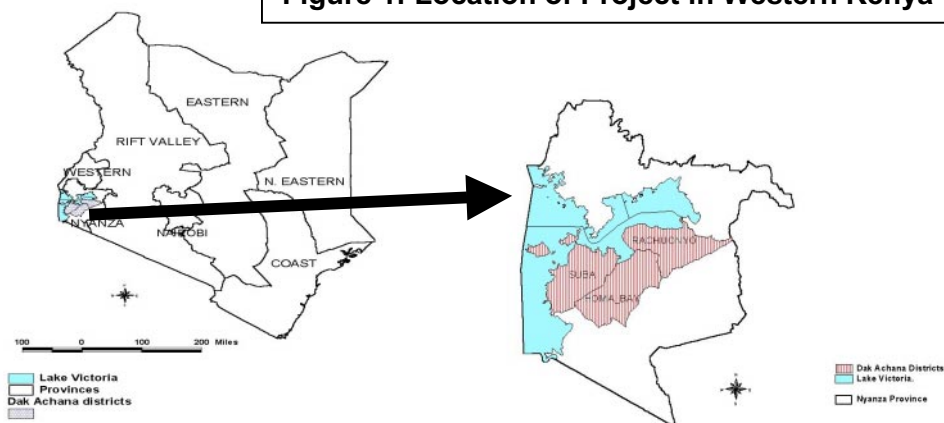
CARE International in Kenya (CARE Kenya) is a not-for-profit non-governmental organization. Between 1993 and 1996, the project embarked on extension methodology development through iterative consultations with communities. It is during such consultations that community leaders suggested an organizational structure to facilitate their participation in extension. Through this process, the TRACE extension methodology evolved.

Practical application of the methodology however started with the implementation of the Nyanza Household Livelihood Security Program funded by USAID. The program runs between October 1998 and 2003. It is located in semi-arid part of western Kenya at the shores of Lake Victoria in three districts namely; Homa Bay, Rachuonyo and Suba shown in Figure 1. Inhabitants of the project area are typically small-scale subsistence farmers with freehold entitlement to land. Land owned is on average 2.4 Ha (GOK, 1997).

The TRACE Approach

The TRACE extension methodology is process oriented. The community entry process is through local administrative leaders (Chiefs). Chiefs are responsible for governing the smallest administrative unit known as a Location. A Location comprises several villages. The Chiefs are introduced to the project activities during a course. Thereafter, Chiefs mobilize community members to organize themselves into groups. During community meetings individuals are elected to form a Locational Management Committee (LMC) this committee reports to a Locational Development Committee, which is responsible for various development issues in a Location. In each Location, 15 groups are selected. The 15 groups are re-grouped into 2 to 3 clusters of farmers with common interest. In areas where the program is not implemented through groups, Village Agricultural Promoters (VAPs) are elected. LMC members elect among themselves farmers who can serve as group resource persons and others as researchers. The latter are known as the Adaptive Research Farmers (ARFs). The former are Group Resource Persons (GRPs). The GRPs are trained as trainers of other members and the community. Apart from issues in agriculture, the program promotes development of community water points to avail clean portable water and control water borne diseases. The logic is that a healthy, well-fed population will have the necessary ability to pursue economic activities including farm forestry.

Figure 1: Location of Project in Western Kenya



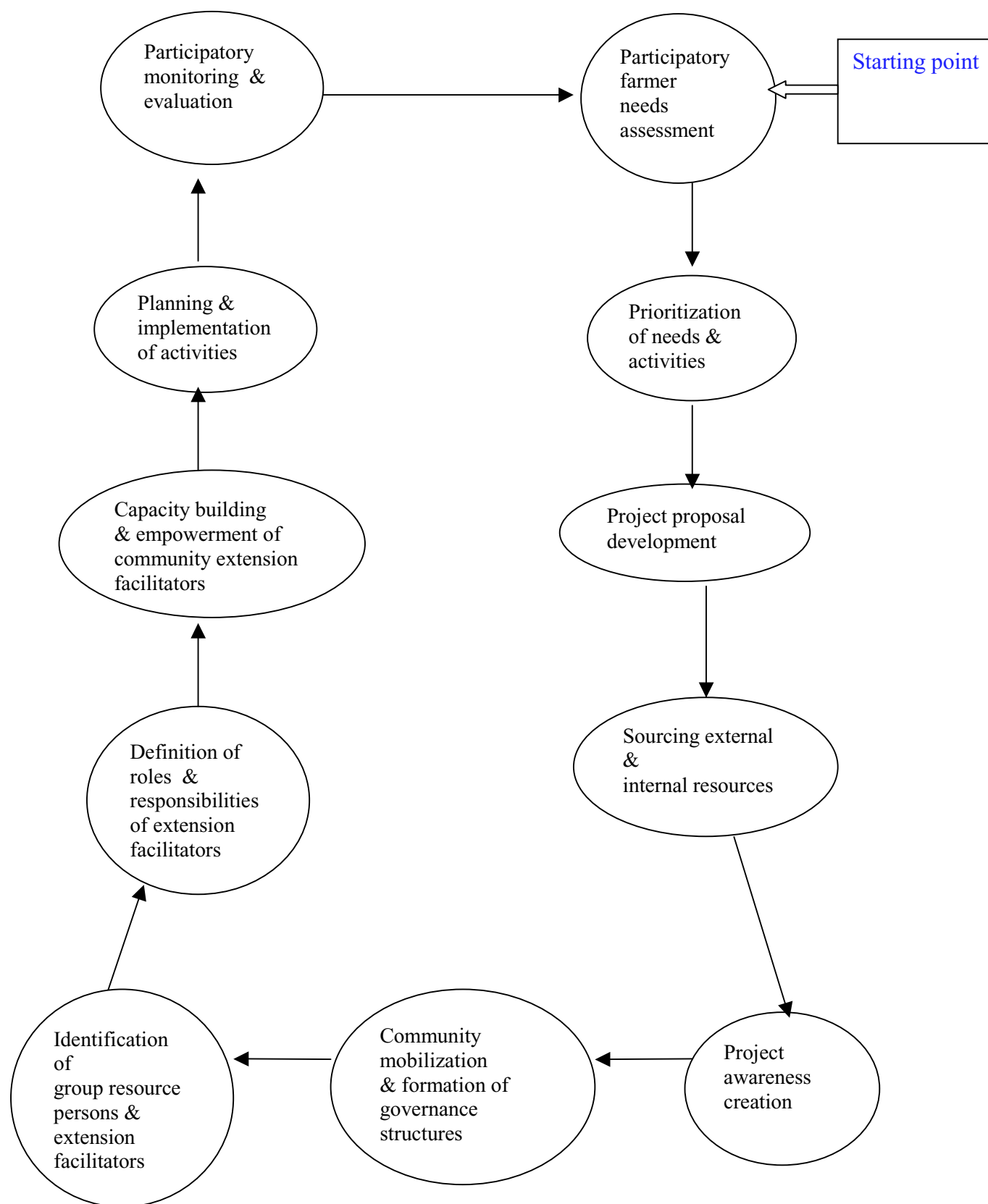
Community capacity building for extension

After the community-level local committees and interaction framework have been formed, the LMCs are facilitated to use various Participatory Rapid Assessment (PRA) tools to identify and prioritize subject areas in which they should be trained to acquire the necessary skills and knowledge to undertake adaptive research, adopt and disseminate the promoted innovations. This Training of Trainers approach ensures that the GRPs and ARFs can continue with extension service with minimum external inputs. The GRPs organize and implement training courses for fellow farmers. They provide advisory services on a one to one basis when called upon. The project however continues to provide services in the area of linking the community with other sources of resources, technical information and planting materials for newly introduced crops and fruit trees.

The project operates in one Location for one year only. Thereafter, activities of the project are phased out to another Location. With time, the target area and about 8,000 farmers will be benefit.

Community extension workers of the project are also phased-out from the weaned Locations. However, one community extension worker is retained to continue providing facilitation services. The TRACE process is illustrated in Figure 2.

A different concept to TRACE but with a similar approach is described in the following section.

Figure 2: TRACE Extension Approach Process

Case study 2: Mount Elgon Integrated Development and Conservation Project (MEICDP)

Mount Elgon forest reserve is located in western Kenya. The mountain transcends Kenya into Uganda. It is an important biodiversity conservation ecological system and is comprised of the National Park and Mt Elgon Forest Reserve. However, threats from the forest adjacent communities who have relied on the forest for subsistence, game hunting and non-residential cultivation necessitated an intervention. The MEICDP project was initiated in 1998 for a two and a half-year period. The area of intervention was a 10 km belt around the Forest Reserve.

Communities living adjacent to Mt. Elgon are typically a mixture of migrant communities from neighboring Uganda and districts bordering the mountain. The bordering districts are typically large scale farming areas. Maize is the predominant food and commercial crop. Farmers have cleared their lands of trees and even planting on the boundaries of farms is not common. A possible explanation for the expansive land areas without trees but covered with vigorous maize crop or grassland is that it is a new settlement area and most of the inhabitants have not secured legal ownership for the lands. Some of them displaced the original owners and the likelihood of reclamation lingers on. There is no incentive for growing trees. In addition, the individuals can – despite restricted access – obtain the necessary tree products from the Forest Reserve.

The low extension workers to farmer ratio and limited extension resources necessitated formation of a complementary extension service based on community participation. The Community Conservation Teams (CCTs) were therefore formed. The formation was through a process entailing voluntarism or selection, confirmation by community members and endorsement by the Chief.

The CCTs concept is still in a pilot stage of development. Four pilot areas in two districts neighboring Mt. Elgon have been identified for trials. The pilot areas differ in terms of ownership of land. In one of the districts about 20 km from Mt. Elgon, farmers own 50 Ha of land on average. On the periphery of Mt Elgon where land ownership is not yet secure, farmers are new settlers and cultivate smaller areas of land.

The institutional arrangement of the CCTs entails community representation at various levels of collaboration up to a national level. At national level, one member represents CCTs in the project implementation steering committee. The 17 CCT members are divided into teams of four in each of the pilot areas. The CCTs have been trained in PRA techniques and production of Community Action Plans.

The role of CCTs¹⁵

The framework of implementing the MEICDP was that active participation by community members is essential for effectiveness and sustainability. Empowering

¹⁵ Based on Focused Group Discussions conducted in May 2001 with CCT members in Mt. Elgon.

the communities to improve their livelihoods through multiple strategies in farming and non-farming activities was seen as a strong foundation for creating self-reliance at farm level, reduced dependence on Mt Elgon Forest Reserve and hence its conservation. The CCT members are responsible for community education, creation of awareness on environmental conservation and promoting Farm Forestry.

However, the CCTs have faced the following challenges:

1. CCT service is based on voluntarism. They are not paid wages. This constraints their operation as commitment is divided between working for self and working for the community;
2. The members are not facilitated with extension resources especially transport. Although each team covers a few villages, they still work long distances to cover the target area;
3. Forest adjacent communities tend to be unwilling to practice farm forestry. Communities were initially less receptive to CCT members. They were considered spies for the government on non-residential cultivators;
4. Without legal recognition, CCT members got into problems with local politicians who questioned their role in the community; and
5. The weak collaboration between CCTs and government extension workers creates conflicts. The government extension workers consider CCTs a duplication of efforts and there are no formal/informal collaboration arrangements¹⁶.

Despite the numerous constraints, CCT members enumerate various achievements including that communities have started to appreciate the importance of on-farm tree planting. This is indicated by the increasing requests for seeds and seedlings.

The CCT members envision their sustainability through formation of a Community Based Organization (CBO) when the project is concluded. Such a organization would be semi-commercial and problems associated with voluntarism would be resolved. The CBO would fit into the institutional framework of the new Kenya Forestry Bill 2000, which has provided for active participation of communities in the management of forests and promotion of farm forestry through CBOs.

Discussion: The emerging roles of extension staff

The review of extension experiences in Africa indicates that most projects have not practically adopted the concept of community-driven extension. This might be because of the difficulties associated with practical application. The TRACE and CCT extension approaches described in the previous section illustrate that it is possible for communities to take-up responsibility for extension with scope for sustainability. But,

¹⁶ This situation had not been resolved at the time this paper was written.

extension workers have important responsibility in community capacity development. It is feasible that the community organizations can evolve into extension service firms.

Conclusion

Sustainability of the emerging community-based organizations for extension is yet to be determined. The situation in poverty and weak economic capacity of most farmers in Africa presents a practical challenge to privatization of extension services without the risk of excluding the poor majority and enhancing low productivity.

Extension agents will continue to provide important linkages between communities and sources of resources and technical information. Leaders of community-based organizations that take responsibility for extension need training in community mobilization, empowerment, conflict resolution and management, adult education among other technical skills.

The role of extension agents is in fact not fading but illuminating new dimensions, which should be incorporated in the design and implementation of extension programs. The key areas of responsibility include being networking facilitators, marketing consultants, facilitators of acquisition of extension resources like seeds, and technical information.

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**ADVANCEMENT OF FARM FORESTRY EXTENSION IN
MADHYA PRADESH, INDIA:
A TRAINING AND CAPACITY BUILDING COLLABORATION**

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Abstract

Social and farm forestry in Madhya Pradesh (MP), central India, have benefited from external funding to the Madhya Pradesh Forest Department (MPFD) over the past two decades. As part a World Bank Forestry Project (P010506), Research and Extension (R&E) Centres were established in 14 agro-ecological zones. The objective of each centre being the production of genetically improved tree species from newly established clonal nursery facilities, establishment seed productions stands, and the provision of extension training facilities for staff. The project was completed in 1999. In 2000, and capitalising on the newly established infrastructure, AusAID, through the India Australia Training and Capacity Building Project, sponsored Sub-Project SP30: Capacity Building for Farm Forestry through Research and Extension Centres. The objective was to expand the extension techniques used within MPFD and to design and develop an extension training manual for R&E Centres and other MPFD staff. The manual was designed to provide a revised approach to farm forestry extension using interactive extension techniques and providing a knowledge and information base for interaction with small-scale farmers and villagers.

This paper discusses the farm forestry extension techniques used in Australia and Madhya Pradesh and describes the development of the extension training manual for future application by farm forestry extension practitioners in the MPFD. The manual represents a movement away from a traditional approach where extension assumed a directional approach, to one of facilitation and collaboration. Initially the question often asked was '*How do I motivate the farmers to plant trees?*' which assumed all farmers were to adopt farm forestry. Now the question has become '*How can I help you?*' which assumes that the primary target will be those farmers who may already motivated toward farm forestry.

Introduction

India has a significant trade deficit in forest products (approx. US\$734 Million (FAO 2001)) and the Central Government has a policy to increase forest and tree cover to 33% (Anon 2001a) programs have been initiated including the introduction of farm forestry in conjunction with traditional agriculture. Realistically, farm forestry will not address the trade issue, but will increase tree cover and other issues such as reducing pressure on native forests, increasing product options for farmers and

villagers, assisting poverty alleviation and assisting in moving toward environmental and economic sustainability.

The expansion of farm forestry requires a coordinated approach by government agencies, NGOs, industry and landholders and the establishment or utilisation of existing extension networks. While extension training and networks are a common feature in the agricultural industries, they tend to be less developed in forestry, farm forestry or agroforestry. The models currently used in Australia have moved from the older styles of direction and dictation by government agencies to facilitation and the active interaction and exchange between government agencies, farmers, farmer organisations, the forest industries, the community and conservation groups. These new methods have developed in response to government policies and wider community concerns for revegetation of degraded lands, desire to improve productivity and new industrial forestry developments which include farm forestry and agroforestry.

Based on our observation in the central Indian State of Madhya Pradesh¹⁷ (MP), the move toward facilitation of farm forestry and agroforestry on private lands has only just begun. Whereas Indian rural communities have already had a continuing involvement in the joint management of forested areas where the Madhya Pradesh Forest Department (MPFD) co-operates with various community groups, generally under the umbrella of Village Forest Protection or Forest Development Committees. At the same time there are well-established extension networks associated with the agencies responsible for agriculture, horticulture and water conservation. There is a clear need for collaboration between these agencies and MPFD for the successful expansion and integration of farm forestry in the agricultural environment.

This paper describes the results of an assistance program sponsored by the Australian aid agency, AusAID, to strengthen the capacity of the MPFD to meet the challenges of extending farm forestry to the wider village community to provide additional sources of wood and non-wood forest products, to increase the level of tree cover and to reduce demands on forested areas and suggests directions for ongoing expansion of farm forestry

Brief background to Forestry in Madhya Pradesh

Madhya Pradesh, located in Central India, was formerly the largest Indian State (44.3 million ha) of which 13.1 million ha, or 30%, has tree cover. Much of the remaining area is dedicated to agriculture; which is of prime importance to the nation's food production. Being located in a tropical monsoonal environment, the bulk of annual rainfall occurs in two or three months between June and August with the heaviest totals occurring in the east and decreasing towards the west; the range is from 1,500-400 mm. The climate for the remainder of the year is hot and dry so all tree and agricultural production relies on retention of adequate soil moisture or supplementation by irrigation.

¹⁷ For this paper, Madhya Pradesh also includes that area which is now the State of Chhattisgarh.

Long-term land use has resulted in a diminution of forest resources and significant land degradation. There is a need to implement strategies to meet demands for traditional forest products and to moderate land degradation with the implementation of land use systems including trees and shrubs to increase the proportion of the State under tree cover to 35%. This has been recognised in the implementation of a US\$58 million World Bank forestry project in Madhya Pradesh (P010506) between 1995 and 1999. The project was intended to support natural regeneration through improved silvicultural practices and forest floor management over an area of 161,000 ha.; a Village Resource Development Programme based on Participatory Planning in about 1,143 villages covering an area of around 343,000 ha; extension, technology and research programmes for the development of R&E Centres in each ecological zone, coupled with Tree Seed Improvement Programme, Demonstration Nurseries etc.; Biodiversity conservation of 12 high priority Protected Areas (Anon 2001b). Implementation of the overall project may be considered successful few outside influences (Hill 2000).

Farm forestry Infrastructure

Knowledge of farm forestry and agroforestry is considerable in India, particularly in relation to wood and non-wood forest products and the interaction of trees on conventional agricultural productivity. This knowledge has been developed by the Indian Forest Service through its series of Forest Research Institutes, by the State Forest Research Institutes, other government agencies and education facilities. However the distribution and extension of this knowledge to field foresters, other government extension agencies, land managers and farmers may not have been optimal.

In MP, farm forestry has been given a priority with the following objectives:

- Alleviation of poverty through increase productivity of wood and non-wood products;
- Movement toward environmentally and economically sustainable land management;
- Improvement of village environment through climate amelioration, dust control, aesthetics, habitat, etc;
- Empowerment of farmers and villagers, especially women, with the technology to apply technically and environmentally sound farm forestry practices with the aim of reducing poverty and improving the quality of life;
- Technology transfer of farm forestry knowledge and experience from the R&E Centres to the broader community, capitalising on the World Bank funded infrastructure; and
- Introduction of whole farm and/or whole catchment planning for farm forestry.

World Bank support has been provided to assist the expansion of farm forestry in MP (Project P010506) to encourage the establishment of trees within the rural environment. A total of US\$9 million was allocated for the establishment of a network of 14 Research and Extension Centres (R&E) across the State. The R&E

Centres have been established in strategic agro-ecological zones to provide extension services, technical advice and demonstrations of recent advances in farm forestry research to individuals, local communities and the MPFD.

The primary foci of the R&E Centres were:

- genetic improvement of tree and pasture species,
- establishment of seed production stands (both for tree and pasture crops),
- establishment of nurseries for clonal produced planting material for distribution to landholders and the community, and
- extension training for MPFD staff and the relevant community members.

The network of R&E Centres was established between during the World Bank project, with the last group being commissioned in 2000. The funding provided each Centre with supporting civil works under all components, roads, demarcation, training, procurement of computers and equipment such as houses, offices, vehicles, information systems, and other infrastructure to provide a focus for extension programs (Anon 2001b).

Capacity Building for Farm Forestry through Research and Extension Centres

Under the auspices of the India Australia Training and Capacity Building Project, an AusAID sponsored Sub-Project, SP30: Capacity Building for Farm Forestry through Research and Extension Centres was implemented by The School of Forestry, Creswick Ltd. during 2000 and 2001. The project consisted of six components with the primary output being an Extension Training Manual for use by MPFD staff in the R&E Centres. The manual was designed for use by R&E Centre staff with direct contact with the principle client group; the small scale farmers and villagers, eligible for MPFD assistance in establishing less than 500 trees over three years.

Needs Analysis

During a three week tour of MP inspecting R&E Centres, Research Institutes, villages and farms, we determined that while the R&E Centre staff had a theoretical understanding of extension techniques, the approach in practice tended towards lecturing and direction rather than understanding the requirements and needs of the villagers and farmers. In collaboration with the Additional Principal Chief Conservator of Forests (R&E), Mr. A.P. Dwivedi, we also identified appropriate course material and practical field requirements for a ten person training program to be based at Creswick, Australia. It was proposed to demonstrate farmer and community participation in farm forestry through active facilitation rather than the traditional 'top-down' approach. We considered this would be very beneficial to R&E Centre staff and farmers following on-farm discussions with villagers and small-scale farmers. It became apparent that often the farmer's needs may not have been addressed or farm forestry options had not been fully planned, explained or explored.

Farm Forestry Extension Manual

The Extension Training Manual was developed in Australia by ten MPFD staff associated with R&E Centres during a three-month training program in 2000. The program consisted of lectures and seminars by specialist staff from The School of Forestry, Creswick Ltd., the Forestry Department of the University of Melbourne, research and development staff from the Forest Science Centre, Creswick and private consultants. The field components provided practical experience in many aspects of farm forestry across south-eastern Australia visiting commercial plantations, private farms, community tree planting projects, landcare sites and other research and training institutions.

The thrust of the field demonstrations was to cover a wide range of conditions and requirements where farm forestry was applicable under Australian conditions. These included plantations, woodlots, shelterbelts managed for wood production and/or shelter, streamside plantings for erosion control, and other plantings designed for salinity control, habitat, aesthetics and amenity values. Emphasis was also given to the importance of integrating farm forestry within the overall agricultural enterprise using whole farm planning techniques to optimise the allocation of land resources to best use (Garrett 1993).

The R&E Centre staff collated the relevant information, and with mentoring by our staff and specialist guest lecturers, developed an Extension Training Manual suitable for implementation in MP. The manual, by necessity, was designed for flexibility and was modular in nature, so that ultimately, extension staff at each R&E Centre would be able to adapt and modify the manual for their respective agro-ecological zones. The manual was also designed for easy understanding by the Forest Guards and Forest Extension Officers; these staff are the actual contact between the R&E Centres and the public. During subsequent discussions within MP, it was apparent that there were also some larger landholders prepared to adopt the integrated agroforestry concept with involvement of the associated villagers and workers.

In summary, the objective of the Extension Training Manual was for use by R&E Centre staff to develop and expand farm forestry in MP, with a particular focus that:

- Provided the necessary skills and information for the R&E staff, their peers and subordinates to establish/expand farm forestry for the target client group;
- Contained the technical requirements relevant to farm forestry practices and of benefit to small scale farmers and villagers;
- Had application to small scale plantings around villages, on wasteland, along roadsides and small (<0.5 ha) woodlots;
- The bulk of the production would be utilised within the village community; and
- The development of conceptual models for farm forestry extension for MPFD.

While the manual was developed in English, it was incumbent on the R&E Centre staff to translate the manual into Hindi and other appropriate languages.

Facilitation versus Direction

The interaction between R&E Centre staff and farmers, foresters and extension staff in south eastern Australia demonstrated the importance of identifying and addressing the needs of the villagers and farmers rather than supplying an outcome which may not meet their requirements. The Master TreeGrower Program (Reid and Stephen 1999) gave a valuable incite to the facilitation and interaction approach and was included as an option in the Extension Training Manual for potential future development by the R&E Centres. Thus, the R&E Centre staff had expanded their vision of extension from *'How do I motivate the farmers to plant trees?'* which assumed all farmers were to adopt farm forestry to the position where they were asking *'How can I help you?'* which assumes that the primary target will be those farmers who may already motivated toward farm forestry.

Implementation of the Extension Training Manual

Following the acceptance of the Extension Training Manual by the MPFD, we returned to MP to review its implementation and to assist in identifying suitable farm forestry demonstration sites within the State. During these visits we observed the first revision of the manual to accommodate specific requirements of individual R&E Centres.

Demonstration sites

While the R&E Centres have been established for less than 6 years, there has been several successful farm forestry projects established near several Centres, sometimes without reference to the R&E Centres themselves. Often the driving force behind these plantings has been the landholder's desire to maintain productivity or establish sustainable management regimes for continued agricultural production, while integrating trees into the landscape on to otherwise unproductive land. We observed several operational farming sites or communities where landholders had developed innovative enterprises incorporating trees, both for wood and non-wood production. These included one farm at Hardibundh, near the Rewa R&E Centre, where the owners had established areas integrating agriculture, horticulture and forestry over several hectares. This site contained a range of forest species growing on bunds and in water conservation areas surrounding agricultural crops. In addition, there were adjacent fields where crops were being raised under widely-spaced trees (ie. inter-cropping). This integrated approach had resulted in a significant and varied bird population and had potential for honey production based on the eucalypts that were in heavy flower. Discussions with other owners also indicated that there was potential for co-operation and the addition of other features, such as spacing and coppicing demonstrations, to add to the value of some of these sites as future demonstration sites.

Other sites with potential to be valuable extension demonstrations were also seen at Bhabel and Talchairy near the Sagar R&E Centre. Any development on these sites would require some strategic planning at the R&E Centre level and a total farm plan development for each individual site/farm.

Staff Development

A workshop of R&E Centre staff was conducted in Jabalpur, MP, in April 2001 to the review and revise the Extension Training Manual, to evaluate implementation and to develop future directions. The important aspect for the continued expansion of farm forestry was continuity of extension staff. Traditionally R&E Centre staff can expect to be within in a Centre for about three years before being transferred elsewhere to increase their forestry experience. Such regular movements have the potential to retard the implementation of the farm forestry program while newly appointed staff establish their own networks; this is also a feature of Australian farm forestry extension. Career paths within farm forestry may be new approach to be considered.

Training

Collaboration and co-operation with other agencies and institutions will also the necessary training and observation of farm forestry. The R&E Centres provide the necessary infrastructure with classrooms, accommodation and access to the clonal nurseries and propagation facilities. Training would also include programs for farmers, women and villagers. While there are currently numerous village- based nurseries producing planting material, often of unknown genetics, the R&E Centres have the scope to assist these enterprises develop into viable entities.

Future Directions

The workshop also identified a number of policy and management issues which would be valuable for the continuation of the expansion of the MP farm forestry program. These included:

- Formalisation of a State-wide farm forestry strategy incorporating collaboration with other land management agencies, and
- Revision of planning rules and legislation to encourage farm forestry including harvesting and marketing mechanisms.

However the major thrust for the advancement of farm forestry would be with respect to farm forestry demonstrations; many demonstrations often only contain one regime, and normally as a plantation design, when most farmers do not have the land available for such plantings. Several following basic concepts were identified for any demonstration series, a few more urgent examples were:

- Tree species – while there is considerable concentration on eucalypts and a very successful program for commercial production of clonal Eucalyptus hybrids, which generally show the best performance, other species comparisons would be instructive.
- Tree spacing – many designs had trees planted at one metre intervals, which from basic silvicultural principles, will result in many tall slender trees which will take some time to reach merchantable size. Fewer trees, planted say at three

metre intervals, would result in a shorter rotation period and quicker return. Also any impact on adjoining agricultural crops would be reduced.

- Planting designs – most demonstrations were in the form of plantations; of more relevance would be plantings on bunds, wastelands, water conservation areas, village surrounds and in inter-cropping arrangements.
- Coppicing – many plantings assume a second crop being from the stump of the harvested trees. The resultant coppice will consist of many stems which will need to be reduced to one or two per stump in the first year after harvesting. Such demonstrations have not been established and developed as yet which would show treated and non-treated coppice.
- Mulching/fertilising – there were many instances where crop and tree litter was being burned resulting in a loss of organic matter and nutrients from the site. Demonstrations of mulching and litter retention versus removal would be valuable.
- Irrigated/non-irrigated – most R&E demonstrations were regularly irrigated on regimes not possible when combined with normal agricultural practice. Demonstrations on actual working farms would be more appropriate.
- Salt tolerance – while not always obvious, salinity occurs in a number of regions of MP as a result of applying saline irrigation water. Demonstrations and research is needed to determine the salt tolerance of the preferred eucalypt clones and other species advocated for farm forestry.
- Strategic plans - each R&E Centre should be encouraged to review their objectives and their audience's needs to assist identify the most relevant demonstrations of farm forestry. There are numerous farmers with suitable plantings who indicated to us that they were prepared to co-operate with the R&E Centres and convert existing plantings or be prepared to establish new plantings on their land to serve as demonstrations.

Underlying the need for on-farm demonstrations, is the acceptance that a failed demonstration is also a success in itself since considerable knowledge can be gained explaining why the demonstrations failed. In general, we observed a reluctance to demonstrate improper techniques, inappropriate species selection or silviculture. The existing demonstrations provide the opportunity to compare and contrast.

Outcomes and Conclusions

Madhya Pradesh has a well established network of Research and Extension Centres, developed with World Bank funding, which is the nucleus for expanding farm forestry to the villagers and small scale farmers. The R&E Centres have a successful and proven process for the commercial production of clonal Eucalyptus hybrids using low level technologies and local resources. This network offers a strong base from which to influence farm forestry adoption.

To this time, there have been numerous institutions, agencies and other organisations in close geographic proximity providing extension services to the agricultural sector and while it has been uncoordinated, these individual groups have often operated with parallel programs perhaps without a basic knowledge of the others activities, resources, facilities etc. Thus by capitalising on these established extension networks and systems, these latter organisations have established, a collaborative approach, could extend farm forestry more rapidly using a coordinated and well planned series of on-farm demonstrations to show the technology transfer from the research providers through the R&E Centres.

Similarly, there are already numerous innovative and adaptive approaches to farm forestry developing in MP without recall to formal extension processes or technology transfer from the MPFD. In retrospect, these present a paradox for farm forestry development: innovation without technology transfer may result in more failure than success. The traditional extension processes may have suppressed innovation, but with new extension processes the ultimate adoption of new farm forestry may be entering a new paradigm.

Possibly the mechanism for moving to this new paradigm will be the Extension Training Manual developed by MPFD R&E Centre staff. The manual is now available and contains a wide range of farm forestry options for villagers and small-scale farmers to implement. The manual has been designed to be flexible and readily modified and updated.

In conclusion, Madhya Pradesh is well placed with resources and extension material to capitalise on the World Bank funded infrastructure in the form of R&E Centres to realise the full potential of a holistic approach to farm forestry for the villager and small scale farmer. MPFD, with co-operation with other agencies involved in the management of natural resources, and using with whole farm planning principles can oversee a significant improvement in the social, economic and environmental conditions of MP in the coming years.

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REVEGETATION INFORMATION AND TRAINING NEEDS OF WESTERN AUSTRALIA'S EXTENSION INTERMEDIARIES: A QUALITATIVE AND QUANTITATIVE MARKET RESEARCH REPORT

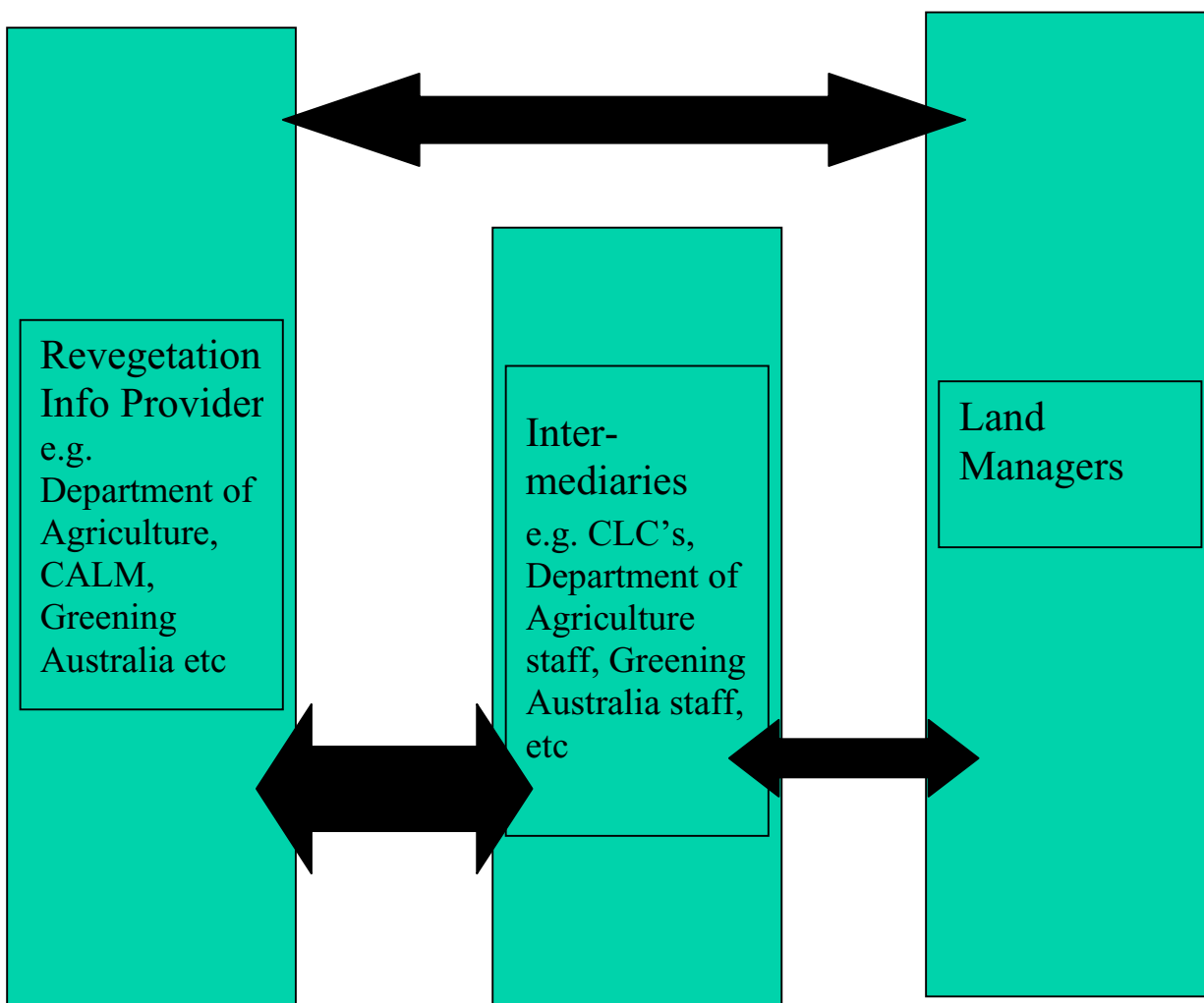
Stephen Lloyd

Background

The WA State Salinity Strategy (Government of Western Australia, 2000) recognises dryland salinity as one of the most critical environmental problems facing Western Australia. Revegetation with woody perennials is seen as the most important of all salinity control options.

'Intermediaries' (individuals who mediate between those with the expertise in revegetation and those who require the information) play a key role in revegetation extension in WA.

Diagram 1. A simple model for dissemination of revegetation information in WA.



The Department of Agriculture's Farm Forestry and Revegetation (FF&R) project uses a variety of communication and training methods to improve access for Intermediaries to best-practice revegetation technology. As such FF&R are very interested in the dissemination of revegetation information in WA.

Objectives

Key Evaluation Questions

This evaluation, instigated by FF&R, should answer the following key questions:

- Q1. How is existing revegetation information perceived?
- Q2. How do Intermediaries feel about extending revegetation information?
- Q3. What are the expressed revegetation information needs/wants of Intermediaries? (What are the expressed information needs/wants of farmers as perceived by Intermediaries?)
- Q4. How effective is revegetation information?
- Q5. How well are Intermediaries information and training needs being met?
- Q6. What information formats do Intermediaries prefer?

Planned Use of Results

Overall, the evaluation has been conducted to document revegetation information and training needs of Intermediaries in order to:

- Plan changes to the current FF&R project;
- Develop recommendations at the FF&R project, SRD Salinity Sub Program Level, Revegetation Information and Training Provider Level and Cross-Agency Level;
- Develop an improved future revegetation information and training structure,
- Assess the effectiveness of existing revegetation information dissemination processes; and
- Fulfil obligations to NHT for funding this project.

Methodology

As many of the questions refer to the needs and opinions of Farm Forestry and Revegetation customers it was appropriate to approach this group for comment.

The two methods chosen for this analysis are Focus Groups and E-mail Survey.

A total of three Focus Group discussions were conducted with 19 Intermediaries interviewed. 57 responses were received for the E-mail Survey (a response rate of 52%).

Results and Discussion

General

Overall, revegetation Intermediaries were moderately confident (or better) about the quality of information, the range of information, ability to pass information on to farmers and access to training. However, there was wide variation, generally related to the amount of time in the role and past experience.

Farmers desires or needs dictate Intermediaries actions. Therefore, the revegetation information and training needs of Intermediaries do reflect very closely the revegetation information and training needs of the communities they represent.

Because the Intermediaries group represent a vast variety of community both geographically and organisationally their expressed revegetation information and training needs are greatly varied. From this study only one clear trend could be outlined. That is the great need for more revegetation information and training on the topic of commercial agroforestry.

Information Resources and Use

Existing information is considered 'moderately effective' or 'effective' as a tool to introduce benefits and assist land managers in good revegetation decision making, by Intermediaries. However, several suggestion for improvement became obvious through the study. Two key suggestions are:

- Information be written with the farmers perspective in mind.
- Revegetation information material must 'sell' revegetation as a farming option.

Training Resources and Use

Intermediaries feel their revegetation information and training needs are being met 'moderately well' or 'well', however, there is a wide variation among Intermediaries. Intermediaries new to the field can feel unsupported in their job overall and have a steep learning curve. They call for more training in general, including more training on revegetation. However, training courses that do exist are often not well attended. Given that Intermediaries were especially keen on training, there may be a lack of publicity/awareness of them. Another reason Intermediaries have difficulty attending revegetation based training is Intermediaries are dictated by farmer desires and needs. Many commented that they would love to be involved in more revegetation work but that is not what farmers always want.

Results indicated the use vs. preference for different information formats. From these results, three classification of formats were identified; Preferred and Used Information Formats, Least Preferred and Least Used Information Formats and Potential Growth Formats.

Preferred and Used Information Formats

This study has identified:

- One to one visits;
- Field days;
- Workshops;
- Guest speakers;
- Peer meetings;
- Demonstrations;
- Newsletters;
- Information kits;
- Farmnotes/Agnotes; and,
- Telephone queries

as the most used and preferred revegetation information formats among Intermediaries.

Least Preferred and Least Used Information Formats

Least used and preferred revegetation information and training formats among Intermediaries include:

- On-line learning courses;
- Greenskills course;
- Master Tree growers course;
- TAFE courses;
- E-mail discussion groups; and
- CD-ROMs.

Potential Growth Formats

Interestingly, a number of formats were preferred by Intermediaries more than they were currently used. These are:

- Demonstrations
- On-line learning courses
- Decision making tools
- E-mail queries
- On-farm practical learning
- Greenskills course
- Master treegrowers course.

This study has identified these formats as potential 'growth formats' for extending information on to Intermediaries.

Websites as an Information Format

Websites were an area of contention in the evaluation. Intermediaries can be polarised in their attitudes towards Website information. Many readily use this resource whilst others find it frustrating waiting to log on and searching for sites.

"It's so time consuming searching for sites, it's better to go to a Bushcare Officer."

"There are so many sites and you have to wait for it to download and print out so I prefer to have hard copies on file."

Many prefer CD formats, such as Rex'96, because of the above reasons. CD's have the advantage of being easy to access and loan.

Networks are critical for Intermediaries to extend revegetation information.

Networks generally are very important in the extension of revegetation information. This is indicated by the very high use and preference for one to one visits, field days, guest speakers, workshops, peer meetings and telephone queries. Networks are a key issue as Intermediaries are heavily reliant on networks for gathering information and linking farmers with appropriate groups. However, networks and ability to network vary greatly among Intermediaries as was borne out in the Focus Groups. The importance of networking was highlighted in the group process itself with less experienced participants keenly questioning other participants and often being corrected about inaccurate or incomplete knowledge.

Position and Experience of Intermediary

Organisation of employment and number of years in an intermediate position can influence Intermediaries confidence in extending revegetation information. Consistently, throughout the Focus Group research, experience was recognised as important in relation to an Intermediaries overall effectiveness. Experience influenced size and calibre of networks, ability to source and judge information, methods for dealing with farmer queries and overall confidence in position. With experienced Intermediaries feeling very confident and judged by others as being effective. The qualitative Focus Group information indicated strongly that increased experience lead to increased confidence in extending revegetation information. While conversely little experience led to less confidence in extending revegetation information.

Need for Commercial Agroforestry Information

There is an overwhelming need for revegetation information and training that focuses on commercial agroforestry. Beyond this the revegetation information and training needs of Intermediaries vary widely.

Half of the responses to, 'Which revegetation topics would you like to see addressed with information and training or more information and training?', related to commercial crops, either generally or specifically e.g. commercial tree species or

Floriculture respectively. This represents a significant expressed need in the Intermediary community for more revegetation information and training based on commercial agroforestry options.

Other responses were extremely varied. This indicates that apart from a strong trend towards commercial agroforestry options, the revegetation information needs of Intermediaries are greatly varied. This statement derived from the E-mail Survey is also apparent in the Focus Group results. In fact the Focus Group results go further and identify the source of the revegetation information need; "Intermediaries are dictated by farmer desires and needs."

Conclusions

This evaluation has answered the following key questions.

Q1. How is existing revegetation information perceived?

Intermediaries are 'confident' or 'moderately confident' in existing revegetation information. The information is considered to be reliable. There are no concerns about conflicting or inconsistent content.

Q2. How do Intermediaries feel about extending revegetation information?

Intermediaries generally feel 'informed' or 'well informed' about revegetation options. Those that don't are either new to their Intermediary position and still developing awareness of revegetation options and networks or are one of the perceived 'small group of experts' that are very well informed about revegetation options.

'Most Intermediaries felt 'moderately confident' or 'confident' in passing revegetation information on to farmers. This is a result of having a 'moderately confident' or 'confident' attitude towards the existing revegetation information and a similar attitude toward their own ability to perform general extension with their customers/communities.

However, while the majority of Intermediaries feel 'moderately confident' or 'confident' in passing revegetation information on to farmers a number feel less confident. This is often related to amount of time in an Intermediary position with new Intermediaries feeling less confident because of isolation, a lack of readily available information, a lack of awareness of revegetation information and training and a feeling of being overwhelmed.

Q3. What are the expressed revegetation information needs/wants of Intermediaries? (What are the expressed information needs/wants of farmers as perceived by Intermediaries?)

Intermediaries are dictated by farmers desires or needs. Therefore, the revegetation information and training needs of Intermediaries do reflect very closely the revegetation information and training needs of the communities they represent.

Also because the Intermediaries group represent a vast variety of community both geographically and organisationally their expressed revegetation information and training needs are also greatly varied.

From this study only one clear trend could be outlined. That is the great need for more revegetation information and training on the topic of commercial agroforestry.

Q4. *How effective is revegetation information?*

As a tool to introduce benefits and assist land managers in good revegetation decision making existing information is considered 'moderately effective' or 'effective', by Intermediaries. However, several suggestion for improvement became obvious through the study. Two key suggestions are:

- Information be written with the farmers perspective in mind: and
- Revegetation information material must 'sell' revegetation as a farming option.

Q5. *How well are Intermediaries information and training needs being met?*

Intermediaries feel their revegetation information and training needs are being met 'moderately well' or 'well'.

However, there is a wide variation surrounding this among Intermediaries. Intermediaries new to the field can feel unsupported in their job overall and have a steep learning curve. They call for more training in general, including more training on revegetation. However, training courses that do exist are often not well attended. Given that Intermediaries in this area were especially keen on training, possibly it was not publicised adequately. Another reason Intermediaries have difficulty attending revegetation based training is Intermediaries are dictated by farmer desires and needs. Many commented that they would love to be involved in more revegetation work but that is not what farmers always want.

Q6. *What information formats do Intermediaries prefer?*

This study has identified:

- One to one visits;
- Field days;
- Workshops;
- Guest speakers;
- Peer meetings;
- Demonstrations;
- Newsletters;
- Information kits;
- Farmnotes/Agnotes; and,
- Telephone queries

as the most used and preferred revegetation information formats among Intermediaries.

Least used and preferred revegetation information and training formats among Intermediaries include:

- On-line learning courses;
- Greenskills course;
- Master Tree growers course;
- TAFE courses;
- E-mail discussion groups; and
- CD-ROMs.

Interestingly a number of formats were preferred by Intermediaries more than they were currently used. These are:

- Demonstrations;
- On-line learning courses;
- Decision making tools;
- E-mail queries;
- On-farm practical learning;
- Greenskills course; and
- Master treegrowers course.

This study has identified these formats as potential 'growth formats' for extending information on to Intermediaries.

Recommendations

Improved Extension

Recommendation 1.1: FF&R make its product more 'sellable' by Intermediaries to farmers by,

- producing a one page summary of all Information Kits Products available and distributing it widely. The summary should include basic information on each kit as well as clear information as to where to source the kits.

Recommendation 1.2: FF&R more suitably address its audience and use it's resources more effectively by

- Segmenting its audience (by organisation of employment and other relevant qualifying information) and establishing and implementing suitable extension methods and protocols for each segment identified.

Recommendation 1.3: FF&R address concerns over the reliability of results in this study by,

- Performing another qualitative study into revegetation information and training needs of the same audience.

Recommendation 1.4: Department of Agriculture SRD Salinity Sub Program overcome labelling as scientific and conservative by

- Adopting a 'marketing' approach to written material with the aim of 'selling' revegetation,

- Avoiding a conservative or overtly technical style
- Focusing on the 'bottom line' benefits to farmers of revegetation.

Recommendation 1.5: All Revegetation information and training providers assist Intermediaries in quickly and easily identifying information suitable for them by

- Qualifying existing and future information by biogeographical indicators (e.g. Rainfall and Soil type).

Information Formats

Recommendation 2.1: FF&R take advantage of the popularity of revegetation demonstrations by,

- Investigating the effectiveness and efficiency of demonstrations in learning and influencing adoption.

Recommendation 2.2: All revegetation information and training providers take advantage of the popularity of revegetation demonstrations by,

- Identify and develop suitable revegetation demonstration sites.

Recommendation 2.3: All NRM Projects providing extension to Intermediaries take advantage of 'growth' extension formats with the Intermediary audience by

- Expanding input into demonstrations, E-mail queries and on-farm practical learning as an extension medium to this audience.

Recommendation 2.4: All NRM Projects providing extension to Intermediaries prevent inefficient use of time and resources by,

- Reviewing Formal community meetings, Conferences, Displays/stands at expos and reports as a primary extension tools aimed at the Intermediary audience.

Recommendation 2.5: All NRM Projects providing extension to Intermediaries take advantage of new and increasingly adopted technology by

- Making their written extension information readily available to Intermediaries in electronic format that can be easily E-mailed and downloaded

Information Topics

Recommendation 3.1: FF&R overcome a general lack of knowledge in the farming community (especially in the low rainfall zone, >400mm/yr) about the basics of revegetation by

- Developing a Revegetation Information Kit that addresses the following common farmer questions:
 - ☛ Where should I put the trees?
 - ☛ What should I plant?
 - ☛ Where do I get it?
 - ☛ What do I need to do to this site?
 - ☛ Will it solve my problems down slope?
 - ☛ Do I have to fence it?

- When can I graze it/how palatable is it?
- Will it contribute to fire management?

Training

Recommendation 4.1: All Revegetation information and training providers address a lack of awareness of revegetation training available by

- Documenting and promoting existing training opportunities.

Recommendation 4.2: All Revegetation Information providers overcome a general lack of revegetation training (especially in the low rainfall zone) by

- Increase resourcing of training and improve access to training.

Networking/Liaison

Recommendation 5.1: FF&R overcome a lack of awareness of revegetation information and training, networks, and confidence in revegetation extension in new Intermediaries by

- quickly identifying Intermediaries new to their position, personally visiting them and introducing them to basic revegetation information, training and networks.

Recommendation 5.2: FF&R project assist Intermediaries build diverse and high calibre networks and information resource libraries by,

- Developing an easily accessible revegetation contacts database and,
- Developing an easily accessible revegetation bibliographic database.

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PUTTING TOGETHER THE TOTAL PACKAGE: FARM FORESTRY EXTENSION IN WESTERN AUSTRALIA

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Abstract

Tree crops have a crucial role in more productive and sustainable farming. This is now the view of many land managers in Western Australia and is based on the knowledge and experience gained over the past twenty-five years. During this time agroforestry research has produced basic information on a range of tree crops integrated with farming and a few innovative farmers have established impressive demonstrations of farm forestry in practice. By the early 1990s the challenge was to develop an effective extension program on farm forestry.

The principles, upon which the farm forestry extension program has been built, include landowner empowerment, guidance to interested farmers on a 1:1 basis, support for all phases of farm forestry (from planning to marketing), and collaboration with key stakeholders. Much of current knowledge has been documented into an information sheet series called *TreeNotes*, produced jointly by the Department of Agriculture and the Department of Conservation and Land Management.

A key strategy has been to build the confidence and understanding of farmers in farm forestry. The Master TreeGrower Program has been a central plank of this strategy. The Program, which has run nine times in Western Australia, is coordinated through a Natural Heritage Trust project called the *WA Farm Forestry Network Development Project*. Under this project a "follow-on" program has also been developed to provide past participants with the opportunity to consolidate their knowledge and to renew contact with like-minded farmers. Furthermore a 1-day introductory program has been developed to inform landowners on farm forestry and on the Master TreeGrower Program.

The second main strategy of the extension program has been to develop partnerships with those who influence the decision-making of farmers, especially Community Landcare Coordinators, Department of Agriculture advisers, agribusiness consultants and contractors, and Bushcare workers. Obtaining support from these groups and individuals is being tackled on several fronts, including the running of 3-day Introductory Courses on Farm Forestry, working with Regional Plantation Committees and participating in farmer-driven seminars and field days.

Increasing numbers of farmers are using forestry as a tool to make their farms work better and to help build a thriving and pleasing rural landscape. The challenge now is to secure funding to keep going the momentum going.

Introduction

The vision that underpins the farm forestry extension program in Western Australia is a more productive and sustainable agriculture. There is a widespread view that trees, especially trees that can generate financial returns, have a crucial role in helping farmers achieve their economic, environmental and social goals (Greening Australia 1996, Reid and Stephen, 2000). In recent times a strong and consistent view has been emerging that commercial solutions have to be found if any significant impact is to be had on overcoming land degradation, such as dry-land salinity (Frost *et al.*, 2001). Commercial trees are not seen as a panacea, but rather as one of several tools, such as drainage and perennial pastures, which when combined offer farmers solutions to the challenges they face (State Salinity Council, 2000).

A survey of farmers in the Bridgetown district in 1995 provided an insight into their life. Forty farmers and their families were interviewed using an approach called "Participative Rural Appraisal" (Dunn, T., Charles Sturt University, *pers. comm.* 1995). The approach involved active listening and open questioning, to be as objective as possible during a one-on-one interview. The survey found that farmers had four main areas of concern (Rose, 1996):

Inadequate income – lower prices and higher costs made it difficult for most farmers to earn sufficient income from the farm. The majority relied on a second job off the farm.

Social isolation – families felt there was a lack of social activities and an inadequate network of social support. It was also common for children to have to leave home to attend senior high school. In combination these factors made for a stressful life.

Need for diversification – most farmers could see the need to diversify their sources of income but hadn't worked out how to achieve this need.

Anti-plantations – there was a general view that fence-to-fence plantations were a cause of de-population and social decline. However they felt that integrating trees into the farming operation was acceptable but they lacked knowledge on how to do it.

Information from the survey on farmer attitudes to farm forestry was helpful in shaping a farm forestry extension program.

The first serious research into farm forestry (or "agroforestry" as it was then called) commenced in Western Australia in the early 1970s. The then Forests Department initially studied the combination of wide-spaced pine and grazing livestock. By the early 1990s the Department of Conservation and Land Management's agroforestry research program had produced basic information on a range of commercial trees integrated with farming, including pine for softwood, bluegum for pulpwood and

eucalypts for high-grade sawlogs (Moore 1992). Information such as growth rates, management requirements, methods of integrating trees with agriculture, production costs and likely wood yields had been produced. It was time to move from a research phase to an implementation phase and to help landowners get started in farm forestry.

From 1993 onwards, and especially after the Farm Forestry Unit was formed within the Department of Conservation and Land Management in 1995, there has been a concerted effort in Western Australia to build an effective farm forestry extension program. This paper outlines program goals, key strategies, major activities and future directions.

Farm Forestry Extension in Western Australia

Goal

The goal of farm forestry extension in Western Australia is to increase the adoption of farm forestry. This goal hinges on the notion that commercial trees integrated with farming have a crucial role in more productive and sustainable farming methods. Farm forestry is however quite different from conventional agricultural activities and landowners need considerable information and support to be able to assess its relevance and to get started (Black *et al.* 2000). The extension program aims to provide farmers with the necessary information, contacts and services for them to assess whether farm forestry can help them achieve their goals and how they might go about implementing and managing a farm forestry component to their business.

Underlying principles

Several principles underpin the farm forestry extension program. They are:

Farmers first: The farmer is the most important person in farm forestry extension.

Unless farm forestry is presented in ways that enable farmers to see that it can meet their needs it is unlikely to be taken up. Increasing the adoption of farm forestry therefore requires an approach that keeps farmers in the “driving seat”.

1:1 support. For many farmers the decision to try farm forestry involves substantial long-term changes in the way the farm is run, in the demand for resources and possibly in farm income. In evaluating farm forestry many farmers need to be able to evaluate options in detail. This requires advisers who are competent in farm forestry both technically and practically and who also possess well-developed social skills to be able to interact effectively with farmers on a 1:1 basis.

Seeing is believing. Being able to see real examples of farm forestry can help farmers enormously as they assess whether farm forestry can help them.

Therefore the establishment and use of operational examples of farm forestry is a vital element of the extension program.

Many of the study sites established during the research phase (1973 to 1993) are now valuable demonstration sites. Demonstrations include 25-year-old pine growing at wide-spacing, 20-year-old eucalypts for high-grade sawlogs growing at wide-spacing, managed pine timberbelts and several species of eucalyptus for sawlogs on a range of sites. In addition there are a number of well-managed farm-scale examples of farm forestry across the south west of Western Australia from Geraldton to Esperance.

Support for all phases: Farm forestry extension requires more than assisting farmers with planning where trees fit on their farm. It also requires support on implementation, economic analysis, tree management, harvesting and marketing.

Collaboration: Several agencies and organisations are contributing to the development of farm forestry in Western Australia, including the Department of Conservation and Land Management, Department of Agriculture, Forest Products Commission, Water & Rivers Commission, Regional Plantation Committees and regional initiative groups (see Figure 1). The Western Australian Agroforestry Working Group, formed in 1983, provides a valuable forum for communication between the major groups and helps to ensure that there is effective collaboration in and coordination of activities.

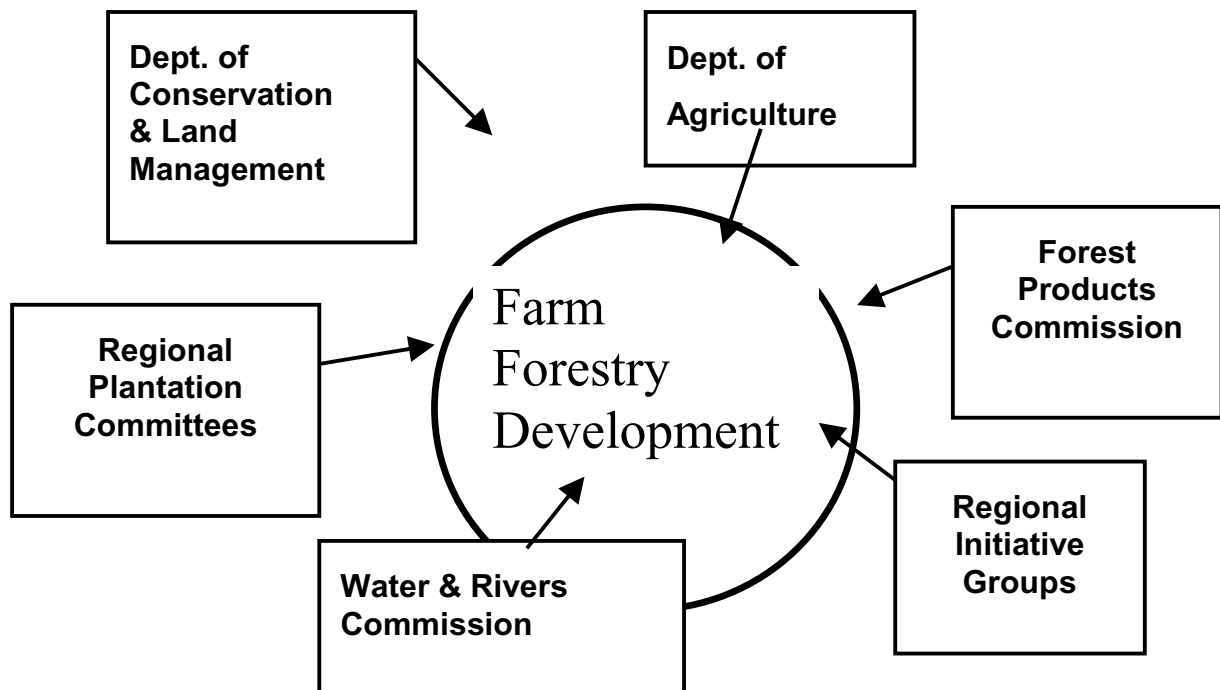


Figure 1: The main organisations and groups contributing to the development of farm forestry in Western Australia

Resources

The main contributors to farm forestry extension have been the Department of Conservation and Land Management and the Department of Agriculture. Collaboration between the two Departments has been on going since the mid-1980s when they jointly formed the Western Australian Agroforestry Working Group. Since the Commonwealth's support for farm forestry, through the Natural Heritage Trust, other organisations such as Regional Plantation Committees, GreenSkills and Greening Australia (W.A.) have also contributed.

The Farm Forestry Unit, within the Department of Conservation and Land Management, has six Farm Forestry Development Officers working full-time on extension, one each at Moora, Busselton, Kojonup, Katanning, Albany and Esperance (see Figure 2). Together the Unit has more than 70 years practical experience in farm forestry research, management and extension. This experience is practical experience gained "in the paddock", preparing sites, planting trees, pruning trees, measuring trees and working with farmers. The primary goal of the Farm Forestry Development Officers is to increase the adoption of farm forestry, particularly in the medium rainfall zone (450 to 650 mm/year), but also in higher rainfall areas. They concentrate on working 1:1 with interested farmers to assist them in planning, implementing and managing farm forestry. Their activities complement those of the Department of Agriculture.

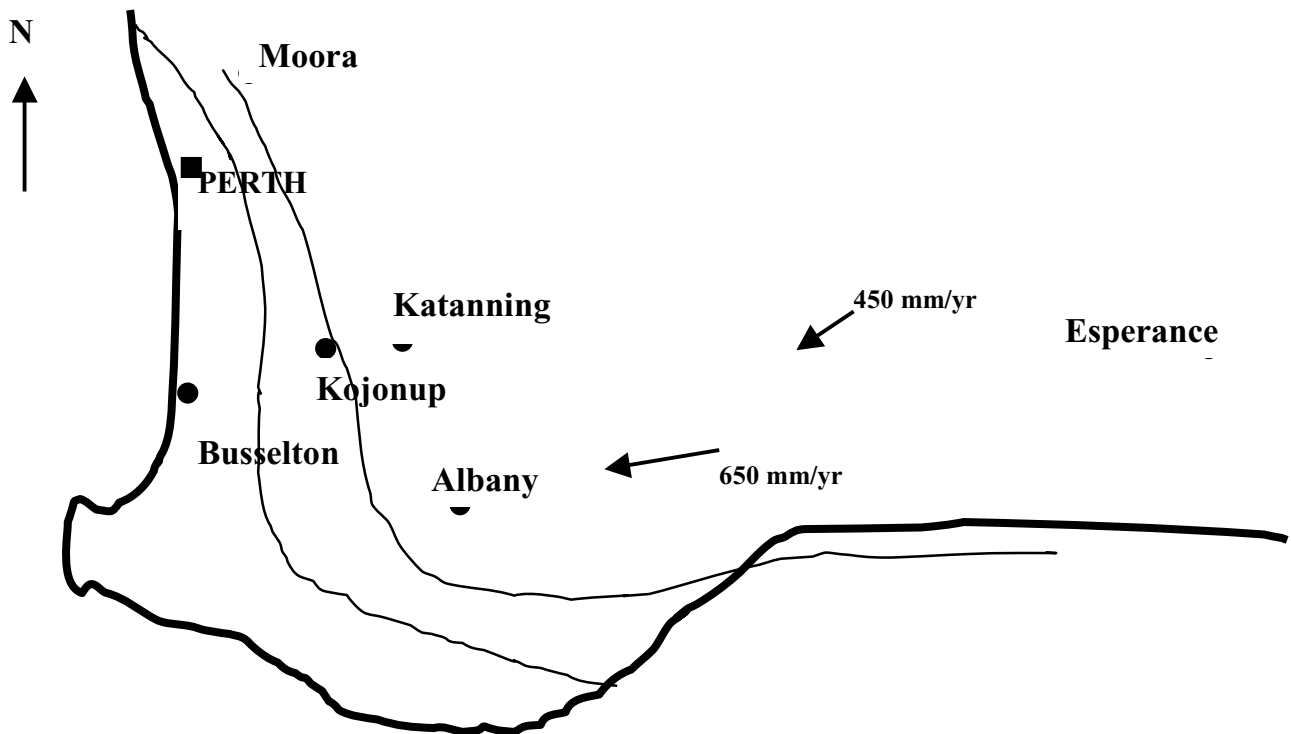


Figure 2: Location of Farm Forestry Development Officers with the Department of Conservation and Land Management's Farm Forestry Unit in Western Australia.

The Department of Agriculture has concentrated on two main aspects of farm forestry development. Firstly researching the effect of trees on the agricultural environment (eg. the impact of trees on water-tables and wind-speeds) and the effect of trees on agricultural production (eg. the impact of trees on crop yields). They have also assessed the economics of farm forestry options and contributed strongly to TreeNotes, an information sheet series on farm forestry. The Department coordinates production and distribution of TreeNotes and have developed innovative methods for its delivery, including fax-backs, web-sites and CD-based decision-support tools (Brooksbank, 2001).

Key strategies

The farm forestry extension program in Western Australia has 3 main strategies:

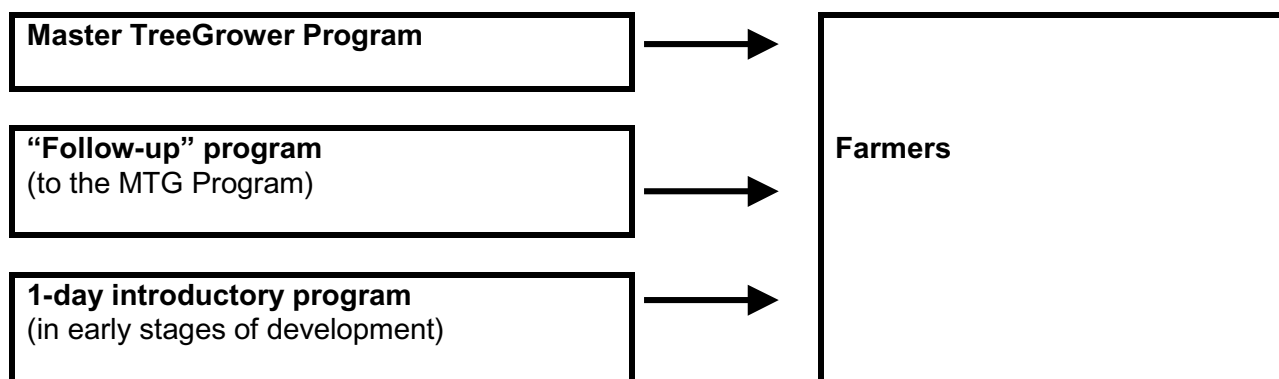
- Increase farmer confidence and understanding of farm forestry.
- Build partnerships with those who influence the decision-making of farmers.
- Raise the awareness of the general community in farm forestry.

Strategy 1: Increase farmer confidence and understanding in farm forestry

Strategy 1 focuses on farmers, especially farmers who are already showing interest in farm forestry. Increasing farmer confidence and understanding in farm forestry is being tackled on several fronts, including:

- The Master TreeGrower Program
- The “follow-up” component to the MTG Program
- The 1-day introductory program on farm forestry

Figure 3: Illustrates the 3 main programs that aim to increase farmer confidence in farm forestry



Master TreeGrower Program

The Master Tree Grower (MTG) Program has a crucial role in building farmer assurance in farm forestry. The Program aims to assist farmers who have started to practice farm forestry to improve their skills and to strengthen their support networks (Reid and Stephen 1999). The philosophy that underpins the Program is one of

empowerment – providing farmers who are already committed to farm forestry with the information and contacts to enable them to become more self-reliant, successful and influential farm foresters.

The MTG Program in Western Australia is managed under the *WA Farm Forestry Network Development Project*, a Natural Heritage Trust (NHT) funded project, managed by Trees South West (a Regional Plantation Committee), the Department of Agriculture and the Department of Conservation and Land Management. A total of nine Programs have been run in Western Australia – one each at Bridgetown, Duranillin, Albany, Kojonup, Wellstead, Busselton, Esperance, Katanning and Denmark. This is about 25% of all Programs run nationally.

The MTG Program partnership

The Master TreeGrower Program is run as a partnership between the University of Melbourne's School of Forestry, State and regional bodies and farmers (see Figure 4). Links with industry, researchers and policy makers are also important.

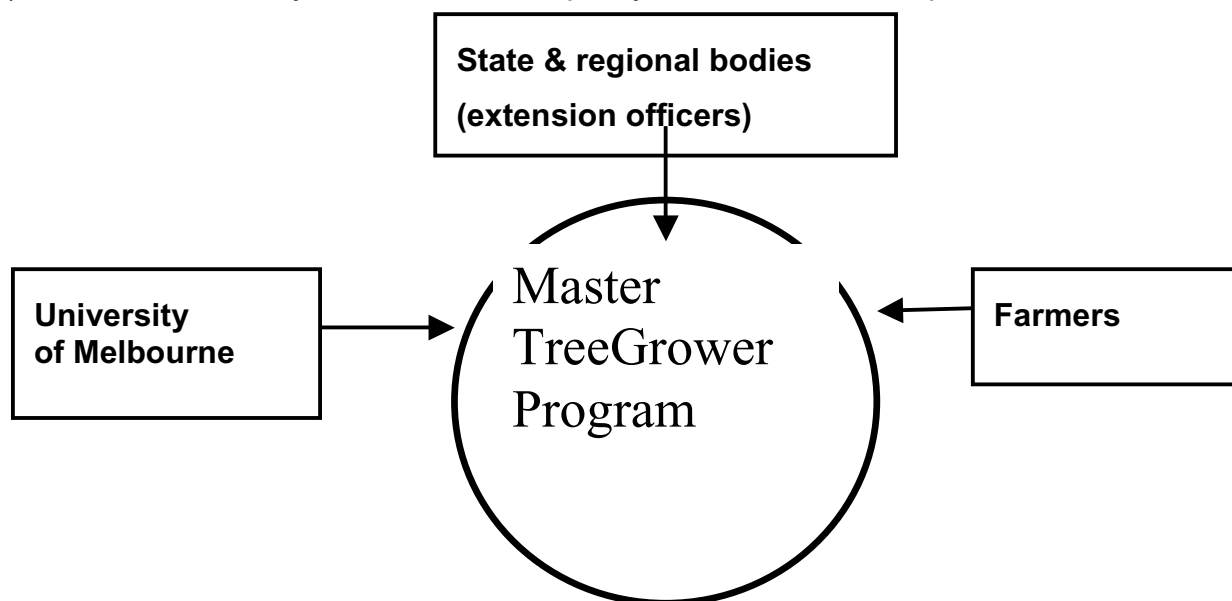


Figure 4: The University of Melbourne, State and regional bodies and farmers contribute to the running of the Master TreeGrower Program.

Melbourne University

The University of Melbourne provides a framework within which MTG Programs can be developed to suit local needs. The framework includes core topics such as principles of farm forestry design, market opportunities for farm-grown timber, farm silviculture and tree measurement. Program format is eight one-day sessions. Melbourne University also provides course materials such as books (ie. *The Farmer's Log* and *Design Principles of Farm Forestry*), diameter tape and presentations by course coordinators Rowan Reid and Peter Stephen. Melbourne University presents

participants with certificates, gate signs, hats and a recent copy of Agroforestry News and the Australian Forest Growers magazine at completion of Programs.

State and regional bodies

State and regional bodies provide strong support to the state coordinator, through farm forestry development officers in each region, in organising and running Programs. Support includes publicity, administration, and arranging venues, field sites and presenters.

Farmers

Participating farmers also contribute to planning Program details. A local coordinator, usually a farmer who has completed a Master TreeGrower Program, is selected to assist with arrangements, such as topics of local interest, presenters and sites to visit.

Flexible approach

Within the framework provided by Melbourne University there is flexibility to include topics of particular local interest. For example, if participants express interest in oil mallees, an appropriate presenter and field visit is organised. After participants have completed 3 or 4 sessions, they often have ideas on what they are most interested in learning about and value the chance to choose between several possible topics. For example, at a recent Program, participants were asked if they would prefer to spend time looking in more detail at soils or sawmilling. The itinerary of the field trip was changed to accommodate the participant's preferences.

Participant feedback

One of the most frequent comments from participants is that the Program enables them to visit sites and to see real examples of farm forestry. A frequent comment from participants is that the chance to visit participant's properties is the best way to evaluate farm forestry options. Examples of feedback are two responses to the question "...which topics were most useful?" (Stephen and Reid, 2000 & 2001).

"Site visits – easy, interesting, inspiring"

"Visiting actual timber growth and learning of other's experiences"

The practical hands-on approach also tends to be much appreciated by participants.

"Enjoyed the hands-on component at Rob Johnstone's"

"Measuring tree stands & wood volumes, practical value on how much wood & where it is"

Caters for a range of levels

Programs invariably have participants with a range of levels of understanding, from "novice" to "advanced". This is a positive aspect, as the "advanced" participants are

models and a source of practical experience and inspiration for others newer to farm forestry.

Networking

A crucial feature of the Program is the opportunity for participants to make contact with a range of people involved in farm forestry, including like-minded farmers, agency specialists and business people (eg. nurserymen, tree planting contractors, millers and wood buyers). Participants frequently comment that they find immense value in being able to chat informally with presenters. In addition the Program provides opportunities for key individuals involved in farm forestry development to meet together informally and to compare notes. For example, staff from the Forest Products Commission, who might be delivering on sharefarming schemes, could have the opportunity to hear the latest finding from the Department of Agriculture on a relevant topic such as the impact of trees on water tables.

Attracting participants

The Program demands eight days of a farmers time, a substantial commitment most farmers are unlikely to make lightly. It is therefore not surprising that at times it has taken considerable effort to find 15 to 20 farmers to sign up for a Program. Various methods of attracting participants have been tried and the most effective appear to be:

- Following up letter of invitation with a personal phone-call.

- Farmers hearing from their peers about the Program; ie. by word of mouth.

- Promotion by Community Landcare Coordinators, especially those who have participated in the 3-day Introductory Course in farm forestry.

The “follow-up” component to the MTG Program

A “follow-up” component to the MTG Program has been developed. It aims to provide past participants with opportunities to consolidate their skills and knowledge on topics of their choice and to renew contact with farmers of a similar mind. Past participants are consulted to find out what topics they want to learn about. Responses to questionnaires show that silvicultural techniques, assessment of soil types, management of remnant-bush and species selection are topics of most interest.

The main “follow-up” activity to date has been plot establishment, tree measurement and silvicultural techniques. Plantings owned by “master tree growers” are commonly used as sites to establish plots, measure trees, calculate growth rates and wood volumes and practice silvicultural skills, such as selection of crop trees and pruning. As well as consolidating fundamental forestry skills the sessions produce real data on wood production from local examples of farm forestry. The data from 28 sites across the State is the beginning of an inventory of the farmer-owned forestry resource. It is envisaged that the growth data will be collated, published and distributed to all “master tree growers” with comments on performance and recommended management.

Other “follow-up” activities to which “master tree growers” have been specifically invited include:

- Talks by visiting experts; eg. on wood properties of young eucalypt logs.
- Courses, such as the milling and seasoning course run by the Timber Technology Centre at Harvey (Forest Products Commission).
- Hands-on training in thinning and pruning.
- Invitations to participate in subsequent MTG Programs held in their area; eg. invitations to attend farm visits and course dinners.

Some of those who have participated in “follow-up” activities have commented that, after a break from doing the MTG Program, it was helpful to come together again and to be able to talk through ideas they had been mulling over since doing their original Program.

One-day introductory program on farm forestry

Four one-day introductory programs on farm forestry have been run in various regions of Western Australia and more are planned. The one-day program is aimed at farmers who are interested in farm forestry to the extent that they want to know what their farm forestry options are and where to go for more information and assistance. It also enables the MTG Program to be promoted and helps to gauge the level of local interest in running a Program. The one-day program needs to be developed further as it is seen as an effective way of attracting future participants.

Strategy 2: Build partnerships with those who influence farmers

Strategy 2 of the extension program in farm forestry focuses on those who influence the decision-making of farmers. This group includes Community Landcare Coordinators (CLCs), Department of Agriculture advisers, agribusiness consultants, Bushcare workers, nurserymen, contractors and bankers. It is important that these people are aware of farm forestry and what it can do for farmers. Most importantly they need to know where to direct farmers should they require information and assistance. Several activities have been developed to address this aspect. They are shown diagrammatically in Figure 5 and include:

- Three-day introductory course on farm forestry
- TreeNotes
- Seminars and field days.
- One-day introduction to farm forestry

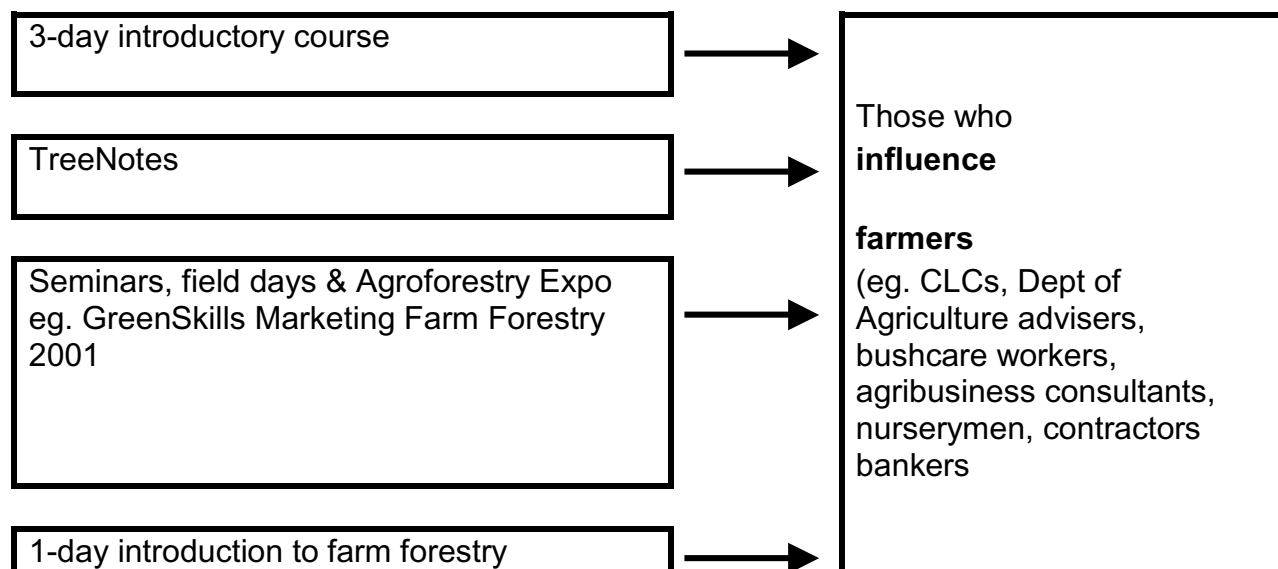


Figure 5: Main components of farm forestry extension in Western Australia directed at those who influence farmers.

Three-day introductory course on farm forestry

The 3-day introductory course on farm forestry is specifically aimed at those who influence the decision-making of farmers, especially Community Landcare Coordinators, Department of Agriculture advisers and field operatives with the Forest Products Commission. The course has 3 main themes:

Farm forestry in practice – what is it and what are farmers getting from it.

Commercial wood production – tree cropping options, markets, products and returns.

Fitting farm forestry into farming – planning, implementation, management and marketing.

Four courses have been run and more are planned. It is considered important that the courses are continued because there is a rapid turnover of Community Landcare Coordinators on short-term contracts.

Seminars and field days

Seminars and field days provide opportunities for those who influence farmers (as well as farmers themselves) to become better informed on farm forestry. Events are numerous and range from official occasions with formal presentations to casual events “in the paddock”. They are organised by the range of government and non-government organisations and cover the diversity of farm forestry topics. Regional Plantation Committees have played a particularly important role in organising farm forestry seminars. Examples of recent events include:

Marketing Farm Forestry 2001, a seminar organised by GreenSkills and Timber 2002 in Albany.

Trees – Future Dollars for Esperance, a seminar organised by South East Forest Foundation in Esperance.

Farm forestry and Local Government, a workshop organised by Trees South West in Nannup.

Sandalwood Field day, a field day organised by Department of Agriculture, Albany.

Agroforestry Expo 2000, a one-day expo held at Boyup Brook.

TreeNotes

TreeNotes were introduced in 1997 as a series of information sheets on farm forestry. They are produced jointly by the Department of Agriculture and the Department of Conservation and Land Management. As a consistent and up-to-date statement of technical information on farm forestry they provide a helpful foundation for much of the farm forestry extension program. Thirty-eight TreeNotes have been produced and more are planned.

One-day introduction to farm forestry

Although the 1-day introduction to farm forestry is designed primarily for farmers (see page 12), it is also a useful way for advisers to find out about farm forestry in their area.

Strategy 3: Raise community awareness of farm forestry

The third strategy in Western Australia's farm forestry extension program targets the general community. Major activities, which raise community awareness in farm forestry, include using the popular media and running Agroforestry Expo.

Popular media

Most organisations involved in farm forestry development use radio, newspapers and TV to deliver news and information on farm forestry. The Department of Agriculture has particular expertise in this area and employs a communications person to coordinate a program of events. The WA Network Development Project managed by Trees South West, coordinates the distribution of Agroforestry News. Most managers of significant farm forestry projects take it upon themselves to communicate their work to the wider community.

Agroforestry Expo

Agroforestry Expo, which was first run in 1999, showcases the variety of options available to farmers and key facets of the industry from farm planning and site preparation through to harvesting and processing the timber. The Expo's theme, "*Trees for farmers, catchments and communities*", reflects the vision of farm forestry benefiting individuals and the communities they live in while addressing land degradation. The Expo, which attracted over 800 visitors in its first year and

stimulated substantial coverage in the media before and after the event, undoubtedly brought farm forestry closer to the broader community. The Expo is held biennially.

Current issues and future directions

Funding

The placement of full-time farm forestry specialists in regional centres across the medium rainfall zone of the South West is a major step forward for farm forestry extension. The challenge now is to secure funding to keep the momentum going. Options for funding include Commonwealth and State funding, and private sponsorship. A major private sponsor is currently being sought to carry the MTG Program forward when Natural Heritage Trust funding runs out early in 2002.

Continuing and extending the MTG Program

The MTG Program is considered a highly effective element of the overall extension program. Evidence for this assessment comes from two main sources; feedback from the 150 farmers in Western Australia who have completed Programs and findings of a survey of farmers and advisers in the Albany region. The feedback from the 150 participants is overwhelmingly positive, as indicated by responses documented in Program evaluations by Stephen and Reid (2000 and 2001). The Albany survey also confirms farmer's high opinion of the Program. When asked to list farm forestry activities that stood out in their mind, the most common and the most positive response was their involvement in the Master TreeGrower Program (Power 2001). The University of Melbourne deserves to be recognised for instigating such a highly successful extension initiative.

It is now obvious that a full-time coordinator is required to run the MTG Program, to attract new participants and to further develop the introductory and "follow-up" components. Aspects to be developed and run include:

- Advanced modules (eg. management of native forest and assessment of soil types)

- Inventory of tree growth (ie. continuation of joint project with the Farm Forestry Unit, currently involving 28 sites)

- Use of real local data on wood production for economic analyses, to show farmers what can be achieved.

- Bringing past participants and potential new participants together at field days.

Incorporating farm forestry into mainstream agricultural education and extension

The Education and Information Transfer Program of the Cooperative Research Centre on Plant-based Management of Dryland Salinity will be investigating how to make farm forestry an integral part of mainstream agricultural education and extension programs. Funding for a range of farm forestry education and extension programs nation-wide, including the Master TreeGrower Program, is a possible outcome. The possibility of extending the MTG Program into agricultural colleges, such as the Denmark Agricultural College, is being explored.

Improving the introductory program

There is a need to improve the introductory program that targets those landowners who are interested in farm forestry but who haven't started yet. An important aim would be to attract more farmers to the Master TreeGrower Program. Work is required to improve the format, obtain funding and start running an introductory program on a regular basis.

Conclusion

An effective extension program in farm forestry has been developed in Western Australia. The program focuses on providing farmers with support and encouragement to fit forestry into their farming enterprises. The Master TreeGrower Program is a central plank of the program. Introductory and "follow-on" components are being developed to attract new participants and to provide opportunities for past participants to continue improving their skills and confidence. Increasing numbers of farmers are using forestry as a tool to make their farms work better and to help build a thriving and pleasing rural landscape. The challenge now is to secure funding to keep going the momentum going.

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GROWING PINES IN TRYING TIMES: EXTENSION FORESTRY PROGRAMMING IN THE FIELD

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Abstract

Forest landowners are increasingly interested in receiving in-depth forest management information and practical field instruction. To address these demands, extension agents, forestry faculty, and natural resource managers have collaborated on the development and delivery of 2-day forest management training programs for forest landowners managing southern pine stands. Silvicultural practices, economics, and Best Management practices are presented with emphasis on field-based instruction and demonstration.

Introduction

In 1999, The University of Georgia Daniel B. Warnell School of Forest Resources developed Forestry: Area Specialty Advanced Training (FASAT) to strengthen Cooperative Extension Service county program delivery system areas of sustainable forest productivity and profitability in annual week-long training programs (Moorhead et al. 2000). An additional series of field and hands-on training, day-long field training programs have been held for FASAT agents on the principles of forest stand evaluation. These programs were presented in the physiographic regions and forest types in which the cluster agents are working. Agents were given instruction on how to use the forestry sampling equipment that they received at the initial FASAT program, and to use information collected to characterize stand stocking, growth, health, and management needs. This training also serves as a prerequisite for the three-day FASAT training program on growth and yield model use. The summer FASAT program covered:

Prism sampling techniques, basal area estimation, height and live crown determination;

Forest fertilization update: recommendations, opportunities for establishing demonstration and research plots;

Radial growth sampling, calculation of growth rate, leaf area estimation; and,

Evaluation of pine stands, growth and yield, thinning responses, stand health

One goal of the FASAT program is to educate landowners that their forest stands represent a valuable resource and they should consider using professional foresters to help them manage their forests. It is important to note that FASAT does not promote cluster agents as an alternative or competitor to consulting or professional foresters, the extension agent's role is in landowner education programming and not technical service. The FASAT agents now cover all 159 counties and all 55 clusters with 67 agents working in areas of forest productivity as well as urban/rural interface forestry.

After the initial training program, University faculty and FASAT Agents began to develop multi-county (cluster) forestry meetings. The goal was to move away from the traditional limited agenda night meetings held in single counties to a full-day or two-day program format. This allowed a comprehensive agenda to be developed and presented and the program also incorporated field site visit/presentations. The program was called "Growing Pines in Trying Times" to highlight the current farming situation with the downturn in traditional production agriculture (cotton, peanuts, small grains, tobacco) prices that impacts many farmers and other landowners holding rural lands.

Cluster agent/client interest in forestry has increased in recent years with successive years of summer drought, low agricultural commodity prices, and inherently low productivity on marginal agricultural lands. These combinations of disincentives have resulted in costs of agricultural production above returns for many major crops in the state (Moorhead and Dangerfield 1998). Federal agricultural program incentives to remove marginal lands from annual row crop production, such as those found in the Conservation Reserve Program (CRP), have resulted in the afforestation of marginal cropland. Prime agricultural lands are being farmed at greater levels of intensity with irrigation and precision farming techniques.

Marginally productive agricultural lands are actively shifting to more profitable forest tree crop production. In the last 15 years, over 310 thousand hectares of marginal cropland have been afforested through the CRP by landowners in the state. An estimate additional 202 thousand marginal crop hectares have been afforested outside of the CRP. More than 405 thousand hectares of marginal land remain in crop production that would earn greater landowner returns if shifted to tree crops (Moorhead et al. 1999) (USDA-FS 1988). Shifting from row crop production to tree crops on marginal lands reduces erosion, enhances water quality, and provides positive economic benefits to rural economies (Alig et al. 1988) (Moorhead and Dangerfield 1996).

Program Development

In order to maximize impact, a consortium of agencies and individuals were involved in planning, sponsoring, advertising, hosting, and delivering the program:

University of Georgia County Extension Offices (3 to 4 county clusters)
Warnell School of Forest Resources faculty

Georgia Forestry Commission
Department of Natural Resources
Water & Conservation Districts
County Reforestation Committees
Forest Industry
Consulting Foresters
Forest Landowners

Representative Program Agenda:

Day 1

8:30 a.m. – 12 noon

Registration
Welcome & Announcements
Keynote comments
 Dean, School of Forest Resources
 Director, Georgia Forestry Commission
 Associate Dean, College of Agricultural & Environmental Sciences
Timber Economics
Forest Fertilization
“Growing Pines in Great Times”

12 – 1:00 p.m. Sponsored Lunch

1 – 4:00 p.m. Field Program

Intensive Management
Stand Establishment
Equipment Demonstrations
Using GPS

Day 2

8:30 a.m. – 12 noon

Landowner Rights
Forestry Regulations
Prescribed Fire Regulations
International Markets
Federal Programs

12 – 1:00 p.m. Sponsored Lunch

1 – 4:00 p.m. Field Program

Longleaf Pine Management
Wildlife Management
Pine Straw Production
Thinning & Pruning
Streamside Management Zones

Results

FASAT Agents initiated a series of seven, multi-county (37 counties covered) forestry meetings from the fall of 1999 to the spring of 2001 with the theme “*Growing Pines in Trying Times*”. Over 700 non-industrial private forest (NIPF) landowners were contacted directly through these meetings. A greater number will be contacted/influenced through a multiplier effect from meeting attendees. Over 405 thousand hectares of NIPF land was represented at the seven meetings. NIPF landowners received information allowing them to increase net returns to tree crops by a conservative estimate of \$ 25 USD per hectare per year, or for an estimated total of \$10 million USD per year in Georgia. The programs heightened the awareness of clients to the wealth of forestry information and services available from the cooperating agencies and groups. As a result, there has been an increased demand for programs, particularly field sessions, throughout the state. FASAT agents are installing various forestry plots in cooperation with landowners to use for future program sites.

Other states in the U.S. South have participated in the FASAT training. In the FASAT 2000 training, seven county agents representing Texas and Florida participated. Following this, Florida has begun a similar pilot training for county agents.

Summary

Program efforts and training are continuing in the FASAT program. This spring, agents received training on stand yield and modeling with GaPPS (Georgia Pine Plantation Simulator). Newly recruited agents received the initial training curriculum, and a new group of agents are enrolled in a rural/urban interface training program. In, 2002, agents will receive a 3-day training program on forestry water quality. “Growing Pines in Trying Times” programs are planned by several clusters for 2002 as well as 1-day sessions on single topic issues like longleaf pine establishment and management, pine straw production, forest fertilization, thinning, and prescribed fire.

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FARMER TO FARMER EXTENSION: EXPERIENCE IN DRYLANDS KENYA

Benard Muok, James Kimondo & Ioki Atsushi

Abstract

The on-going rationalization of the civil service in Kenya has adversely affected the delivery of services to the rural communities. Among the affected services are the government extension services. The current numbers of extension officers are grossly inadequate to effectively-serve the populations. To address the problem the government of Kenya in collaboration with the Japanese government initiated a project, social forestry extension model development (SOFEM). The project aims at equipping the inhabitants of the semi-arid areas of Kenya with appropriate techniques to plant and manage trees through establishment of farm forests by the local residents. One of the expected outputs is to develop appropriate method of farm forest establishment with initiative of the local residents through practical training of farmers and extension agents. The trained farmers are expected to act as models and facilitated to act as extension agents. Representative farmers are selected by the communities using some set criteria (accessibility to other farmers, willingness to train other farmers, etc). The selected farmers are given residential training by the project as well as on-job training at the project's farm forest demonstration plot as well as on the farmers' own farms. The farmers selected are exposed to a number of developed technologies and are free to select whatever technology they wish to try on their farms. With the technical assistance from the project officers, the farmers establish farm forest on their own farms.

Once the establishment is done successfully, the farmer invites neighboring farmers for an open day/training session, using their own farms for demonstration. The system has become popular in the area judging from the people who willingly attend the training session organized by the farmers. About 100 farmers have been recruited and the average attendance for is training session is about 200 people. Local schools and organized groups also attended the training sessions organized by the farmers.

Introduction

Through out Africa, land resources are deteriorating an accelerating pace. A complex matrix of factors has produced the current crisis. The interaction between uncontrollable external factors, such as drought and human abuse prevents formerly effective productive systems from satisfying the needs of the population. Increased pressure on the land has led to overgrazed range areas, diminished soil fertility, deteriorated soil structure and increased soil erosion. Added to this cycle are the effects of excessive tree cutting, over-exploitation for timber and fuelwood and expansion of agricultural land into marginal areas. Through overgrazing, over-cultivation, over-cutting of woodlands and deforestation has led to environmental degradation (or desertification)

The effect of desertification is frequent crop failures and famine in the drylands, erosion of genetic resources, poor food security and severe poverty. With the ever-increasing population, there is severe shortage of forest and forest resources in drylands, which the supply from the little government forests, cannot satisfy.

Government extension services

To mitigate the problem the government of Kenya through the Forest Department started the Rural Afforestation Extension Scheme (RAES) in the early 1970s with the sole mandate to carry out forest extension activities on private land. The initial approach of the service was production of seedlings, which were given to the farmers free to plant. Since then, the service has gone through a shift in policy from performing production role to facilitation role, where the local communities are facilitated to produce their own seedlings and plant on their own farm or for sale. The name has also since change to Forestry Extension Service Division (FESD).

To achieve its objective of facilitating tree planting by farmers on their farms, the Forestry extension Division has been striving to deploy forestry extension agents from the national level to the smallest administration levels (locations). The extension agents are expected to facilitate farmers by providing technical advice through different methods such as farm visits, holding of public lecture during formal gatherings called by government administrative officials in the locations, etc.

Though the extension service has been facing a number of problems such as poor infrastructure, inadequate facilitation by the government, inadequate extension staff on the ground etc, some progress had been made. In the recent past, the extension service has face one of its major problem, which has forced it to look for alternative ways to provide the extension service. The main now facing the service has been brought about by the on-going structural adjustment program, which as forced the government to retrench its civil service. In the retrenchment program a substantial number of the extension staff have been affected to almost less than half of its original work force. At the moment, extension services to the farmers are almost a thing of the past, not only in forestry but also in other ministries. At the moment there is already attempts to privatize extension services in some department such as veterinary. Much cannot be said at the moment, but following the same for forestry is a tricky situation given the long-term investment in forestry and the level of poverty in the drylands areas where the immediate priority is to survive.

Contribution from the Non-governmental organizations

Apart from the government, non-governmental organizations have also been providing extension services, which are environmental conservation oriented. With the renewed interest in drylands, many of such organization are operating in these areas and providing parallel extension services and supplementing the government efforts.

Most of the NGO programs, however are program based and operate in an area for a defined number of years and after that they move on to other areas. During the period of the project, most of the organization ends up employing own extension stall

to meet the objective of the project. However, the personnel recruited by these organizations are normally laid off after the termination of the project period.

Furthermore, there is no uniformity in the extension approach used to reach the farmers. It becomes even more confusing when some of such organization are well funded and will not hesitate to give incentives to the farmers in form of handouts. Once the project pull out and the incentives are not forthcoming all the activities quickly collapse.

Social forestry extension model development

In the view of the above, there is need to develop an extension approach that is self-supporting and thus more sustainable. As noted by Farrington (1995), the way forward is the need to offer farmers with particular technical knowledge and training, which lie outside purview of their own indigenous knowledge. In this way the farmers themselves, will act as the resource persons without having to depend on people from outside. In simple terms the farmers themselves must be their own extension agents if the extension service is to go on.

To address the problem, the government of Kenya in collaboration with the Japanese government initiated a project, Social Forestry Extension Model development (SOFEM). The project aims at equipping the inhabitants of the semi-arid areas of Kenya with appropriate techniques to plant and manage trees through establishment of farm forests by the local residents. One of the expected outputs is to develop appropriate method of farm forest establishment with initiative of the local residents through practical training of farmers and extension agents.

Farm to farmer extension: The SOFEM approach

In this approach core group farmers are selected and trained in practical skills of tree planting as well as communication skills to act as the extension agents to the neighboring farmers. The selected farmers are also expected to establish farm forests on their own farms to act as demonstration and teaching fields to their neighbors. The process is as follows:

Farmers` selection

Three approaches were used to select the farmers:

Village approach – The farmers in a given village are requested to select a representative farmer from their village to be trained by the project. The remaining village members are expected to learn from the farmer that they have selected.

Group approach – The project identifies an existing group, who has interest in farm forest establishment, to select a farmer amongst its group members to be trained by the project to act as their extension agent.

Individual farmer approach – This approach was meant to give a chance to a farmer who does not fit in either of the above but who has shown interest and potential to act

as an extension agent. The project staff at the grassroots level selects these categories of farmers.

Criteria for selection

Criteria for selection was developed and agreed by the stakeholders as listed below.

Among the criteria for farmers to be selected are that the farmers must be:

- Accessible to the other farmers as well as the project staff in terms of infrastructure
- Willing to collaborate with the project and the other farmers
- Willing to act as an extension agent and train other farmers
- Have enough piece of land to establish farm forest
- Have labour to establish farm forest

Training of farmers

Before the implementation of field exercise, the farmers have to undergo a one-week residential retraining program. The objective of the training program is to equip the farmers with technical package and communication skills in order to prepare them as effective resource persons in their day-to-day technology transfer activity.

Among the course contents are:

- Communication skills,
- Roles of core farmers on farm forests establishment,
- Profile of some important tree species in ASALs,
- Tree nursery techniques and management,
- Soil improvement methods,
- Tree planting and tending techniques,
- Importance of trees in bee keeping,
- Fuelwood conservation measures
- Plants improvement technologies e.g. budding and grafting.

Farm forest establishment

After the training program, the farmers were given ample time to establish farm forest and prepare some teaching materials on their farms. The project facilitates the farmers in several ways.

Services provided by the project

Providing technical advice

Project staff visits farmers and provide technical advice during the period of farm planning and design, preparation and actual farm forest establishment.

Seed and seedling information system

The aim seed and seedling information system is to disseminate information collected at the grass root level on seed and seedling availability in order to create awareness and open markets for seedlings produce by farmers as well as linking the farmers, who wish to buy seedling, with the production centers. The location extension agents (Technical Assistants (T.As) collect data on seedling production from nurseries in their respective locations, which they submit, to their respective divisional forest extension officers (DFEOs). The DFEOs compile the data for the whole division and submit them to the project office for final compilation. Once all the information is compiled, the information is published as a poster, which is then distributed to all social centers such as schools, churches and market places.

Cost sharing for tools and materials

The process assist farmers to acquire some materials, which are not readily available in the local markets and sell to the farmers at a subsidized cost at a rate of 50:50 project to farmer. The rate is then reduced to 25:75 (project: farmers). As the rate of project contribution goes down, the project identifies a trader who takes up the responsibility to stock the materials with reach of the farmers. Once the trader starts supplying, then the project stop the acquisition of the materials.

Farmers field training

Once the selected farmers establish their farm forest as well as training materials, then the farmers organize a training session on their respective farms. The farmers charged with the responsibility to invite their neighbors during the field exercise and conduct the whole exercise. During the training session, the project staff may attend as observers but the respective farmer who organized the training session does everything.

Results***Attendance***

In the year 2000, twelve selected core farmers conducted the field exercise at their respective farms with a total of 629 participants attending. This gives an average attendance of 52 people per farm, which is appropriate for effective demonstration. Technologies demonstrated per farm varied from one farm to another depending on:

Technologies already on the ground

Availability of teaching materials

As well as the farmers understanding on the technologies

Some of the technologies demonstrated by these farmers ranged from fruit orchard establishment, woodlot, boundary planting, planting and tending, soil and water conservation, bee keeping, basket composting, grafting and budding, charcoal filter as well as tree nursery techniques.

In the year 2001 the same number of farmers were involved in the farmer-to-farmer field exercise with total attendance of 468 farmers. Average attendance was 39 farmers per

site. After the field exercise, the attendants had to fill a pre-designed questionnaire to give their views about the field exercise.

Sex of participants

From the two years field data, it was noted that over 60% of participants were female. Figures 1 and 2 show the participants attendance in farmer-to-farmer (on-farm training) per sex per site in the year 2001 and 2000.

Data obtained also showed that there was a relationship between genders of the resource farmers with attendance. Where the resource farmer was a lady, there seems to be a higher attendance of female compared to male farmers. Consequently, where the resource farmer was a male, some good number of males, though not majority, attended the training.

Another observation made was that if the male resource farmer was a member of a given group, some good number of females still attends since most of the members within local community group are females.

Age group of participants

The results from the two-field exercises indicates that the majority of the field attendants were from the age groups 21-30 and 31-40 giving average attendance for the two age classes as 27% and 30%, respectively. The other age brackets 10-20, 41-50 and Over 50 recorded the average attendance of 6%, 17% and 19%, respectively. Age group 10-20 recorded the lowest turn out.

Source of field day information

The participants cited three major sources of information. These were through the host target farmers 74%, the project and the F.D Technical Assistants 30%, both host farmers and TAs 7.9% and through the location chiefs 3.9%.

Participants' opinion on field activity

All the participants concurred that the field activity was of great important to them since they were enlightened on some of the technologies which they were not aware of and more so, they were pleased by the fact that one of them (host farmer) was the resource person.

Technologies preferences

The results indicated that most of the participants preferred planting and tending technique teachings followed by nursery practice and management. Soil conservation technology was also preferred by a good number of attendants probably because it is more directly related to food production, which is a very crucial activity in Kitui and Semi-arid areas as a whole.

Discussion

Gender of participants

The fact that majority 60% of the participants to the farmers' field training were females was an important observation. We may not out rightly conclude that males are not interested in tree planting activity but just because the males are not available due to a number of reason, one being in towns for paid jobs. Muok *et al.*,(1998), in an earlier survey noted that most men in the interviewed homestead were living in town and leaving the households to be headed by females. Such women are left to take care of household activities including farming and other related activities such as tree planting. This is a clear testimony as to the reason why in the past two decades, many forestry and related development projects have involved more women than men in forestry activities. For example, past activities of the project dealing with small scale group nurseries indicated that over almost all (99%) of the community based tree nurseries were ran by women (Atanas *et al.*, 2001). Incases where some few men were within the groups, their participation were mainly in terms of financial contribution.

Another reason which may make men tend to give financial support rather than being physically involved could be because since women are the majority most men may feel uncomfortable in a group where majority are women. This observation is further supported by the fact that in field training, more men attended courses where the resource farmers are men than when the resource farmers are women. This observation suggests a fact that gender analysis should be conducted carefully so as to address specific problems of women and men without disadvantaging either. Most projects in the recent past used women groups as entry point.

Age of the participants

The two age classes 21-30 years and 31-40 years where majority of attendance was recorded are the most active as it contain the youth who have just completed their schools and yet to get paid jobs and also young families who are yet to have a lot of family commitments. The group also contains the most knowledgeable members of the society and therefore is more receptive to new ideas. The younger age Of 10 to 20 years had conspicuously low turn out because it is the school going age and most of the members were in school. It important to hold such field training during school holidays or even has separate activities for schools all together. The school going age is one of the very important groups that need to be considered.

Role of resource farmers in technology transfer

The fact that majority of the participants received their invitation from the resource farmers' underscore the viability of using resource farmers as extension agents. This fact was further evidence by the enthusiasms and response from the farmers who participated in the fieldwork training. The resource farmers were also able to explain a number of technologies with a lot of competence which they gained during to training

given by the project as well as practical experience gained during establishment of farm forests in their farms.

The fact that most of the participants preferred planting and tending technique teachings followed by nursery practice and management may be attributed to the impact of the core farmers' field success such as the presence of the farm nursery, woodlots and the fruit orchards. Soil conservation technology was also preferred by a good number of attendants probably because it is more directly related to food production, which is a very crucial activity in Kitui and Semi-arid areas as a whole.

Participants' recommendations

According to the participants, farmer-to-farmer field exercise is a very important field activity and therefore they generally recommended that:

More time to be allocated on plant improvement technology.

More technologies related to tree planting such as seed collection and handling to be included.

Such field seminar to be conducted at least twice a year when there is no much farm work.

More emphasis on contour planting, soil protection to be done in future.

Tree seeds to be issued during the seminar.

Conclusions

From the field data as well as the response from farmers, farmer to farmer extension have proved to be an effective extension approach for sustainable technology dissemination, bearing in mind the limited human resources facing the forestry sector today. These target farmers can simplify technical information from extension agents using the local language and which other farmers can easily understand. Core farmers can also mobilize other farmers, especially if she or he is a member of a given group, for tree planting activities.

Recommendations

Farmer to farmer extension is a viable approach that can help to sustain the current forestry extension initiative in the light that the government resources are dwindling.

Further training should be given to the resource farmers so as to widen their knowledge on the current technologies and organization of extension activities.

Further monitoring and evaluation is still needed to come up with a well tuned model if it is to be recommended on a wider scale

More gender sensitive extension methods should be considered to accommodate the interest of all the interested parties.

Farmer should be given time and support to prove their capability in extension.

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PARTICIPATORY EXTENSION BY SUBTROPICAL FARM FORESTRY ASSOCIATION: FOR SMALLER TREE GROWERS, BY THESE GROWERS, WITH ALL STAKEHOLDERS

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Abstract

This paper examines the role of participatory extension provided by the Subtropical Farm Forestry Association (SFFA). Some background with regard to the association is included. The historic development of SFFA extension is outlined by way of an introduction. The paper details the most effective methodologies used over the past few years including the evaluation of: an advisory service, the association newsletter, field days, seminars, farm forestry courses, a financial assistance scheme, participatory monitoring using university graduates and undergraduates and the SFFA Farm Forestry Manual. The cooperative approach taken by the association with regard to working with agencies, institutions, organisations and prominent individuals is discussed.

The philosophy behind the SFFA advisory service is outlined indicating a participatory, holistic approach aimed at empowerment of all involved particularly the farmer or smaller landholder. The approach taken by the association in planning and implementing farm forestry extension in the region is shown to utilise a diagnosis and design approach, aiming at cooperative development with all the stakeholders, forming alliances which maximise benefits both at the individual level and between organisations while recognising all the values of forests and forestry be they social, economic or environmental. A key goal is to facilitate farmers and smaller growers becoming the principal players in farm forestry development.

The paper includes case studies, detailing Advisory Officers site visits and reports, and examples of Newsletters, the manual and other SFFA publications used to provide information to growers. Results of surveys and comments from SFFA members, committee and staff with regard to extension are included. Generally significant support was indicated for the approach taken by the association in participatory extension. The National Farm Forestry Program is shown to have been crucial to the effectiveness of SFFA extension. Four projects conducted under this program are shown to have participatory extension as one of two essential instruments in achieving the integration of farm forestry on farms within the region. The other is the use of financial incentive schemes, which is also briefly discussed.

Introduction

SFFA extension has evolved from a long and diverse tradition of forestry and farmland management. The subtropical region of eastern Australia has supported a rich and diverse range of forest types and dependant life forms for hundreds of millions of years

right up to today. This includes some of the most productive and dynamic systems that have existed as terrestrial entities upon the earth. The traditional local Aboriginal culture is an integral part of this.

It is this concentrated energy that has helped influence the keen interest of landowners in the region. All this has profoundly helped shape the association's extension role to one, which aims at balancing environmental, economic and social values. Forestry is viewed as a continuum between production and ecology one cannot exist without the other. Hence it is evident that any extension role must encompass the interplay of interests that range from farm forest timber and other commercial production through to aesthetic and environmental enhancement. The approach the association has taken is one of accommodating diversity through participation.



Accommodating diversity through participation (SFFA photo 2000)

Over the past 8 eight years SFFA has had a turn over of over 400 members. Its current financial membership stands at over 200. This membership represents a diverse range of interests, from production through to conservation forestry with the majority being interested in both. (SFFA NL- surveys) The association's extension service has developed in response to this interest.

The association and its Advisory Service recognises as its principal objective the role of facilitating the exchange of information and experience between members and other industry stakeholders. It is this participatory approach to extension, which is considered central to its effectiveness. In addition to this the broad range of methods used to implement this exchange, detailed below, are resulting in sound farm forestry development in the region.

In order to place the SFFA extension role into context it is important to recognise the lack of farm forestry extension in NSW. There is virtually no government agency extension. The National Farm Forestry Program supports a limited extension role, which has just been significantly reduced with the recent NHT down sizing.

It is also important to understand that without other government or industry initiatives such as effectively targeted incentive programs, what extension exists will not be utilised in the future. Despite the fact that farm forestry has been identified as having significant environmental, economic and social benefits, (Anon 1996) uptake is levelling out. The innovators and enthusiasts (Specht 1999) are involved but the bulk of farmers are caught up with trying to survive with their core farming activities and are not able to take the opportunity that farm forestry presents to them.

An additional threat to the effectiveness of farm forestry extension is the support of plantation forestry at the expense of integrated farm forestry. Tax driven investment into prospectus companies clearing native vegetation and buying up traditional farms (Northern Farmer Bulletin March 2001) is not what SFFA members and other community members have in mind when they turn to farm forestry as a rural diversification and environmental enhancement option.

Participatory extension methodology

Over the past eight years the SFFA has developed a number of ways of implementing an extension program. These include, an advisory service, the association newsletter, field days, seminars, farm forestry courses, a financial assistance scheme, participatory monitoring using university graduates and undergraduates and the SFFA Farm Forestry Manual. (SFFA 2000) A participatory approach involving farmers, other landholders and other stakeholders, has been at the heart of the association's philosophy and activities. In fact the association formation itself was based on this approach.

The association came into being as a result of outcomes of a series of seminar workshops involving 200 participants (DFSC 1994). The report of the workshops outlined the role of the association and instigated the formation. A similar seminar, one year later, also involving a similar range of participants numbering approximately 200 helped to set directions for the Advisory Service.

The seminar titled *"Farm and Community Forestry: From production to ecology"* enabled speakers and participants to examine key farm forestry issues at the time, and they identified a number of categories in order to provide a framework for farm forestry development in the region (Novak 1994).

At present the Advisory Service employs two officers who respond to enquiries in person and via telephone and email at the office at no charge. They also conduct site visits and produce site reports on a cost recovery basis. In addition they play a key role in the SFFA seminars, field days, farm forestry courses that are conducted in a collaborative manner. They play an important part in providing feedback to SFFA management, on the needs of the landowner clients. This information is also used to identify R&D priorities.

Advisory officers' site visits generally occur on a regular week-by-week basis. The project funds (NHT), which support these activities, are limited; this results in delays in the preparation of landholders' information and Site Reports. These reports are generally needed by landholders to incorporate into farm and business plans. These plans play a

crucial role in landholders gaining tax incentives and generally in placing themselves on a sound commercial footing. They include a full property description, description of production enterprises existing and planned, legislative and tax considerations, options for plantation design and layout, site preparations, planting details, species recommendations, plantation maintenance, financial data and modelling.

It is clearly evident from the monitoring of plantings in the region that those farm foresters that have been active members of the association and utilised its services have had a high level of success in their endeavours (SFFA Newsletter, issue 36).

Unfortunately there is limited support by government and agencies for this type of participatory role. The grass roots organisations could and should play a much more effective role in creating a framework for integrated farm forestry. In fact if state and federal governments are serious about the development of a genuine national farm forestry industry and achieving the associated substantial benefits then a truly participatory approach involving farmers and other stakeholders is the only way (SFFA Newsletter Issue 37).

The association provides information to members also via publications including a newsletter; email bulletin, a manual and planner, Fact Sheets, Tree Profiles and seminar proceedings. These publications along with those from outside the organisation are an essential part of the SFFA extension role.

The Farm Forestry Manual and Planner for Subtropical Eastern Australia has been specifically designed to allow for the diversity of interests by growers within the region. In the manual prospective farm foresters are advised at an early stage to talk to others involved in farm forestry, neighbours and other landholders, nursery persons, consultants, and local groups and associations. Completing the Planner (SFFA 2001) assists the landholder to arrive at key decisions without limiting choice and design. Users are encouraged to identify potential benefits and available resources. Where a lack of knowledge and/or finances is a significant constraint the landholder is guided to identify at the outset any likely sources of assistance and to make contacts with those organisations. If, on the basis of the landholder's own evaluation supplemented by the advice of others, the proposed project is favourable, the landholder is then encouraged to undertake the development of detailed plans and detailed recording process using the Manual and Planner as guide.

The conservative approach taken by industrial foresters has acted as a significant disincentive to potential farm foresters. Despite criticism from traditional forestry interests, SFFA has encouraged farm foresters in attempting innovative and unconventional projects, however this has always been balanced by facilitating exchange of other relevant information through the participatory extension process.

Feedback on the SFFA activities and publications has been highly supportive over the years particularly in the association's ability to maintain an active and substantial membership while also maintaining a meaningful relationship and communication with other stakeholders.

A cooperative approach is taken whenever possible with most of the associations activities. Representatives of government agencies, other organisations and prominent individuals are invited to become involved with seminars, field days, course presentations and publication development. More importantly existing and potential farm foresters are the principals in the whole process. Membership of the association is mostly comprised of smaller landholders, as is the management committee.

Surveys, monitoring and data analysis

Surveys of members by the association reveal the values and interest of members (SFFA NL, Issue 9 & 31). A majority (61%) have an interest in landcare and environmental issues. 48% were interested in rainforest cabinet timber plantings, 41% the main interest was in commercial plantings. Generally the interest is in farm forestry rather than plantation forestry. These surveys assist the extension service to target its delivery and support member's interest.

Table a: Estimated annual increase in actual dollar value (\$/tree)

Species	Mean	Median
<i>Acacia melanoxylon</i>	22.80	20.95
<i>Elaeocarpus grandis</i>	15.91	14.09
<i>Gmelina leichhardtii</i>	10.38	6.52
<i>Grevillea robusta</i>	8.88	5.72
<i>Lophostemon confertus</i>	6.81	6.10
<i>Toona ciliata</i>	6.42	3.69
<i>Rhodosphaera rhodanthema</i>	3.61	2.84
<i>Dysoxylum fraserianum</i>	3.26	2.54
<i>Dysoxylum muelleri</i>	2.40	1.92
<i>Geissois benthamii</i>	2.16	1.79
<i>Araucaria cunninghamii</i>	2.15	1.38
<i>Araucaria bidwillii</i>	1.35	1.17
<i>Agathis robusta</i>	1.03	0.92
<i>Flindersia australis</i>	1.01	0.37
<i>Melia azedarach</i>	0.71	0.26
<i>Eucalyptus grandis</i>	0.60	0.16
<i>Podocarpus elatus</i>	0.15	0.17

Tables a and b use the rather fragmentary data available on current timber royalties to obtain estimates of the mean increase in market value for those species for which the information was available. Table a shows the actual estimated dollar values, and Table b shows the relative values derived from relative volume increments. Monitoring and data analysis has played an important role in involving landholders, students, academics and SFFA staff. It stimulates communication and results in significant information transfer. The following tables were produced as a part of a report on SFFA monitoring and data analysis and were published in the SFFA newsletter Issue 36.

As will be seen from Table b, *Acacia melanoxylon* is not quite such an outstanding performer as it appears from Table a. It was only grown at one site in the study, and that site performed relatively well. Also the differences in performance between species are somewhat exaggerated in Table a, again as a consequence of the different species mixes and the variability of sites. However, the actual dollar values may indicate what is possible for the better-performing species given favourable conditions. Table b does not use percentages, as previous comparison tables have done; instead it estimates the actual increase in dollar values with sites held constant (as far as the data permits).” (SFFA Newsletter Issue 36).

Table b: Estimated annual increase in value (\$/tree) relative to *Grevillea robusta*

Species	Mean	Median
<i>Elaeocarpus grandis</i>	15.65	12.30
<i>Gmelina leichhardtii</i>	14.81	8.62
<i>Acacia melanoxylon</i>	13.62	12.52
<i>Eucalyptus grandis</i>	12.14	3.17
<i>Grevillea robusta</i>	8.88	7.73
<i>Lophostemon confertus</i>	5.77	5.16
<i>Toona ciliata</i>	5.12	3.14
<i>Rhodosphaera rhodanthema</i>	3.74	2.79
<i>Geissois benthamii</i>	2.49	1.49
<i>Araucaria cunninghamii</i>	2.27	1.36
<i>Dysoxylum fraserianum</i>	1.58	1.14
<i>Agathis robusta</i>	1.32	0.75
<i>Dysoxylum muelleri</i>	1.15	0.97
<i>Melia azedarach</i>	0.79	0.45
<i>Flindersia australis</i>	0.77	0.36
<i>Araucaria bidwillii</i>	0.55	0.44
<i>Podocarpus elatus</i>	0.12	0.11

Peter Westheimer farm forestry project: a Case Study

Case studies are used as a tool to demonstrate a range of options to landholders by SFFA. The following is based on a field day report written by Ken Dory an active tree grower and member of a prominent organisation in the region, The Big Scrub Rainforest Landcare group.

Peter Westheimer's property incorporates a woodlot, riparian plantings and regeneration site. Peter's 14.5 hectares has been divided into 2 management areas. The lower slopes of this natural amphitheatre has been agisted to cattle while the higher regions have been set aside for trees of one sort or another. Approximately 2 hectares of woodlot, 2 hectares of ecological and riparian plantings and 2 hectares of rainforest gully regeneration.

Peter's woodlot was planted in April 1998, 2,000 trees of mixed species spaced at 3x3 metre spacing. The rows ran down hill so as to make tractor passes safer and were ripped. Peter reckons that this brought more rocks to the surface and may have been counter-productive. Originally Peter had contractors slash the woodlot but this became expensive so he purchased a Toro type ride-on slasher to do the job himself. Certainly the hillside looked immaculate with the close cropped grass, but I couldn't help but remember Rob Kooyman's comment about trees not being a forest while there was grass underneath. The trees didn't look as if they were growing at their optimum and canopy closure seemed as if it was a long way away, but then again I was looking at 3-year planting.

Optimum canopy closure in a 5 year old mixed rainforest cabinet timber planting (SFFA photo 2000)



Some discussion ensued about some of the factors that might be inhibiting the

trees. Martin Novak enquired about the ripper tine used by the bulldozer. He believes that a large 'winged' type ripper is best at fracturing the soil structure and allowing tree roots to spread, avoiding possible root constriction and 'blow-over'. Rob English ventured the opinion that the vast majority of blown over, in his experience, have had 'J' curved roots or other long-term root problems, there did not seem to be that many trees leaning over here. While the grass competition was discussed there seemed to be more agreement on the soil type being a problem. I'm not an expert on soils but visually this brown hillside pug didn't look as good as Rob Kooyman's level red soil site visited earlier in the day. Although many of the Blue Figs seemed to be doing best, the Silky Oaks appeared to be in trouble. From the group came four possible reasons for Oaks to perform badly. Poor form because of inferior selection, caterpillar grazing; 'wet feet' and glyphosate poisoning were all suggested. I suspect that I've seen all four in my Silky Oaks but the 'bunchy' or bonsai appearance of some of the leaves suggested glyphosate poisoning as a possible cause. On the edge of the woodlot was a small section that appeared to be doing quite well. This steeper section was too rocky to be ripped and so was hand planted. No ripper and better drainage but also the trees had been planted closer, perhaps as close as 2x2 metres. Moreover, the rocks had prevented slashing and the area was dense with regenerating *Macaranga* that were shading out the grass.

Peter received a Department of Land and Water Conservation grant to plant trees along a small creek that runs along the bottom boundary of the woodlot. Around 1,000 trees were planted last year and they seemed to be doing quite well. Although primarily rainforest trees there were also Cabbage Palms, *Melaleucas* and Swamp Mahoganies. Above the woodlot was another area of plantings, which Peter described as been totally 'ecological', that, with the riparian planting, constituted another 2 hectares of trees under management. Peter certainly had his work cut out for him, a musing that was verbalised by one of the group. Peter's response was that he thought it a privilege to leave something of beauty for the future. On a more practical level, he believes that planting and maintaining trees, at 3x3 metres, costs around \$10,000 a hectare. (SFFA Newsletter June July 2001)

Conclusion



Extension alone, no matter how participatory and innovative, cannot bring about a significant expansion of farm forestry. It must go hand in hand with a number of other strategies. A number of government programs such as the National Farm Forestry Program have played a key role in assisting the association in achieving its objectives. The Natural Heritage Trust has provided some of the funding, although the competitive selection process and the ability of government agencies to complete for the limited funds have created instability, particularly in NSW. In addition because of the interpretation and implementation of policy, farm forestry development has been slanted towards industrial plantations rather than true integrated farm forestry (Reid 2000). This places further pressure on the extension role.

A well-targeted farm forestry incentive program would go a long way towards addressing these problems. This has been further highlighted by the tragic collapse of the tax incentive investment schemes. There are a number of very good examples of successful forestry incentive programs in other countries. The Australian environmental programs are introducing cost sharing and incentives; they could be expanded to encompass integrated farm forestry. Only then can participatory farm forestry extension become truly effective. (SFFA 2001)

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HOW TO REACH RURAL PEOPLE IN DEVELOPING COUNTRIES WITH QUALITY TREE PLANTING MATERIAL

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Introduction: Why is it important for rural people to get access to quality tree planting material?

It has been stated that the future of trees is on-farm (Simons, 1997). This statement is likely to hold true because trends indicate that tree-planting on-farm is increasing, and because of the growing awareness of the need to grow trees on-farm in the future. Although uncertain it has been estimated that small farmers actually constitute a majority of tree planters, that the number of trees on-farm exceeds the number of trees in plantations, and that this gap tends to increase (Simons, 1997; FAO, 1997).

Worldwide deforestation has been estimated at 12.6 mill ha or 0.7 % of the total forested area annually (FAO, 1997). Deforestation and forest degradation result in a dramatic loss of present and, as biodiversity is lost, future options for use of trees (Kjær & Nathan, 2000). This represents a serious problem at the global level but in particular to the millions of rural poor in tropical countries who are dependent on trees. Trees provide important products such as fuel wood, building material, food and fodder. Moreover, trees provide important services such as shade, shelter, erosion control, watershed protection, soil enrichment, etc. As alternative sources disappear, rural people will increasingly have to plant trees on their own land to cover their needs for these products and services in the future.

Adoption of agroforestry innovations can increase agricultural production on a sustainable basis and hence improve food security for rural people. (ICRAF, 2000). In that perspective alone, rural people would benefit from planting more trees.

Lack of seed and seedlings constitute a serious constraint for smallholders to fully utilise the benefits of trees (ICRAF, 2000; Johansson & Westman, 1992; Aalbæk, 2001). Even when planting material is available, it is often insufficient with regard to choice of species or provenance as well as genetic and physiological quality.

It is important to use quality tree planting material for several reasons. First, the physiological quality of seeds and seedlings affects the success of establishment and the subsequent growth rate of the plant. Second, genetic quality is of great economic consequence (Foster, Jones & Kjær, 1995). The chosen material should be selected to suit local conditions and should be of sufficient genetically broad origin to ensure the stability, e.g. resistance against pests and diseases of the planted trees. Using quality plant material is one important avenue to ensure that farmers and other tree planters will gain from planting trees. Improvements, even very small improvements, in the productivity of trees will often be of great importance, especially to subsistence farmers who have invested some of their scarce resources in planting trees (Kjaer & Nathan, 2000).

National tree seed programmes

National tree seed programmes (NTSPs) exist in most countries where significant tree planting activities take place. These programmes have been established to ensure that tree planters get access to quality planting material (Graudal, 1998; Graudal & Kjær, 2000).

Tree planters range widely from government institutions over large-scale industrial plantations to NGOs and rural people. During the seventies and eighties, centralised national tree seed programmes supplied seed and training mainly to large-scale industrial plantations, government planting programmes, and donor supported development projects. Now, for the reasons mentioned in the previous section, emphasis is changing towards tree planting farmers (DFSC, 2000).

Many tree-planting farmers will obtain their planting material without the help from the NTSP. They may find it difficult or expensive to obtain what they need from the NTSP, or they may not have heard of NTSP at all. These farmers collect their own material in the form of seed, cuttings, or wildlings or they obtain plant material from other farmers, from local markets or nurseries (Edwards and Schreckenberg, 1997). The majority of this material will be collected locally or come from unknown sources and would often, as stated above, be of lower quality. This may be due to either a lack of suitable alternatives, or it may be due to lack of knowledge.

Hence, there are at least two possible strategies for a tree seed programme to ensure that tree-planting farmers get access to quality plant material. The first is to ensure that quality plant material is available to the user. The other is to ensure that providers of plant material as well as farmers who collect their own have the knowledge that is necessary for them to collect plant material of a sufficient quality.

In this paper, we will focus on the question of how NTSPs and other relevant organisations through extension can ensure that small-scale nursery owners and farmers collecting their own plant material get access to the necessary knowledge. Before making considerations about a future strategy, it will be relevant briefly to look at how national tree seed programmes previously have approached extension.

How have national tree seed programmes previously approached extension?

It is normally recommended that NTSPs have several functions, i.e. to procure/distribute seed as well as to offer training and extension for the benefit of farmers and other seed users (Graudal & Kjær, 2000). In reality, the designed training and extension strategies have rarely enabled NTSPs to reach small-scale farmers. This will be illustrated by two examples from Tanzania and Thailand.

The example of the National Tree Seed Programme (NTSP) in Tanzania

NTSP was established in 1989 with financial support from the Government of Tanzania and the Danish International Development Agency (Danida). Danida's financial support has recently terminated, but the programme continues. Since the start, NTSP has had the declared development objective to "improve wood production and provide other benefits from woody plants including rehabilitation of degraded environments meeting the requirements of the Tanzanian people". Provision of tree seed of a good quality as well as training and extension have been seen as important means to achieve this objective (Nathan, 2000).

A training strategy was sketched out for NTSP in May 1995. The strategy was based on a distinction between training and extension. Training was defined as improving the qualifications of the project staff. Extension was defined as the training and information services that the project offers non-project personnel (NTSP, 1995).

There was an intensive programme of training for NTSP staff in particular in the beginning of the programme. These courses were mainly technical by nature. Courses aiming at improving the skills of the staff to communicate with or provide extension directly to farmers (or to provide others with such skills) have been few (Nathan 2000).

Concerning the training ("extension") services for non-project staff, it was stated in the training strategy that NTSP did not have the resources to reach the farmers of Tanzania effectively. Instead, the programme was suggested to work through

other projects and institutions with the capacity to assist farmers in seed related issues. The main target groups would then be forestry and agriculture extension workers.

It can be calculated from NTSPs progress reports that NGO- and project staff, including forestry project technical staff, have constituted the largest target group for NTSPs training and workshop programme. Officials from various forest departments constitute another large group whereas extensionists constitute less than 10 per cent of NTSP's trainees.

It has not been possible to make a systematic survey of the indirect beneficiaries of NTSPs training. However, interviews indicate that there are farmers who have "benefited" indirectly in terms of learning from NTSP's trainees. The farmers who were interviewed had very different opinions about the usefulness of the training they had received (cf. Nathan, 2001). Data are not available, however, with regard to how many farmers have benefited indirectly from NTSPs training activities. It can thus be concluded that only some farmers / nursery owners have benefited indirectly in terms of receiving training ("extension") from NTSP's trainees.

In the training as well as in the marketing strategy, training/extension and marketing are approached as two sides of the same coin. Thus, it is stated in the training strategy report that the courses and workshops serve the secondary purpose of raising NTSP's profile and that advertising the products through training may actually boost sales of seed.

Examples of extension material produced by NTSP is:

- A newsletter
- Seed pretreatment notes in Swahili and English
- A calendar with different NTSP motives
- Wheel covers, pens, key holders and t-shirts with NTSP's logo printed on them
- Radio broadcasts

This material is distributed free to trainees, workshop participants, customers etc. In reality, most of this "extension material" must be characterised as marketing material. Only the small seed notes produced by NTSP in Swahili and English contains information, which is useful for all kinds of seed users including small farmers. Still, they are not designed for illiterate farmers. Thus, some of the information is in a language used mainly by forest professionals, such as: "The species fixes nitrogen and has also got mycorrhiza association".

Concerning training activities, it can be concluded that:

NTSP has had an intensive training programme for its in-house staff.

the programme has emphasised to develop technical skills rather than, e.g., skills in communicating with farmers, facilitating farmers' participation, etc.

NTSP has aimed its training and 'extension' activities directly at institutions and individuals who can pay, and that it is mainly such institutions and individuals who have been the direct beneficiaries of these activities.

Concerning NTSP's extension activities, it can be concluded that the programme has benefited some farmers indirectly, but it has not been possible to estimate how many.

The example of the Forest Genetic Resources Conservation and Management Project (FORGENMAP) in Thailand

FORGENMAP was established in 1997 with financial support from the Government of Thailand and the Danish Cooperation for Environment and Development (DANCED). DANCED's financial support will be terminated in 2002.

FORGENMAP is engaged with many of the same tasks as NTSPs in other countries, however with focus on conservation of forest genetic resources. As concerning outreach, it has a specific component on this comprising:

- Issuing information/extension material

- Establishment of demo plots for demonstrating superior "genetic quality"

- Awareness raising in schools, temples, villages etc on advantages of using high-quality seed.

Because of a fairly centralised set-up, it is difficult to gain local awareness and thereby have a local impact (NIRAS, 2000). The main reason is that the extension is provided through Royal Forest Department (RFD). RFD has an unpopular, policing image among many villagers making it difficult to create an open dialogue. The conflict derives from both sides: the villagers tend to mistrust the RFD because RFD opposes agricultural expansion in forest reserves. RFD mistrust the villagers and their endless need for land, often far beyond the forest border and inside protected areas.

Impact increases when publications are issued in the local language instead of English. Poor farmers especially those from the hill-tribes could only be reached sporadically. Four pilot-sites were created with the help of NGOs or other local organisations. Some of these may unfortunately be lost now due to government transfer of responsible officers. In terms of awareness raising it was found easy to create interest in quality seed. However, if quality seed is not readily available, people tend to lose interest. In addition, if the stated superiority of the seeds offered was not documented the villagers tended to mistrust these seeds. The belief that imported goods are better than home-produced is pronounced. Imports of seed of varying quality are still going on despite the fact that better national seed would normally be available.

Conclusion

In the two examples above, "extension" was approached as training of staff from forest departments and other projects, or as an aspect of marketing. Although

extension activities aiming at farmers have been declared to play a focal role in the strategies outlined for both NTSPs, it seems that these activities in reality have not been directed towards farmers. Consequently, the activities of the two NTSPs have not had any significant impact on farmers' livelihood. When the two NTSPs have implemented extension activities, they usually have implemented them as a top-down process separated from extension activities in other institutions of relevance to farmers. In addition it seems difficult for NTSPs, having by "nature" a fairly centralised set up, to reach rural people in general. This is a general problem for many NTSPs (Graudal & Thomsen, 1998).

Extension in theory

Within the last decades, theory about extension has changed from emphasising a (top-down) transfer of technology and knowledge to an emphasis on the need for a bottom-up approach. Such an approach implies that the extensionist act as a facilitator, who assists farmers to identify the constraints, problems and opportunities affecting their daily lives followed by assisting the farmers to obtain the information and support they need to solve the problems. This type of extension requires greater interaction and an open dialogue between farmer and extensionist, and acknowledges the farmers' often lifelong expertise in identifying and solving problems and selecting options for improvement (Garforth & Harford, 1997, Neuchatel, 1999).

In this sense, extension is a process where all involved learn from each other. This enables scientists and extensionist to gain knowledge from farmers and discover what problems the farmers are facing and thereby hopefully try to solve the discovered problems in collaboration with the farmers (Neuchatel, 1999; Scarborough *et.al* 1997).

Following previous experience as well as the latest developments within extension theory, it is necessary for NTSPs to adopt a new approach to extension. This will represent a challenge to NTSPs because it requires trainers and extension workers to change their attitude about how to perform extension. In addition they have to learn new techniques such as participatory methods, communication skills and facilitation techniques (Scarborough *et.al* 1997).

Introduction to Danida Forest Seed Centre

Danida Forest Seed Centre (DFSC) is an institution under Danida, the Danish International Development Agency, which in turn is part of the Ministry of Foreign Affairs. DFSC has been in operation since 1969, and currently employs a staff of 14 people.

DFSC provides technical support to developing countries in the following fields:

- Seed procurement, which includes methods for collection, treatment and storage of tree seed.

- Tree improvement, which involves improving the quality of tree species already in use and introducing new and better provenances or species.

Conservation of forest genetic resources involves conserving threatened tree species which will allow the utilisation of these species now and in the future

Institutional development contributes to setting up efficient forest seed programmes and improving existing ones.

In the coming years, DFSC will focus on the following five working areas. It will be taken into special consideration the fact that trees are increasingly being used as integral parts of agriculture. The five focus areas are:

Integrated tree seed programmes

Quality seed for farmers

Conservation of the genetic resources of trees

The under-utilised species

Transfer and use of knowledge

DFSC collaborates with several kinds of partners worldwide mainly by providing information about tree seed in the form of books, technical notes, lecture notes and seed leaflets. DFSC is in contact with practically all NTSPs in the developing world, and in several countries the collaboration has been especially wide-ranging because Danida has provided funds directly to the NTSPs. These funds have been used to develop, staff and sometimes build modern tree seed centres.

DFSC is currently in a process of transformation towards greater emphasis on rural people. This is because the main objective of Danida is to reduce poverty among poor people in the developing countries. In the countries that Danida collaborates with the poor people are found mainly in the countryside amongst villagers and farmers.

The objective of DFSC is therefore, apart from still supporting the NTSPs, to support farmers and rural people in the developing world with planting more trees of good genetic quality, to collaborate with whoever is interested in domestication of new species and to promote planting of a variety of species. The difficulty that DFSC faces in this enormous task is that DFSC can not be in contact with every farmer in the developing world and besides it is better to leave this task to other institutions whose job it is to do exactly that. Hence DFSC will collaborate with other institutions in their efforts to reach rural people with quality tree seed and with relevant knowledge about how to collect, handle, and use tree seed. These institutions can be either national, international, NGO's or farmers organisations.

Developing an extension strategy for DFSC

Objective

The development objective is to improve farmers' livelihood through access to, and knowledge about, seed and planting material.

Activities where the "new" approach is integrated

DFSC should incorporate latest developments in extension and should into all relevant activities. The most important of these activities include:

When Danida are supporting new NTSPs “new” approaches to extension should be included as a main strategy. A clear distinction between marketing and extension should be made, perhaps allowing methods from one to inspire the other - but commercial goals should not be disguised under extension.

Training of NTSP management staff should emphasise “new” approaches to extension.

Whenever courses in training of trainers are conducted, “new” approaches to extension should be taught.

Extension material produced by DFSC should reflect recent theoretical developments within extension.

Important issues to remember

Extension must cross cut the five focus areas of DFSC.

Extension should be gender and minority sensitive.

Promote lateral exchange of experience between rural people.

Important questions to address

How to ensure that extension is designed to become a two way process?

Shall DFSC become extensionists and trainers of extensionists or shall DFSC establish a network of extensionists/trainers?

How shall DFSC define its outreach / extension focus area in relation to other organisations with similar target groups (e.g. ICRAF)?

Are DFSC prepared to change (e.g. strategy, publications etc.) if our end-users recommend it?

How can DFSC outsource activities to partnership institutions in order to obtain higher impact?

How to prioritise between proposed activities?

Activities to be carried out by DFSC

DFSC must improve its capacity to support NTSPs and partner institutions in addressing extensionists and farmers more directly with extension activities based on the extension approaches mentioned above.

Make reviews about:

Pathways in dissemination of knowledge to different groups of seed users.

Extension methods to different groups of seed users.

Experiences from demonstration plots

Existing knowledge/extension material in general and on seed in particular—starting with ICRAF and FAO.

The need of projects for support in extension.

Existing knowledge concerning extension to rural people.

Rural peoples needs in relation to trees and the gaps in their knowledge about how to reproduce trees.

Development of information models, which should include needs assessment, curriculum design, training of trainers, examples of methods and material.

Conduct pilot studies where the models are used in practice.

Become active part of extension networks (i.e. IUFRO).

Establish contacts to persons who can be hired to implement extension courses

Collect extension material and literature from projects, organisations and research institutions for the DFSC library.

The extension material should include material with relation to trees, seed and farmers but could also contain other subjects as long as it can inspire and give examples of how extension material can look like.

The research material should include: a) agroforestry and forestry related extension; b) training and extension needs assessment; c) farmer-led extension etc.

Encourage co-operation between NTSPs and private seed dealers concerning marketing of tree seed in small quantities. The idea is that private seed dealers who already sell vegetable seed in small quantities can broaden their product range by including tree seed.

Encouragement of small private nurseries. Provide them with seed to establish seed sources of most wanted trees in the particular region.

Material published by DFSC

Literature

DFSC shall continue to produce technical notes, lecture notes, books etc. New subjects will be taken up especially if recommended by our users. We will make revisions of older technical notes in order to make them more understandable and up to date.

A new series of extension notes and other extension materials will be initiated. These can be own productions or be produced in collaboration with others. The material should be designed so it can be used directly by others or can be altered easily e.g. translation of text, adding or altering drawings/pictures etc. The material should be in the form of pamphlets and posters rich in illustrations and with simple and understandable text. The material could also include videos, instructions for role-plays and samples of small seed bags with simple information printed on the back.

Website

The DFSC website will in the future contain all new publications from DFSC including extension material and will be free to download. Some types of extension material, like videos, posters, etc., will not be possible to publish on the website (at present), but will be promoted.

Demonstration plots

Demonstration plots will be planned and implemented in collaboration with NTSPs and other partners (c.f. IFSP / DFSC 2000). Local villagers should be involved in all decisions concerning the demonstration plots. Mobile demonstration units with everything in extension material could be considered.

Training

DFSC and the organisations that DFSC collaborate with should get experience in training / extension needs assessment (no reason to teach people what they already know).

Evaluate existing training courses and include if relevant.

Ensure that elements of communication with farmers are integrated in training courses.

Increase awareness about farmers as ultimate beneficiaries.

Review the form of the training courses – not just "sit and listen" courses.

Be better at targeting the trainees with appropriate training material.

When training extensionist the trainees should be trained by using the same material as they will use with the farmers.

New training courses conducted by DFSC or consultants.

Training in assessment of farmers needs for knowledge

Training in how to produce extension material

Training in establishment of seed sources and demonstration plots

Training in training/extension

Training in training needs assessment

Training of DFSC staff

Upgrade the training and extension skills of DFSC staff by conducting courses at DFSC or participating in courses elsewhere

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TRIALS ON FARMS – AND PARTICULARLY “ADAPTATION TRIALS”

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Background: Farm trials in general

Agricultural research in lower-income countries has seen a marked move away from research stations towards trials on-farms – which has generally been justified on the basis that:

- much technology developed purely on research stations has never been adopted;

- conditions and practices on research stations seldom represent farm situations;

- farmers cannot assess applicability of technology on stations as well as on farms;

- working (even partly) on farms makes scientists more sensitive to farmers' needs; and

- co-researching with farmers can lead to higher rates of innovation than more traditional research approaches (e.g., Norman and Modiakgotla 1990).

Farm trials can never replace research station experiments for complex studies involving several treatments, where control of variables is essential. However, all the points listed above may apply in certain situations in Australia, and the last two points appear to be gaining particular importance - as reasons for initiating programs of on-farm trials in Australian R&D programs.

The commitment of farmers to a process involving design and conduct of trials on farms could be considered as the epitome of participatory RD&Extension, and offers great potential toward developing sustainable farming and agro-forestry systems. While most of the literature on on-farm trials is about crops and animal enterprises, the concepts involved are just as relevant to work with farmers on trees on farms.

Despite the growing acceptance of concepts of farmer participation in research, the topic of on-farm trials has received little attention in the Australian research literature - partly because it is seen as "unscientific" by agricultural and forestry journal editors. Clarifying the differences in aims between various types of trials and experiments may help to improve understanding and importance of the concepts of on-farm research.

On-farm trials in small-scale farming have been classified (Ashby, 1987; Okali et al 1994) in terms of the roles played by researchers and farmers in trial design

and implementation (see Box 1. Classes 1-3). The fourth class listed in Box 1 is a variant commonly used in Australia, particularly by large farmer groups such as Southern Farming Systems (1999) and Birchip Cropping Group - where the aims are often set by farmers but the trials run mainly by scientists in relatively controlled situations on farms or demonstration sites.

Box 1: A typology of "On-farm trials"

1. Researcher designed, researcher run
2. Researcher designed, farmer run
3. Farmer designed, farmer run
4. Farmer designed, researcher run
5. Co-design by farmers with researchers

The five categories in Box 1 involve different levels and types of participation by farmers in the design and conduct of farm trials. Higher levels of farmer involvement in trials has been correlated with higher "ownership" and also higher adoption of technologies of ideas tested (Ashby 1987). In Australia, farm trials have been classified mainly in terms of their level of statistical precision (Patabendige et al, 1999), as depicted in Figure 1.

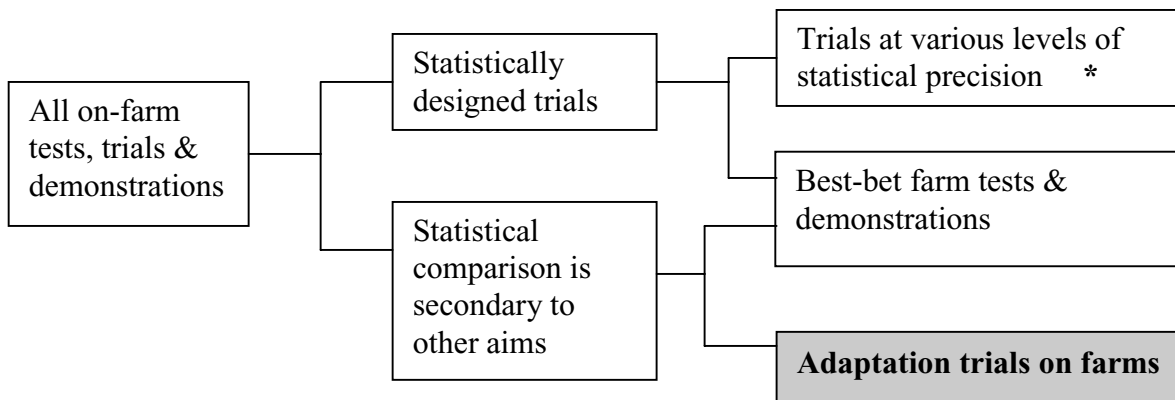


Figure 1: A broad classification of types of on-farm trials

* Farm trials designed at various levels of statistical sophistication are discussed by Patabendige et al (1999) in the "Test as You Grow" manual, and Hunter & Hayes (1996) for plant nurseries.

In Australia now, a number of standard designs (and even manuals) have been published for on-farm tests and more sophisticated trials on farms that are planned to maximise statistical validity. Some R&D programs offer advice on design of farm trials by fax (Blake et al 2000). These designs are allowing farmer groups to test their ideas in their own conditions, on farms or demonstration sites - usually run by technicians (e.g., Southern Farming Systems 2000). Some enterprises such as nurseries and other forms of horticulture, lend themselves to

running multiple treatments trials on farms - but most broadacre enterprises do not.

Adaptation trials on farms

In reality, there are many ideas that farmers have for testing that do not lend themselves to statistical design at all. Here the aims of trials are "adaptation" or initial testing, or broad initial comparison, that requires innovation and adaptation by the farmers during the testing period. The "data" from such trials are often on observations and/or opinions of farmers - based on their practical experience in assessing or handling the subject of the trial (e.g., implement, animal feed, chemical, crop, tree, spacing, planting method).

Adaptation trials on farms may fall into class 3 in Box 1 above, but where research/extension agents instigate the trial and recruit farmers, it may fall into class 2. Increasingly, farmer groups are designing trials collaboratively with researchers (class 5). From both the farmer's and the scientist's point of view the objectives of adaptation trials on farms may be to:

- test and adapt an idea to suit local soil, implements or other farm conditions
- evaluate practicality of ideas from research stations, on a small scale before wider use
- elicit (farmer) opinion on the viability and potential of new ideas for improvement
- gain participation and ownership of problems by a farmer or community group.

The idea being tested (e.g., a new implement) may allow a design with some replication across farms, but the statistical precision is usually very low. Where a number of farms are involved, the trial is laid out according to a fairly standard format on each farm. But farmers are encouraged to adapt the idea to "make it work" in their situation. Performance may be compared generally with standard practice. However, the main interest is in farmers' opinion of the potential of the idea, and in the adaptations made (to make the idea work), rather than in statistical differences.

The methods and materials used (e.g., implements, stocking rate) in adaptation trials are kept as close to the local convention as possible. Recording forms are prepared to document all information / measurement / opinions at agreed intervals. A camera can be a valuable means of recording events, practical problems and results, to share with the participating group.

The concept of "adaptation"

Adaptation trials on farms can be a powerful means for farmers to harness the ability within a participating group to adapt ideas or technology (new or from other areas) to suit their local farming conditions. This is closer to what farmers traditionally do on their farms than normal experimentation - but with more planning of the process, measurements, observations and reflection by outsiders, than usually happens on farms.

Because conditions on each farm will differ and farmers are encouraged to adapt the idea (e.g., a new implement, sowing method, silvicultural practice) to their particular needs, statistically valid comparison may not be feasible. However, the objectives of adaptation trials differ from those of other on-farm trials. While measurements of inputs and performance are often made, the main interest is in farmer opinion of the practicality of the ideas (and adaptations made by farmers), rather than on statistical differences between treatments.

There is considerable scope for farmer groups to undertake adaptation trials on their farms, using PIRD (producer initiated R&D) grants and other funding aimed at promoting farmer innovation. The most interesting results of such farm trials are often in terms of general progress of a group's learning about a topic, and can be quite unexpected - as illustrated in the example outlined below.

Difficulties in conduct of farm trials

While farm trials of all sorts have great potential for co-learning by scientists and farmers in many farming systems and areas, difficulties are often experienced in conducting on-farm trials initially in any one area or group. These most commonly arise from differing perceptions by those involved, of the purpose and nature of the activity. Scientists often wish to see farm trials conducted with great precision and control, as on research stations. Farmers are often used to seeing researchers making the decisions and also supervising all the work of (conventional) trials on farms - as in variety testing programs. The most essential need in any farm trial is for the aims, process and responsibilities to be clearly discussed and agreed before the trial starts, and reviewed regularly during the trial process.

Adaptation trial on tree establishment – an example

A group of Wimmera farmers obtained Landcare funding for a farm trial aimed at improving the success of their efforts to re-establish native Buloke trees on their properties. Three group members each volunteered to fence two sites on their farms - one under Buloke woodland and one on land that had been cropped for many years.

The aims were to compare the success of three methods of tree establishment - direct seeding, standard seedlings and "speedlings". In addition, each treatment was split into two sub treatments - watered and non-watered. A standard layout was used at each site (with three replicates) but soil conditions and weed intensity varied between sites, as did rainfall after planting. Numbers and height of surviving trees were recorded (and photos taken) at various dates, and group meetings were held to discuss these results.

In addition to natural variations between the sites, there was variation due to farmer adaptations. The three farmers were asked to use their own judgement as to when to weed and water the trees - according to local conditions and their past

experience. All these differences in treatment meant that no rigorous statistical comparison could be made. Yet, by closely observing the trial and the different responses on the three different farms, the group members were confident enough after one year to make some general conclusions - that helped in their own farm situations (Box 2).

**Box 2: Some preliminary results of a trial on farm tree establishment
- in a dry year**

standard seedlings survived and grew much better than trees planted by other methods
weed control was the most critical factor in survival of Buloke seedlings
the weed seed bank on cropped land was much greater than under Buloke woodland.
there was no inhibition or beneficial effect of planting under mature Buloke trees
extra watering in the dry season greatly improved tree survival direct seeding did not
work at all in a dry year

These five conclusions seem nothing new (and certainly lack statistical certainty), but farmers often place higher value on visual observations from their own (or a group's) trials than on information from other sources. Although there is danger that farmers will misinterpret the results of such an "uncontrolled" trial, farmers tend to base their conclusions less on the numerical data from the trial - but more on their observations of what transpired under the practical conditions faced on each farm, and on discussions with the farmers involved. One very important outcome of the trial was not planned at all (see Box 3).

Box 3: Unexpected outcomes of adaptation trial

A most important outcome arose when two farmers in the group were inspired - partly by the group trial activity - to run their own farm observations. They came up with a Buloke establishment method that surpassed all other methods in effectiveness – which is now being widely adopted by members of the farm tree group (meticulous weed control for two years near mature Buloke trees). Thus, the concept of adaptation can stimulate innovation within the participatory group.

Some lessons from past adaptation trials on farms

One problem with the above trial in the first year was that the farmer participants waited for "instructions" and help from a participating student to undertake weed control; they did not feel full ownership. Their respective roles had not been clarified well enough. Farmers did not see themselves as researchers and initially looked for others to "do" the research.

There can also be difficulty amongst scientists not wanting to hand-over the reins to farmers.

Many scientists have difficulty accepting the concept of non-statistically designed trials. It is vital to clarify the (non-statistical) aims of this particular types of trial with farmers and scientists involved (a) before the trial, and (b) in interpreting the results.

Farmers who have seen multi-location trials (e.g., of varieties) run by researchers on local farms (as has been traditional for many years) often expect researchers to supervise all the work of trials on farms. In adaptation trials, farmers' skills are needed to adapt the ideas to best suit their conditions. So with all farm trials, it is critical to clarify the expectations and responsibilities of each farmer and adviser (and/or students or volunteer workers) who may be involved in the trial, from the very start.

Farmers or groups must be well aware of the likely work loads involved in running farm trials from the start. Where there is concern about the work involved, they should be discouraged from taking part - without employing outside labour/help at the critical periods.

Measurements taken should be commensurate with the precision that is feasible - not excessively intensive or so meagre that information is wasted. In the case described above, the measurement of height were not adequate to assess growth rate, so farmers decided to count all branches on seedlings in the second year. It is important to stress that data on farmer opinion of the practicality of the idea being tested can be as valuable as any measurements made in the field. Such data are often collected by means of ranking or scales of approval or disapproval.

Observation and reflection - on all actions and opinions is essential

Regular observation and discussion is vital in the case of group farm trials - so that all members can have input into decisions about management, and hence gain and retain ownership of the trial and its results. Distribution and reflection on the results of trials at each stage is essential part of the co-learning process: What did different farmers think and learn? What did scientists think and learn? Why the differences? Documenting the mistakes made is vital if future years and trials are to run better. Mistakes often include failures in communication as well as technical errors, and these should all be documented and discussed.

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A DYNAMIC CONTEXT: FARM FORESTRY EXTENSION IN AUSTRALIA

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Abstract

Effective forestry extension implies a thorough understanding of the context of the many stakeholders involved in forestry and related disciplines. Since the early-1990s, forestry in Australia has undergone – and continues to undergo – considerable structural change. This includes change in the ownership, objectives, location, management, industries, and societal expectations of forestry. Small-scale integrated forestry, largely represented as farm forestry, is an expanding and important component of Australia's forest industries. Farm forestry appears to have considerable potential to provide socio-economic and environmental benefits to rural Australia. Yet the context for farm forestry continues to be dynamic, with there a need to increase our understanding of appropriate extension concepts and approaches if we are to contribute to meaningful co-learning processes. In this paper, the authors briefly explore some of the major changes that have recently occurred in Australian forestry, review the principal extension approaches, and draw on international experiences to suggest ways that extension may be improved to meet the diverse and changing of forestry.

Introduction

The forestry sector in Australia has undergone considerable change during the past two decades (Dargavel 1995; BRS 2001), with much of this change consistent with that occurring at an international level (FAO 1999). Of this change, some has had a profound affect on the role and way we practice extension. Of particular relevance is the emergence of 'pluralism' in forestry – with communities consisting of multiple stakeholders, holding multiple values, and seeking multiple outcomes from their forests. In many respects, today's inherent pluralism in forestry means that it has never been more critical that we refine the art and science of extension.

The essence of forestry extension is now characterised by the need to foster partnerships – partnerships between growers, processors, governments, private organizations, neighbouring rural landholders, and urban communities. Extension holds the key to these partnerships becoming the hub for shared understanding,

stimulating ideas and active learning as forestry continues to evolve. While some of these partnerships have existed for many decades, it is now important that they become meaningful partnerships of mutual benefit if forestry is to successfully meet the pluralist demands of the 21st century.

The changing context – local and global

Recent reviews of the changes in forestry, both within Australia (BRS 1998 & 2001; C'wealth 2001; Curtis & Race 1998) and globally (FAO 1999; Desmond & Race 2000), provide a valuable understanding of the context in which forestry extension operates. Some of the important changes include:

- Increasing attention to ensure forest management is balancing social, economic and environmental objectives. Various instruments are being developed (eg. product certification for markets, legally binding targets) at national and international levels. However, the effectiveness of such instruments to accurately reflect and support the pluralism in society is still to be determined;

- Australia's commercial plantation estate has been expanding at an average of 86,000 ha/year during 1995-2000 (total plantation area is approximately 1.5 million ha) – considerably higher than the historical average¹⁸. This trend contrasts with the international scene, with a decrease in the total area of the world's forests between 1990 and 1995 by about 1.6%, although there was an increase of 8.8 million ha in industrialised countries;

- Increasing privatisation of forests and forest services – including extension services, making the private sector increasingly dominant in forestry. Typically, the private sector is investing in fibre production from high-yielding forests in plantations in sub-tropical and temperate regions. As in Australia, farm forestry is expected to play an increasing role in supplying wood products at a global level. The biggest industrial investors in the new forests are large-scale corporations, which in turn are increasingly shaping the nature of forestry (eg. species, silviculture, information required) due to their vast trade in forest products;

- Increasing number of mechanisms for the devolution of forestry decision-making and management to local communities or user groups. In Australia, the Commonwealth government funded in the mid-1990s the establishment of 15 Regional Plantation Committees (RPCs) to facilitate private forestry development, although RPCs varied in their activities and capacity leverage continuing support;

Forestry belongs within a wider context of natural resource management and regional development and so, local communities demand a combination of

¹⁸ A recent ruling by the Australian Taxation Office that cast doubt over the legitimacy of tax deductibility for some forestry prospectus schemes appears to have reduced the enthusiasm for urban-based investors to invest in forestry, with a reduction in the national planting rate likely during 2001-02. In response, the Federal Minister for Forests clarified the government's desire to support tax deductibility for commercial forestry operations (Oct. 2001). However, it is uncertain at this stage whether this will restore the level of interest by urban-based investors in forestry.

timber and non-timber forest products and services (eg. water catchments, recreation, wildlife habitat). In parts of Australia, and throughout the world, there is a continuing tension between community (public) and private sector expectations over how forests should be managed. This tension adds to the pressure on local extension services to negotiate any emerging conflict and facilitate solutions; and

Increasing importance of farm forestry in the supply of raw material for industry and, as a consequence, the importance of farmers (and other landholders) as forest growers and their new ways of forging commercial partnerships¹⁹.

Pluralism in forestry

There is increasing recognition of the social dimension of forestry and the need to accommodate a wide range of socio-economic objectives sought by multiple stakeholders in the continuum of forest policy, planning, implementation, management, harvesting, marketing and utilisation (FAO 1997). Accepting and managing the pluralism of forestry is not an easy task, particularly when objectives and deeply held values of different stakeholders are seemingly incompatible – such as biodiversity conservation and resource production²⁰. In short, people view ‘successful’ forestry through different eyes and so assumptions about what others will embrace should be avoided (Race *et al.* 1998).

Forests are central to the livelihoods of individual families and whole communities, the economic prosperity of industries and authority of governments, and the health of local and global environments (C'wealth 2001). While many stakeholders have a similarly intense passion about their respective forest values, there can be a competitive motivation to influence forest policy and management. A major challenge for forestry extension in many parts of the world is to manage the tension between the polarised values people place upon, and seek from, forests. In this respect, forestry is consistent with other natural resource sectors. Put simply, the dominant tensions tend to be between:

- private and public interests;
- local and non-local interests; and
- conservation and production.

In more concrete terms, forestry remains contentious – and therefore contestable – because of the uncertainty with:

- who are legitimate stakeholders and their representatives;
- what are the important values of forestry and in what priority;
- what is a fair distribution of forest resources and subsequent benefits;

¹⁹ The recent report by BRS (2001) reveals that farm forestry may represent 5-20% of Australia's commercial forestry resource. There is some overlap in interpretation of what is ‘farm forestry’ and ‘industrial plantations’.

²⁰ Environment Australia has recently funded ANU Forestry and CSIRO to document the ideas, practices and lessons of Australian farmers who have been able to balance biodiversity conservation with productive farm forestry. Results from this project are expected by July 2002.

- what is a fair process for negotiation between stakeholders and, if required, who should play the role of independent arbiter (eg. judiciary, civil society); and
- what is the appropriate management to ensure sustainability of the agreed values.

The process for finding consensus or compromise is often complex and time consuming – suggesting extension approaches to be grounded in the trans-disciplinary nature of community development, incorporating elements of communication, facilitation, conflict resolution and building social capacity (Cernea 1991).

Forestry extension approaches in Australia

Extension defined

Before exploring the range of extension approaches used in Australian forestry, it is important to clarify what we mean when using the term 'extension'. Within the context of this conference, we have chosen to use van den Ban and Hawkins' (1996, p.9) definition that '... extension involves the conscious use of communication of information to help people form sound opinions and make good decisions.' The Australasia Pacific Extensions Network also explains that extension is the '... use of communication and adult education processes to help people and communities identify potential improvements to their practices, and then provides them with the skills and resources to effect these improvements' (APEN 1999, in Black 2000, p.493). Extension is more than simply providing information or slick advertising, it implies a genuine commitment to human resource development (Scoones & Thompson 1994).

Contemporary models of extension

In the quest for succinct debate, there are four broad strategies or models for forestry extension:

- linear 'top-down' transfer of technology;
- participatory 'bottom-up' discussion groups;
- one-to-one advisory service; and
- structured education and training.

Rather than accepting any single strategy, we argue that there is a role – indeed, a necessity – for a complementary suite of all of the above extension strategies if forestry is to meet the complexities of forestry today. While participatory 'farmer-first' extension strategies have grown markedly in popularity around the world (eg. Chambers 1997), these should not necessarily be adopted to the exclusion of other approaches.

Technology transfer

When reflecting on agricultural extension, Black (2000, p.493) explained that the linear ‘top-down’ approach to:

“... extension was based on the assumption that new agricultural technologies and knowledge are typically developed and validated by research scientists, and that the task of extension agencies is to promote the adoption of these technologies by farmers, thereby increasing agricultural productivity.”

The notion that farmers were thirsty recipients of any scientific information and who operated in an intellectual vacuum had some currency even up until the 1980s. Furthermore, there was a common perception that farmers outside the group of ‘early adopters’ or ‘progressive farmers’ were to wait their turn as technological innovations diffuse down to the majority of producers (Rogers 1983).

There was also a time where the farmers who were slow to adopt new practices – the ‘laggards’ – were disparagingly believed to be personally inadequate, almost undeserving of the benefits of new technology, even though such practices may still be unproven, expensive, risky, difficult to integrate with existing enterprises or contrary to the values of farmers. Röling (1988) argued that the application of top-down diffusion theory has tended to reinforce existing social inequalities within farming communities, as those who benefit most tend to have greater financial and capital resources, and intellectual and social strength.

Farmers and other small-scale private landholders were not directly involved in forestry to any significant degree until the early-1990s. Until this time, Australian forestry was centred on straightforward contractual arrangements between State governments and industrial processors (Dargavel 1995). It was during the early-1990s when some of the more substantive changes in forestry began to take effect, such as those discussed above under ‘changing context’, that critical thinking about forestry extension emerged²¹ (Reid 1996; Race & Fulton 1999; Reid & Stephen 1999; Black *et al.* 2000).

Participatory ‘bottom-up’ discussion groups

During the 1980s, agricultural extension in Australia, as elsewhere around the world, underwent a profound shift towards participatory ‘bottom-up’ extension. Drawing on extensive experience in international rural development, Chambers *et al.* (1989), Pretty (1995) and others heralded a new era of ‘farmer-first’ extension. In the Australian context, this found expression most visibly in the Victorian, and subsequently National, Landcare Program²² – a movement based

²¹ During the early-1990s in Victoria, the Department of Conservation and Natural Resources chaired quarterly meetings of the 10-12 people practicing agroforestry extension under the auspices of the Agroforestry Extension Sub-committee (AES). The AES assisted to establish several Regional Agroforestry Networks and the supporting newsletter ‘*Agroforestry News*’ – now a national publication.

²² For further information on the National Landcare Program visit <http://www.landcare.gov.au>.

on strengthening community-government partnerships to address environmental degradation on private farmland at a local catchment (watershed) scale. Today, the Landcare network with its 4,500 groups and nearly 40,000 farmers is one of Australia's most powerful vehicles for extension within rural communities. Agroforestry and farm forestry projects emerged around Australia under the wings of Landcare with the shared desire to increase the integration of trees with farming, and so adopted a similar approach. Again, firstly in Victoria in the early-1990s then later nationally, Regional Agroforestry Networks provided a social structure for group-oriented extension – whereby local groups of landholders could receive government support (eg. administrative assistance, newsletters, field days) to explore local opportunities for farm forestry from their perspective.

Participatory discussion groups tend to recognise that farming communities are inherently rich in knowledge and practical skills – of great value even with more complex and untested enterprises, such as farm forestry. Such groups implicitly acknowledge the value of farmers sharing ideas and information amongst themselves, rather than always relying on the information or advice from government agencies or other professionals (Carr 1997; Cary & Webb 2000). In particular, participatory discussion groups aim for members to take 'ownership' of both problems and solutions – ideally, creating viable farming systems that are adapted to the local context, rather than implementing practices that are generic across Australia.

With the increasing importance of small-scale growers in Australia's forestry sector, our approaches to extension need to add value to, rather than replace, the considerable local or indigenous knowledge that farming communities possess. Furthermore, farming communities can have quite different, yet equally legitimate, perspectives to those within the formal scientific community towards situation analysis, monitoring progress and change, conducting and applying research (Millar 1997).

Nevertheless, Vanclay and Lawrence (1995, pp.125-6) caution that participatory group extension also has its limitations, with the:

“... reliance on farmers' local knowledge to solve problems that are new to their experience, such as environmental problems, is unlikely to be successful ... new problems, particularly environmental problems, may be best dealt with through a combination of new and traditional extension.”

Also, local community groups largely rely on consensus, and so can underestimate or ignore the diversity – and sometimes the considerable differences – within local communities. That is, farmers vary considerably in the extent to which participatory group-based learning suits their style of learning and local situation.

One-to-one advisory service

During recent decades the one-to-one advisory service has generally declined, with the perception that group-based extension is more efficient. Or at least, farmers should pay directly for one-to-one extension that is exclusively focused

on private enterprise. However, where the technical advice relates to off-farm impacts, such as where farm forestry acts to control catchment-wide salinity or enhance biodiversity conservation, many argue that governments still have a responsibility to contribute to one-to-one extension. In recognition of the public benefits inherent in many aspects of farm forestry, the Commonwealth and State governments now support a range of farm forestry research and development initiatives, with several being in operation since the early-1990s (Race & Robins 1998). While one-to-one extension does occur through these initiatives, the most common extension approach is through localised participatory discussion groups, such as Landcare groups, Regional Agroforestry Networks or local chapters of the Australian Forest Growers.

In parallel with the various government forestry initiatives, there has been the rapid expansion of plantations financed by private prospectus and investment companies – most notably with blue gum (*Eucalyptus globulus*) for pulpwood in Western Australia, Victoria, South Australia and Tasmania. In most cases, companies simply lease the land from farmers, and in turn employ their own forest managers. It is rare for farmers to be the principal silviculturist when in partnership with forestry investment companies, with the expectation that their responsibilities extending little beyond maintaining firebreaks and controlling pest plants and animals (Curtis & Race 1998).

Structured education and training

While most farmers are reluctant to undertake formal, long-term educational courses such as those offered by universities (Black 2000), the opposite applies for agricultural and forestry professionals. A noticeable exception to this assessment is the Master Tree Grower²³ program coordinated by Melbourne University, which facilitates participatory group-based learning for farmers with a committed interest in farm forestry.

Structured accredited courses that improve the knowledge base and enhance career prospects of extension officers prove popular. Courses meeting the needs of extension staff are those that analyse contemporary issues, focus on workplace problems and solutions, offer flexible delivery (ie. time & location), and encourage participation – with ANU's new National Graduate Program in Farm Forestry meeting these requirements²⁴.

Extension agents and approaches

The Commonwealth government has funded numerous extension projects via the Farm Forestry Program²⁵ and research projects via the Joint Venture

²³ For further information on Melbourne University's Master Treegrower Program visit <http://www.mtg.unimelb.edu.au>.

²⁴ For further information on ANU's National Graduate Program in Farm Forestry visit <http://www.anu.edu.au/SRES/forestry>.

²⁵ For further information on Australia's Farm Forestry Program visit <http://www.affa.gov.au>.

Agroforestry Program²⁶ since the early-1990s. In addition, all State governments and some non-government organisations, such as Greening Australia²⁷ and Australia Forest Growers²⁸, have current farm forestry extension services (Race & Robins 1998).

State government natural resource agencies (eg. Department of Natural Resources & Environment in Victoria; Conservation & Land Management in Western Australia; Private Forestry Tasmania), Regional Plantation Committees and a few non-government organisations (eg. Greening Australia; Australian Forest Growers) provide the vast majority of farm forestry extension in Australia. Their general approach to extension largely relies on strengthening local partnerships between growers and industry, one-to-one support for farmers establishing demonstration sites, organising field days and seminars, generating articles for newsletters and media outlets, and occasionally producing CD-ROMs (eg. Private Forestry Tasmania's *Farm Forestry Toolbox*; Agriculture Western Australia's *Agroforestry calculator*). Using the latest communication technology, such as the internet, is likely to remain limited in its value for farmers for some time, as only 20% of Australian farmers have reliable access to the internet (Black 2000). More recently, farmers with farm forestry expertise are providing extension services – either to groups or one-to-one (eg. Jenkins Agroforestry Developments) together with a small but growing number of consultants.

Contrary to calls by some that farm forestry development needs a single extension 'voice', we believe that maintaining the mix of organisations and employing the wide range of approaches to extension is not only realistic, but is indeed preferable if forestry is to gain from its pluralism. In reality, rural landholders are far from being a homogenous social group – indeed, they are becoming increasingly heterogeneous – with clear indications that they pursue farm forestry for diverse objectives. In this pursuit, landholders seek information from those organisations and people whom they perceive to be credible, reliable and relevant to their context. In essence, farmers will prefer to liaise directly with either industrial processors, State agencies, non-government organisations, research organisations²⁹ or simply their neighbours – or a combination of these. Even when seeking information and advice from 'outsiders', they invariably verify such information through in-depth discussions with local farmers – making informal or formal local networks an important stage when developing farm forestry that is tailored to the local context.

While supporting the mix of organisations involved in forestry extension, we also advocate that regional, State and national coordination of forestry research, development and extension is vital. The coordination by Regional Plantation

²⁶ For further information on the Joint Venture Agroforestry Program visit <http://www.rirdc.gov.au/>.

²⁷ For further information on Greening Australia visit <http://www.greeningaustralia.org.au>.

²⁸ For further information on Australian Forest Growers visit <http://www.afg.asn.au>.

²⁹ For information on leading national research organizations such as CSIRO visit <http://www.ffp.csiro.au> and the CRC for Sustainable Production Forestry visit <http://www.forestry.crc.gov.au>.

Committees, State forums (eg. Private Forestry Council in Victoria; Farm Forestry Advisory Committee in Western Australia) and nationally (eg. the former National Farm Forestry Roundtable) appears to have been valuable in building cooperation and exploiting synergies between organisations that would otherwise have caused Australia's collective investment in farm forestry, including extension, to be fractured and less effective. However, the process of coordination should not be used as a strategy to narrow forestry's horizon or marginalise the extension effort of one organisation over another's.

International experiences and lessons

At an international level, there is a wealth of extension experience in forestry and related disciplines that Australian forestry would do well to be increasingly connected to. While it is impossible to summarise the breadth of this experience in this paper, some of the more valuable ideas that have emerged are abbreviated below (Chambers *et al.* 1989; Anderson & Farrington 1998; McKinley *et al.* 1998). Forestry extension tends to be most effective when it:

- acknowledges that forestry – and its stakeholders – exist with a wider context of social, economic and environmental imperatives;
- links information from a range of organisations that is credible, reliable and locally relevant;
- follows an analysis of the target audience's context and information needs;
- applies a mix of, and emphasis on, approaches most appropriate to the target audience's learning style;
- builds on local expertise and institutions, rather than displacement;
- accepts that it is as much about listening – to individuals as well as communities – as it is about providing information;
- increases the accessibility for the target audience to information that can be easily understood; and
- is reflective and adaptive – based on skilled monitoring and evaluation.

Conclusion: A future for forestry extension

The inherent pluralism of forestry means our extension efforts need to recognise and reflect the range of values held by diverse stakeholders. At times, this will require us to leave the cloak of positivism behind, where answers or solutions are absolute – and be prepared to accept the uncertainty of naturalism, where solutions tend to be emergent and context-specific. Overall, we need to develop a rich mosaic of extension approaches to match the continuum of forestry – approaches that are contingent upon supporting people to make informed decisions, rather than simply adopt recommended practices.

Coordination of our collective investment in extension should be viewed as process for building partnerships and seeing forestry's pluralism as an

opportunity to engage more widely amongst communities about forestry's contribution to the social, economic and environmental fabric of society. What will be of most value is extension that accepts forestry's inherent pluralism, builds active partnerships and values an iterative co-learning process.

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THE ROLE OF COMMUNITY PARTICIPATION IN FIRE SAFE DECISION-MAKING

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Introduction

Approaches to forest health and wildfire safety issues have historically been addressed through a variety of mechanisms. More common approaches have included administrative regulations, economic incentives through grants or on-the ground money for prescriptions, educational campaigns such as the popular U.S. Forest Service Smokey the Bear campaigns, and planning and management by forest service agencies and private consultants. Many of these traditional approaches to forest health and wildfire safety have been unilateral, with forest, fire service agencies, or resource experts targeting information to the citizen or homeowner regarding appropriate management actions or fire prevention strategies. While these techniques are an appropriate transfer of knowledge, it often is not the most effective way for motivating homeowner or community action. Today I would like to talk about a community development approach I've been using to address the issue of wildfire safety that concentrates on the role of community participation in fire safe decision-making.

For the next few minutes, I would like to take you down a path that weaves theory with practical application, through a program that I initiated and fostered called *Fire Safe Highlands*. This Extension program serves as a model for community participation in fire safe decision-making by merging fuels management with community development practices. The program goal is to motivate residents to take actions that safeguard their homes and their community against the threat of wildfire. *Fire Safe Highlands* is a pilot program targeted in Virginia City Highlands, Nevada, USA.

To first understand how the program operates, we need to understand the foundational roots of community development. Popular synonyms have described community developed as community building, capacity building, social capital etc. Jerry Wade and Don Littrell (1997) have simply defined community development as; *"the purposeful effort by community people to learn and work together to guide the future development of their communities making full use of their own resources as well as external resources"*. Some of the key values and guiding principles to community development include the concept of developing capacity, maximizing citizen interaction, providing accurate information, and active and full participation of the community in decision-making. The question of community participation is a common thread in most extension programs, especially those programs that focus on process as well as content issues. I think at times that many of us have a little trepidation prior to engaging into a

community participation effort. The larger question for Extension professionals is what are we really getting into with community participation? What do we mean by community participation?

Long et al. (1973) have defined community participation as “to share in common with others the decisions and goals about what should be done”(p. 11). If community participation is to be successful it needs to remain as transparent as possible, it should involve a wide range of community opinions, and as Extension professionals, we need to re-interpret how we define “participation”. Community participation is more broadly defined than simply attending community meetings. In 1969, Sherry Arnstein described a participation framework of citizen involvement in the U.S. and labeled this framework a “ladder of participation”. According to Arnstein (1969), there are various degrees of participation depending upon the intent and value of participation efforts. In Arnstein’s typology, the lower rungs of the ladders are considered non-participatory because they simply work to manipulate public support through public relations. Rung three and four of the ladder are mere acts of token participation with information flowing from the decision makers to the public or placating citizens by asking for their concerns but offering no direct form of decision-making. Rungs six through eight offer some degree of citizen power through shared decision-making in partnerships or in delegated decision-making authority through committees. The top most rung of the participation ladder allows citizens the entire task of planning, policy making, and decision-making.

CDR Associates in Boulder Colorado, USA have developed a conceptual framework regarding participation and decision-making (1999). According to this spectrum, the further right on the spectrum the greater level of full public participation. While each degree of participation and decision-making is coordinated with the objective for participation and planning, the important aspect is to match the appropriate participation method with the situation.

Common problems that are encountered in community participation include: 1) citizens have difficulty identifying with a community; 2) a limited amount of the public actually participates; and 3) designing an effective process (Long et al. 1973). I would like to go into each problem and discuss how I addressed these through the *Fire Safe Highlands* program in our community participation efforts for fire safe decision-making. The Highlands is a well-delineated community located within the Virginia Mountain Range. There are two, property owner associations situated within two concentric circles of each other. The Highlands Community itself was very easy to delineate and residents readily identified with the Highlands Community. Therefore, this was not a problem for our programming efforts and one of the reasons the community was chosen as a pilot program.

Limited participation by the target community is a constant obstacle we face in almost any Extension Program. One of the first items the *Fire Safe Highlands* program expressed to residents, via the monthly newsletter, was the fact that you do not have to attend meetings to participate. We have consciously broadened our definition of what participation means. Participation can simply mean reading the

monthly newsletters and taking individual action to reduce the threat of your home to a wildfire, it may mean helping out on a work project or just calling your neighbors through a telephone committee. As long as community members are maintaining their focus on the shared problem and working to address the problem through constructive means, then they are participating in the program.

Another common obstacle to community participation is how do you design an effective process that allows for true community-wide participation in fire safe decision-making? This problem can be the biggest obstacle between an effective or an ineffective program. In the *Fire Safe Highlands* program, there are monthly meetings where members who are interested can attend and discuss how to help make the community more fire safe. The monthly meetings are concentrated on a community wide perspective rather than individual homeowner actions. In order to engage community members at this level of participation, a decision-making process needed to be designed to make the process orderly, but not too much to prevent the process from being dynamic and flexible. The process needs to fit the overall intent of the program—motivating community action. *Fire Safe Highlands* incorporated four elements into our decision-making process that included: 1) group expectations (Figure 1); 2) organizational structure; 3) decision-making structure; and 4) meeting facilitation/management.

Group expectations are also what we refer to as our discussion procedures (Figure 3). Residents collectively developed these expectations and agreed to follow them. Expectations are reviewed prior to any decisions made and are kept posted at every meeting.

While I intentionally wanted to keep our organizational structure loose, I felt the need to provide some framework for the program. Although the program is an educational program sponsored by Extension, it also is a venue for coordinating community action to increase wildfire safety. Through the establishment of a Guiding Group, we have been able to formalize our project tasks and to put in place a “community task group”. Some members of the Guiding Group were selectively chosen to assure representation of all associations within the community, for example the property owners associations, the Volunteer Fire Department, local county representation, and the Virginia Range Wildlife Protection Agency (a wild horse advocacy group within the community). Other members simply wanted to volunteer their time because they feel the wildfire issue is of utmost concern. I used the term Guiding Group because I wanted to remove any perception of “bureaucracy”—all too often we lose our creativity and simply call these committees task forces and etc. Instead, I felt the name gave a sense of purpose to the residents. The role of the Guiding Group is to help guide our community in our

Group Expectations

Treat each other with respect
Engage in dialogue, not debate
Use active listening to seek understanding
Be sensitive and respectful to concerns
Use a consensus based process for decisions
Keep communication open with all groups in the Highlands
Stay on track with discussion items and agenda topics

efforts for fire safety.

The decision-making structure is a common application of a consensus-based process that I feel is used often and the only consensus framework I use when working with community groups (Rebori 2000). Consensus is defined as a decision that all members can support. Five levels of support are outlined (Figure 2). Each level of support has a varying degree. When the Guiding Group makes a decision, we take a call for consensus. The facilitator states the proposal and then members show their level of support. A vote of support is taken and visually expressed by each member, usually this means on a level of one through five, each member holds up the amount of fingers to reflect their level of consensus. For example, 2 fingers indicate a level 2 consensus, which means I support the decision but it may not be my preference, a level of 4 support is indicated by showing four fingers, which means I support the group, but not necessarily the action or decision. Any vote that is a 4 or higher is consensus; however, if a member has a 3 or a 4, they are required to provide reasons for either changes or to express their concerns.

Consensus Levels

- I can easily support the decision.
- I can support the decision but it may not be my preference.
- I can support the decision with minor changes...
- I support the group but not necessarily the decision...
- I cannot support the decision unless major changes are made...

Based on my experience with the *Fire Safe Highlands* program, the role of community participation in fire safe decision-making has filled many needs. Most importantly it has allowed and created community ownership over its own safety. It has also, quite noticeably, empowered citizens to take actions not just individually but as a community. It is social science in action—we can discuss the theory of community development and how to engage citizens, but until we apply these approaches in the laboratory (i.e., the community) then can we actually get our practical research results. And finally, in my opinion, community participation is a mission of Extension. Extension, at least in the U.S., concerns itself with providing research-based education for citizens to make well-informed decisions. I feel often we leave the more difficult task of making changes up to the participant. Sometimes a support network or a mechanism is required to help carry out their changes and actions. This has certainly been the case for taking community action in wildfire safety.

While community participation is an important component of fire safe decision-making and applying a community development approach has been an effective vehicle for action, it is but one piece in the overall puzzle of wildfire safety. Community participation has allowed the residents to reflect on and actually incorporate their community values into fire safe decision-making. This reflection has led to more effective implementation, and community supported decisions. The role of Extension in this effort has been critical. The hats I have worn in this program have included facilitator, educator, collaborator and partner. As a facilitator, I set the agenda's based on previous meeting discussions with the group and I help steer the group when we seem to get off track of our discussion.

As educator, I obviously apply the concepts and value of community development, but I also provide wildfire information through my colleagues in Extension with workshops and educational information in the monthly newsletter. I consider myself in Extension as a collaborator because in my mind, collaboration is about building relationships. Extension has been building a relationship with community members, the county employees, the local fire department etc. And finally the role of partner is because we in Extension have resources to bring to the issue of wildfire and community safety. We are but one partner among many.

You may be asking, *“well after one year, is the program effective?”* Rather than biasing your opinion, let me add some information regarding the program outcomes and impacts. Over 60 individual homes have cleared brush or implemented defensible space practices as a result of either the newsletter, workshops or meetings they have attended over the last year. Attendance at our monthly community meetings began with 5 people and now averages between 15 and 20. *Fire Safe Highlands* is asked by both property owners associations to speak at their yearly board meetings to provide updates on community projects and activities. A demonstration fuel reduction project is planned for November 17, 2001 to showcase how simply it is for residents to reduce their threat to fire. We have a volunteer base of over 50 residents willing and interested to volunteer their time and resources for fire safety. Residents have pressured the local fire department to put signs along the highway that abut the community, to educate tourists about the fire threat. Residents have initiated action with the Department of Transportation to remove dead trees along the highway because they pose a fire threat to the community. All of these activities have been selected and worked on by community members. While I could continue with numerous examples, I feel as though actions do speak louder than words.

In summary, I would like to leave you with my own personal guidelines for merging community participation with fire safe decision making (Figure 3). While these guidelines are not very academic, they are sound practical advice for engaging in community development and participation efforts.

Guidelines

Begin where the people are, not
where you are.
Expand your idea of “participation”.
Nurture the community.
As a resource, be on tap, not on top.
Effectiveness results when we build
quality relationships.
Building “community” is the end
product.

Figure 3

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EXTENSION FOR COMMUNITY FORESTRY DEVELOPMENT IN THE MIDHILL ZONE OF NEPAL

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Abstract

The move to community forestry in Nepal was an important policy shift in the 1980s - from state control of forests to management by 'Forest User Groups' (FUGs) comprised of local residents. This new policy has markedly changed the role of the government forestry official - from a police person to a community extension agent. Significant outcomes have been achieved through these changes in policy and roles, and the hand-over of about 700 000 hectares of forest to more than 9000 FUGs. However, achieving more equitable utilisation of community forests presents a huge challenge for extension in the future. This paper, based on recent research in the Midhills of eastern Nepal, argues that community forestry has had spectacular success in terms of protection of forest. However, the intended livelihood benefits from community forests to disadvantaged groups, such as women and the poor, have yet to be achieved.

The study showed that different groups within communities differ in their access to forest, and in their priority for use of different forest products. Because the FUG decisions are highly influenced by FUG leaders who are mostly male and rich, the needs of disadvantaged people are often neglected. Most FUGs still practise conservative closure regimes to regenerate forest and to produce commercial timber that will benefit richer members - rather than products that are most important for daily use by the majority.

The role of forestry officials as extension agents becomes crucial in promoting changes that will empower the disadvantaged groups in forest management and utilisation. It is proposed that this aim may be best achieved mainly through the facilitation by forest department staff of the development by FUGs of more fully participatory forest operational plans.

Introduction

In recent years there has been a significant paradigm shift in approaches to rural development and natural resource management, following the failure of the prevailing top-down approaches to resource management, particularly in the developing world (Arnold, 1992). This paradigm shift represents a move from resource control by the government to resource management by local communities. In the 1980s, the Nepal Government initiated community forestry (CF) program, based on the idea that citizen involvement in management is essential for forest protection and environmental conservation. The emergence of

community forestry in Nepal has largely changed the role of forestry officials from 'police-person' to that of community 'extension agent'.

Community forestry in Nepal involves formation of Forest User Groups (FUG) from local communities, following a participatory process and hand-over of government-owned forests to the FUGs for management and utilization. The Forest Act of 1993 legitimised the FUG as an autonomous institution of the local community, set up to control and manage local forest, including harvesting and pricing all forest products independently. Forest Department staff remain as facilitators to help organize FUGs and to support the FUGs in preparing and implementing forest operational plans (FOPs). Presently (June, 2000) about 663000 hectares of forest has been handed over to about 9000 FUGs and about one million beneficiary families are involved in community forestry in Nepal (HMG, 2000).

The community forestry program of Nepal focuses primarily on the Midhills physiographic zone. The Midhills lie in the central band of the country, bounded by the high mountain range to the north and the *Terai* (Gangatic plain) to the south. They range in altitude from 1000m to 3000m, cover about 30 percent of the country and support about 45 percent of the total population. The lives of people in the hills are hard because of difficult physiography and limited access to services such as transport, education, health and safe drinking water. In addition, natural hazards such as landslides and floods can impede normal activities at certain times and add to environmental dangers and problems. (HMG/ADB/FINIDA, 1988).

This paper, based on recent research in Dhankuta District of eastern region of Nepal, argues that community forestry has had spectacular success in terms of protection of forest, but that the intended livelihood benefits to disadvantaged groups have not yet achieved. Some factors affecting management of community forest and the need for more effective extension through sound participatory planning are discussed.

The forest resources, deforestation and livelihood nexus in Nepal

Because of its very diverse topographical conditions, Nepal has unique ecological diversity and contains a range of vegetation, from tropical to alpine, with about 5160 species of flowering plants, 380 ferns, 465 lichens, 181 mammals and 844 bird species. A large number of flora and fauna species are on the verge of extinction because of rapid deforestation and poor management of natural resources (HMG/GON, 1995).

Deforestation and land degradation is widely acknowledged as a serious crisis in Himalayan region. The rate of deforestation has increased in Nepal because of the high demographic pressure and expansion of agriculture. Sussan et al (1995 p 5) states "*...the conversion of forests to farmland in Nepal is, as is true worldwide, a long-standing historical process, and is one in which the state played an active part*". It dates back to the 18th century when crops like maize and

potatoes were introduced and was further accelerated by the military activities in the period of unification of Nepal following King Prithivi Narayan Shah, the founder of greater Nepal (1743 – 75 AD). Deforestation in the *Terai* is a relatively recent phenomenon, gained momentum during the first half of the 20th century following the eradication of malaria in many areas (Mahat et al, 1991; Sussan et al, 1995). Estimated forest cover in Nepal in 1964 was 6.5 million hectares (45 % of land). By 1978 forest had been reduced to 37.4% and by 1999 to 29 % of total land area. The area covered by shrub land increased from 5% in 1978 to 10 % in 1999 (Sussan et al 1995; HMG, 1999).

The livelihood of people in the hills of Nepal is strongly linked with the health of forest resources. More than 90 percent of the population rely on forests as a major source of fuel-wood, animal fodder, construction materials, as well as some food and cash income. Forests are an integral component of subsistence agriculture in the hills and meet about 42 percent of the fodder requirement for cattle, and are important sources of compost materials. Highly technical and commercial management of forests in the hills has limited scope because of the highly fragmented distribution of forests and difficult physiographic condition (New ERA, 1992, Malla 1997).

The significant inter-relationship between forest resources, livestock and crop production in traditional subsistence agriculture in the hills is emphasised by Ives and Messerli (1989 p 67), who state, " *One or more hectares of forest are required to 'support' one hectare of arable land*". They also claim that if deforestation is not checked, the existing farming system in the hills would completely collapse. The inter-relationship of forests, farm and human life sustenance in the Midhills of Nepal is illustrated in Figure 2.2.

Women are the main fuel-wood and fodder gatherers. The declining local availability of fuel-wood and fodder places additional burdens on the already heavy daily workload for women, who usually work three to four hours more than the men. Environmental hazards such as soil erosion, landslides, and water wastage are also important consequences of loss of forests, that can markedly affect the livelihood of people (Sussan et al, 1995 and UNDP, 1998).

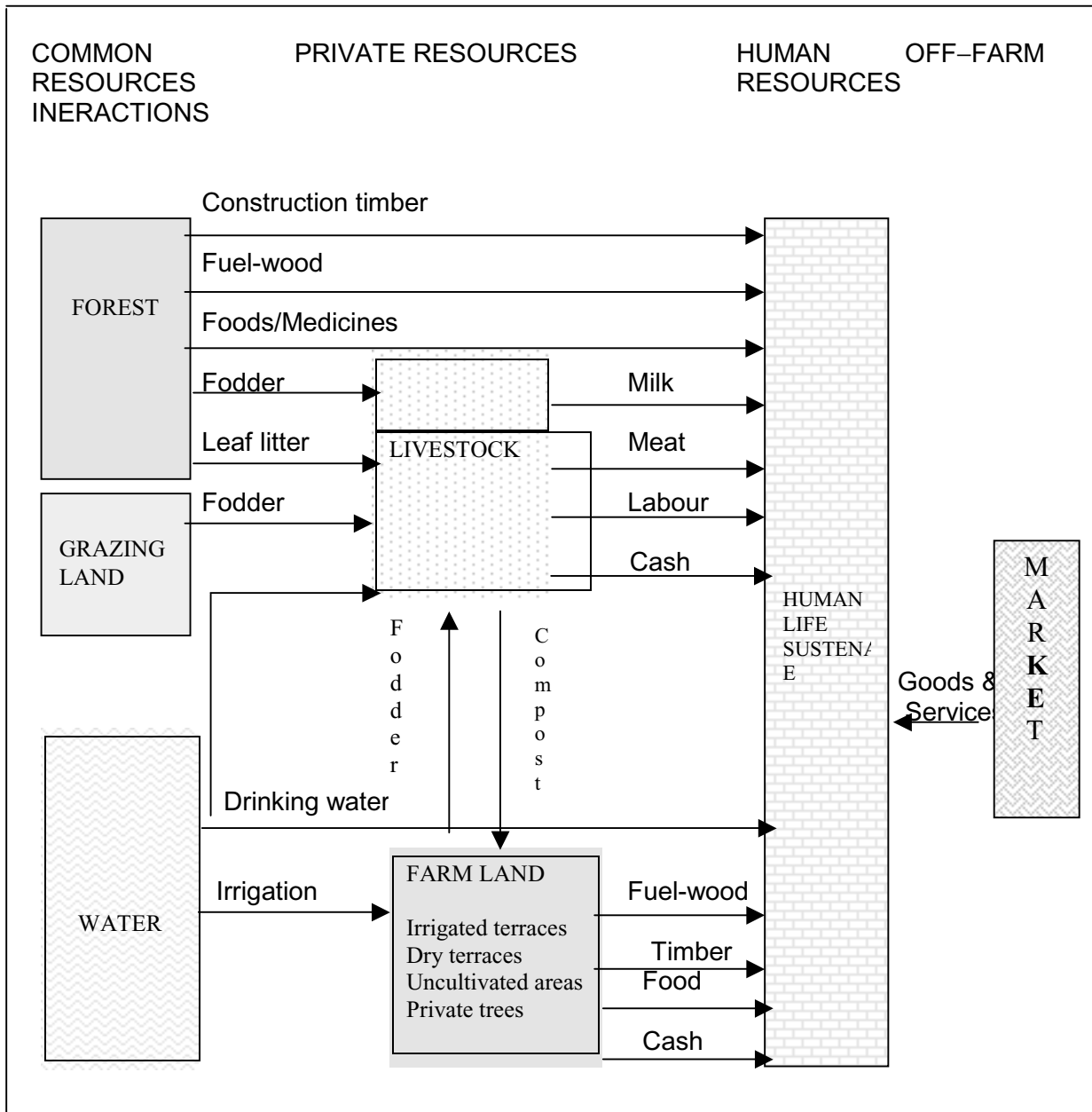


Figure 2.2: Inter-relationship of forest, farmland and people in the Hills of Nepal
[Modified from Gilmour and Fisher, 1991]

A study of management and utilization of community forests by FUGs

Research for this paper in three FUGs in Dhankuta District of Eastern Nepal found that forest condition had markedly improved in all the study sites after hand-over to FUGs in 1993. The improvement in forest condition was a result of effective protection measures taken by the FUG committees (FUGC), who play the critical role of monitoring and implementing FUG rules and regulations. Local

people believe that the Forest Department has transferred its power to the FUGC, which can therefore impose legal restrictions and take action against offenders. The high penalty rates that are imposed by FUGCs are an important means to prevent users from illegally over-exploiting forests.

The study revealed, however, that the management of forest in terms of product utilization and distribution of forest products among the users was highly inequitable. Forests have become dense through growth of trees and regeneration of saplings. But thinning and utilization of forest products was highly inadequate, despite the high demands for fuel-wood by the majority of people. The maintenance operations by FUGs were confined to limited areas, with the aim of cleaning weeds, but no view to extraction of sufficient fuel-wood. The poor effectiveness in utilization of community forests appears to be linked with a number of socio-economic factors that have affected decision-making in the FUGs.

In the all three FUGs, the FUGC was unwilling to utilise forest products to the full potential. The FUG leaders felt more comfortable in closing access to the forests, than in attempting to manage for product utilisation for all members. This attitude is partly attributable to different preferences of different groups of people for different forest products, and partly to management complexities such as conflicts in product distribution, risks of over-exploitation, and lack of technical know-how.

The rich and male members strongly dominated in all three FUGCs. The FUGs' decision-making on forest management is therefore heavily biased towards interests of the rich and male members in the community. Differences between males and females in their priority for different forest products are largely ignored. Males prefer timber while females prefer non-timber products. In addition, the rich can often fulfil their fuel-wood and fodder needs through private sources, whereas poor households have to rely entirely on community forest as a daily source of fuel and other products. The CFs studied were managed mainly for protecting the forest - for high yields of timber in the long term. Such management has created much hardship for families who had been collecting forest products freely before the FUGs were formed around 1993. Although timber may have value as a commercial product in future, it does not necessarily meet the majority of users' main or immediate needs.

Forest management by FUGs was also found to be influenced by the location of different groups of people in the community. The users living nearest to the forest have highest opportunity to use many products intensively, while the distant residents use the forest for more limited products. In particular, the distant users collect less non-timber products because of high requirement for time and labour. Hence, the distant users were keen for their FUG to restrict access to the forest and to promote timber products, as a strategy to obtain more equal benefits from the forest. Different groups therefore exerted different pressure on the FUG, depending on their location in relation to the CF.

Distribution of work and benefits among different group in communities

The distribution of benefits from CF to different sectors in the community is critical for the sustainability of community forest management. Management of a community forest involves considerable labour, time and resources of the users. FUG members contribute in planting, cleaning, forest watching, meetings and assemblies, and pay a regular royalty and taxes to the FUG. Even where the contributions by members may be more or less equal in quantitative terms, the value of the contribution to the poor is much higher than that of the rich, particularly when poor people have to forego days of labour and wages to the FUG duties. One group of poor people in one FUG had given up their membership because of 'burdensome' duties, though they were highly dependent on the community forest. The rich families are often further privileged in product distribution, as the poor cannot use timber because of high harvesting and processing cost. In addition, the rich often gain benefits of improved social status and political power through being committee members of the FUG.

Inequitable benefit sharing among different groups in the community can lead to a breakdown of group cohesion and a decline in peoples' interest on community forestry, as well as greater conflict and inefficiency in forest management, and this poses a serious threat to sustainability of the CF movement.

Fully participatory CF operational plans

FUGs have a clear need for a simple and practical mechanism for planning the utilisation of forest products in a way that will fulfil the daily requirements of all their different user groups. This requires a fully participatory planning and CF management process, which in turn needs skilled facilitation by extension staff.

But although community forestry regulations and guidelines suggest a participatory process at formation of the FUG and for preparation of forest operational plans (FOP), such a process is seldom properly followed in the field. Table 1 lists some main problem areas identified from the current research, in participatory planning and implementation of FOP by FUGs. Some possible solutions – intended to guide extension agents who are involved in facilitating improvement in this area are also outlined in Table1.

The FOP is a legal document required by the Department of Forest (DoF) from FUGs for their management and development of community forest, and is prepared mainly by government staff in consultation with the members of FUG committee. The FOP contains (a) a description of forest resources including a map of the forest and infrastructure (b) map of forest types and regeneration status (c) information on soil and other features of the forest. (d) It divides the forest into different blocks based on vegetation type for silvicultural and other management purposes. (e) Lists are provided of different forest products and (f) roles and responsibilities of users are also outlined. However, the plans seldom reflect the needs and priorities of all different groups of people and so usually fail to provide management strategies that will benefit the majority of people.

Table 1: Main problem areas and possible solutions in achieving fully participatory planning and implementation of community forest operational plans

Main problem area	Problems in current process	Proposed solutions – to guide future extension effort
Identification of different user groups and their needs within the FUG	The step of identification of different groups within a FUG at FUG formation is seldom completed properly, so the different needs of groups is not documented in the plan	All user groups and their particular needs should be identified before FUG formation (or urgently in existing FUGs). This should be a major part of the plan, and must be presented to the community for their comments at an early date. In large groups, intensive (primary) and casual (secondary) users should also be clarified - to allow responsibility of users and distribution of products to be planned.
Participation of all groups in CF planning and management	The rich and male, and people from "higher" castes mainly dominate the FUGCs. Forest management issues are only discussed in committee meetings and in general assembly, where poor people and women usually do not participate.	FUGCs must provide clear evidence of representation by all main groups. The views of all these groups must be heard and documented at the start of planning, and regularly during the management process. Major forest management issues should be discussed with different groups (poor, women, occupational caste and location) prior to formal decision making in committee and in assembly.
Provision of advice from extension staff on technical matters	Extension staff tend to provide advice from their own perspective – without understanding needs of poor groups and other gender, castes etc.	Extension staff should be made aware and sensitive about the problems of equity in CF management through training and workshops.
Lack of extension staff	Forest extension service cannot reach all FUGs on a continuing basis to provide advice on participatory planning and CF management.	Priority must be given to seeking and training locals (women & poor) to take on roles in extension and facilitation in participatory planning and management. Government staff should have a strategy to supervise all FUGs – planning a regular meeting with FUGs.
Lack of skills in resource assessment and planning	FOPs are prepared without proper assessment of resources. Usually FOP is prepared for five years, but is seldom updated or modified over time based on proper resource assessment.	Ensure preparation and revision of FOP is time-based on participatory assessment of resources. Government staff should make be more responsible about technical aspect of CF - through training and monitoring and evaluation.

It is clear that fully participatory FO Planning is a critical requirement to overcome most of the existing problems in community forestry. FOPs are best prepared by the FUG through active participation of all sectors of the community, with the support of extension staff. The 'active participation' of people means the involvement of all groups in the community at all stages of group identification and resource assessment, group needs assessment, and setting strategies for management and utilisation of forest products. The participatory FOP is fully owned by the people, not only by the FUG committee or government staff. Each person in the community should be well acquainted with the plan and have commitment towards its implementation. A comparison of a typical FOP currently found in FUGs and a proposed fully participatory FOP is shown in Table 2.

Table 2: Characteristics of a typical existing FOP and a fully participatory FOP

Characteristics of typical existing FOP	Characteristics of fully participatory FOP
Prepared by government staff consultation with FUG committee.	Prepared by FUG by the support of extension staff.
Describes forest condition through conventional inventory and/ or estimates by staff.	Describes forest condition through a participatory assessment process.
Needs and priorities of different groups are not properly assessed and considered.	Needs and priorities of different groups are assessed and described through a participatory process.
Management and silvicultural strategies are made on basis of resource condition perceived by staff and committee members.	Management and silvicultural strategies are made on basis of resource condition and needs of people through participatory assessment.
Needs of poor and women are ignored.	Needs of poor and women are sought, documented and considered in planning.
Management strategies are not well defined and decisions are highly influenced by FUG committee.	Management strategies are discussed, agreed and explicitly defined on the plan.
Most people are not aware about the provisions in the plan.	All FUG members are aware of the provisions in the plan.
FUG committee members implement the plan.	All FUG members play active roles in implementation of the plan.

A participatory FOP is useless without a fully participatory implementation. An equitable representation of different sectors of communities in an FUG committee and adaptation of participatory procedures in decision-making are two important indicators of fully participatory FOP planning and implementation.

Conclusion: Role of extension in community forestry

The success of the CF model in Nepal demands effective advice and facilitation by forestry staff – who are the main extension workers to communities. Most of the problems in community forestry discussed above are closely linked with lack of proper communication of the FUGC with the people, and with poor participatory practices in planning and implementation of the activities. Active participation of poor, women and disadvantaged groups in decision-making is critical for effective CF management and equitable benefit distribution among the users. Adequate levels of participation cannot be achieved without the empowerment of the disadvantaged groups; a situation that can only be attained through implementation of supportive legislation and also effective extension processes and activities. On the other hand, the power held by certain groups and individuals cannot be ignored, and the support of the powerful needs to be harnessed in the extension process.

Empowerment of disadvantaged groups is challenging in societies like that in Nepal, where caste and gender inequality and poverty are very common. Conventional extension approaches are inadequate to address complex social problems. Participatory extension programs that enhance the peoples' capacities to carry out the planning, implementation and evaluation of their own activities are essential. To achieve such practices government needs to offer appropriate incentives to both FUGs and extension staff.

Continuous extension support to all FUGs is not always feasible by government because of limitations of DoF resources. It is suggested that a scheme should be developed in which some FUG members are selected as local 'extension agents', preferably from disadvantaged groups. These local agents would be given training in relevant topics for their particular roles in extension, and can be fully involved in the CF management process, possibly in more than one FUG. Such an extension approach could be economically viable and effective in communities where the level of literacy is poor. However, the government has responsibility to design a proper extension strategy, including incentives, training for staff and community extension agents, and priority for implementation of a participatory FOP process in the field.

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A METHODOLOGY FOR PRIVATE NATIVE FOREST EXTENSION IN SOUTH EAST QUEENSLAND

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Introduction

Private native forest has long formed an important resource to the timber processing industry in Queensland and a valuable income source for landholders. In the past, timber harvested from native forest in Queensland on private land has equalled or exceeded that from Crown lands. Over the last five years this harvest has declined dramatically from 420,000 m³ in 93/94 to 250,000 m³ in 98/99. Recent changes in crown resource tenure have placed a greater pressure on the private resource and this has placed a greater emphasis on good management if landholders are to capitalise on probable future resource scarcity.

Management guidelines for native forest timber production in Queensland have largely been developed by Government with little or no formal attention paid to transfer of this information to private forest owners. The current extension programs and initiatives targeting plantation production on private land at a state level have no equivalent in the native forest area despite a large resource with current poor productivity and an existing industry with an identified need. In the absence of good scientific information, management of private native forests has been variable with many examples of management regimes compromising future productivity through poor practice. Essentially, the basic problems associated with this mismanagement result from a lack of knowledge and most landholders, when offered the opportunity, are keen to learn and thus improve productivity and income from their native forests.

Most of the private native forests in south-east Queensland are regrowth forests, comprising a mix of commercial and non-commercial species of uneven ages. Forest condition can also be variable, with many forests in a suppressed growth state with little future growth potential. Thus management of native forest for sustainable timber production, in an environmentally responsible manner, needs to be addressed for the private landholder. Production of a simple management manual is not seen as being adequate to address the problem. Thus an integrated extension program comprising establishment of demonstration sites featuring on-ground management options, supported by an educational program focussed on required basic forest management skills supported by documented case studies, has been the approach taken in this instance. This paper outlines the extension approach and details a number of demonstration sites developed.

THE PROJECT

The National Heritage Trust has funded a joint venture between the Mary Valley Sunshine Coast Farm Forestry Association (MVSCFFA), a voluntary organisation comprised of representatives from a number of farm forestry organisations in

SEQ, and the Queensland Forestry Research Institute (QFRI). The major benefit of this collaboration has been the development of an effective program incorporating ideas, perspective and knowledge from private landholders and sound, scientifically based technical support and expertise from QFRI.

The major objective of this project is to provide private landholders in the Mary River Catchment - Sunshine Coast region with confidence and skills in sustainable native forest management and to promote the integration of forest management into their normal farm management activities.

SEQ has a large area of private native forest remaining on freehold land and is potentially productive with good management. For productivity to be realised, good management principles need to be applied however this needs to be incorporated into systems that are readily adopted by landholders and continue to be practiced. Thus a key strategy of this project has been to involve landholders from the start.

This has been achieved by establishing a series of demonstration sites on private land as a focus for field days to provide a 'hands-on' approach to imparting better forest management skills. Each site is documented in a detailed case study discussing the processes, techniques and results.

The overall project strategy has been to: (i) develop maps of the project area to determine extent of the resource and likely locations for demonstration sites, (ii) locate suitable sites within the selected areas for establishment of demonstration sites based on location, forest type and forest condition, and (iii) to illustrate stand management and environmental protection principles. Within these demonstration sites, a range of silvicultural practices, habitat management, fire management and where appropriate, timber harvesting techniques based on the 'Code of Practice for Native Forest Timber Harvesting' has been demonstrated.

To date (September 2001) four case studies / demonstration sites have been completed:

A Case Study in Thinning an Even Aged Regrowth Forest in SEQ
Investigating Techniques to Restore Productivity in a 'High-Graded' Dry Eucalypt Forest in SEQ
Implementing an Integrated Sale in a Eucalypt Forest SEQ
On-Farm Value-Adding of Mixed Hardwood Forest Products in SEQ
Towards the end of the project life, this information will be further supported by the production of a user-friendly Silvicultural Manual for Native Forest Management on Private land, using information directly gleaned from these sites and technical information from past QFRI work.

Implementation

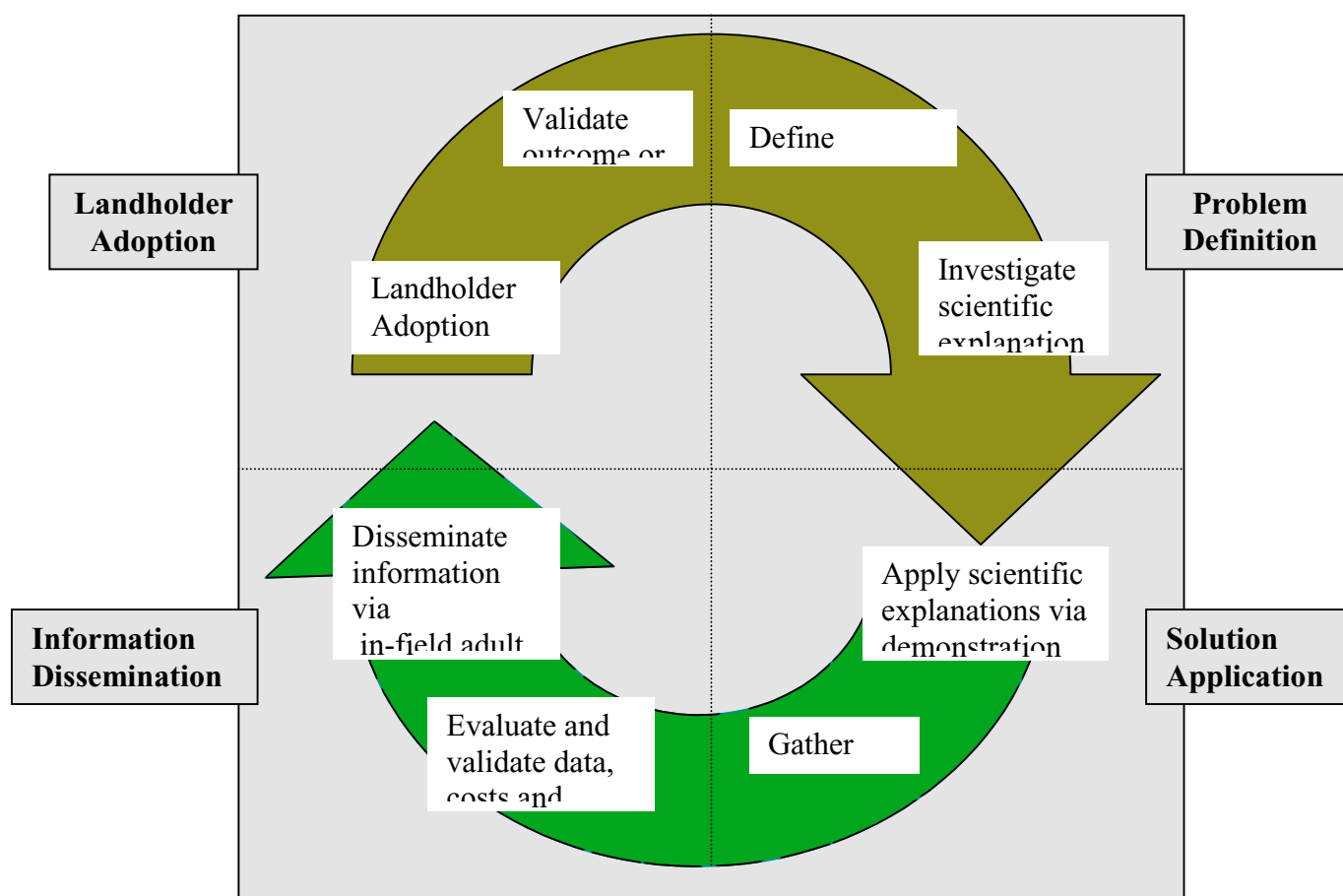
Limiting factors affecting landholders considering private native forest management (PNFM) in Queensland have been identified for some time, namely:

Lack of inventory data on the PNF resource
Lack of information regarding silviculture, economics and marketing

Degraded resource from past management practices
 Unconvinced of the economic benefits of sustainable management after poor returns from previous harvesting
 Uncertainty regarding future harvesting rights
 A hindrance to other potential land uses
 Competing with a state controlled allocation and marketing systems
 Lack of PNFM ethos

The project considered it imperative to base its extension program on information based on direct scientific investigation and amelioration of productivity problems apparent in many private native forests. Implementing a program based on a variation of 'Action Learning' and 'The Principles of Applied Science Inquiry' (Bawden *et al* 1985, Bawden & Packham *nd*, Wilson & Morren 1990) was considered most likely to succeed.

Figure 1. Represents the phases in this process (adapted from Wilson & Morren 1990).



The advantage of combining a forestry research institute and community-based farm forestry organisation enabled the project steering committee to be made up of a multidisciplinary team of scientists, industry, landholder and environmental groups representatives and various natural resource managers. Each member could focus on familiar components of designated problems and their possible solutions and the project officer could pull all these strands together into a coherent, focused program.

Mapping

Resource inventory information on a local and regional level is a critical precursor to understanding and managing the native forest resource. This was undertaken by mapping and stratifying the private native forest areas by broad forest groups, regeneration type, broad vegetation type and rainfall. This became the first step in understanding the resource in the project area, its distribution and the priority areas for implementing the extension program to achieve maximum on ground impact. The mapping was undertaken by QFRI in collaboration with the then QDNR using data stratified by the Queensland herbarium for the Comprehensive Resource Assessment (CRA) carried out prior to the SEQ Regional Forestry Agreement (RFA).

The inventory of the project area covered the Mary River and adjacent Catchments, an area of approximately 1.1 million ha containing 700,000ha of free hold land of which approximately 200,000ha supports remnant native forest.

Table 1 gives a breakdown of that native forest into broad vegetation groups in hectares.

Table 1. Broad Vegetation Groups in Hectares.

Broad Veg Groups	Area in Ha	Broad Veg Groups	Area in Ha
Mixed Spotted Gum	65,149	White Mahogany/Grey Gum	27,355
Blackbutt	7,962	Mixed Messmate	4,150
Bluegum Flat	35,715	White Mahogany	8,870
Grey Box	3,106	Non Commercial	36,617
B box /Flooded Gum/Turps	8,705	Total	196,729

Defining the Problems with Private Native Forest Management

The majority of private native forests in SEQ are derived from regrowth of previously cleared land. From the turn of the century land under lease or 'soldier settlement' schemes were taken up on the condition that certain levels of 'improvements' were achieved usually in the form of clearing for grazing or other farm enterprises. Large tracts of this land proved to be unsuitable for farming and later abandoned. Due to the persistent nature of our eucalypt forests, particularly the lignotuberous regenerating types, regrowth soon reinstated itself over these areas.

The majority of these forests can now be divided into two categories:

A regrowth forest left unmanaged and now heavily overstocked with:

- An overstorey or dominant layer of trees that have grown faster and are now in a dominant or co-dominant position. These trees are now growing slowly due to heavy competition from below. A proportion of these trees are usually in decline due to excess competition, insect attack, fungal attack or crown dieback.

- An understorey or intermediate layer mostly of suppressed and/or non-merchantable trees with little potential for growth even if released.

- A ground or regeneration layer often occupied by invasive Brush Box species and very suppressed eucalypts of poor form.

A regrowth forest left unmanaged except for periodic 'high grade' harvests with:

- Significant levels of damaged trees from the previous harvest operation.

- High proportions of the residual stand defective or suppressed.

- Large quantities of harvest residues pushed into heaps often against good young trees.

- Degraded tracks and log dumps due to poor location and no post harvest drainage.

- Some good quality trees in the 20 - 30 cm dbh range.

- Areas of heavy regeneration.

Within these two categories variables in stand condition occur due to forest type and location.



Figure 2. Overstocked Spotted Gum regrowth forest

Extension Program

The major focus of this project is to use demonstration sites to illustrate and disseminate solutions to a complex mix of inherent and stereotypical problems occurring in private native forests. The demonstration sites are located in a variety of forest types subjected to a range of past management and involves implementing the management procedures considered necessary to either ameliorate problems developed due to poor past management practices or implement the next step in the stand cycle for well managed stands. To date these include:

Thinning an overstocked timber stand; Investigating the growth response in a mixed hardwood forest subjected to two silvicultural thinning regimes with high retention standards compared to that achieved in the untreated forest (control plots). The thinnings were marketed and the costs and returns calculated for each procedure and probable value of each of the residual stands.

Rehabilitating a 'high graded' forest; This site looked at two areas on a property carrying predominantly Spotted Gum, one with a residual stand suitable for treatment (commercial and non commercial thinning) and the other with very heavy regeneration, but little residual stand most of which was defective and needed removing. A variety of spacing regimes were again applied to the first area removing the defective and suppressed sector of the stand and retaining 80, 100 and 200 stems/ha respectively comparing costs, returns, future growth rates and product ranges against control areas. The second site supported heavy regeneration (3000/ha, 4-6m tall) and was thinned to 600/ha using a variety of techniques and equipment including fire as a comparative study on costs, techniques and effectiveness.

Implementing an integrated sale; Product left in the bush is one of the areas most landholders are dissatisfied with in the harvesting process. Implementing a 450m³ harvest and then marketing a full range of products to a range of buyers demonstrated a fully integrated sale process from tree marking to product sorting, specifications, presentation and marketing. It detailed costs, real product values, marketing techniques, environmental considerations and post harvest maintenance including regeneration procedures.

On farm value adding; Value adding is frequently cited as a panacea to the poor returns often received by the grower. The aim of this trial was not to advocate value adding, but to test one form of the process from stand management to harvest, value adding and sales. It examined the systems used and included a cost comparative analysis of the returns from value adding a portion of the 230 m³ harvest against the returns from the rest of the harvest sold straight to a mill.

At each site a detailed stand assessment is carried out with the landholder including an investigation of the past management, and how that management

effects the decision-making processes for the future of the stand. Each site then follows a set procedure:

The first field day is held to consider the stand before actual work commences but with the detailed stand data available. Stand problems are considered and solutions discussed.

The management process considered best for the stand is then implemented.

A subsequent field day on the site is held to look at the actual techniques involved in the processes, product specifications, any problems encountered and detailing a break down of costs, returns and future outcomes for the stand.

Figure 3. Discussing specifications for sawlogs and girders



Each site provided the opportunity to consider problems inherent to that particular site eg the 'high graded' site had associated degraded tracks and log dumps.

This gave the project team the opportunity to work with the owner to rehabilitate some of these areas and use them to demonstrate the results of bad practice and some of the ways and costs of fixing the problems. A good example of this was the badly eroded tracks resulting from no post harvest maintenance. (see figure 4). We repaired some of the tracks, installing transverse drains and rehabilitating and draining the log dumps (see figure 5).



Figure 4. Badly eroded access track



Figure 5. - Grader repairing track and installing drains

Having a site that graphically illustrates these problems as a 'before and after' shot proved to be a very effective tool in overall forest management education. To be able to show the effects of stocking rates, tree health and the thinning process instead of just describing the theory of management generated considerable interest and discussion.

A series of 5 field days are then held, to cover SNFM in detail, each at a different property to give experience in a variety of stand conditions and species mix. The following is an outline of the five part series developed by the project to cover all the aspects of SNFM including property management.

The emphasis of the series is to have a 'hands on', practically based program moving from farm to farm over a period of 3 - 5 months, using an adult education approach to impart as much of the information in the field as possible.

1st Field day

- Recognising Forest products
- Stand Assessment and exercise
- Condition of the stand
- Bio diversity
- Implications for forest management directions

2nd Field Day

- Planning for marketing, logging and treatment
 - Marking for logging retention and treatment
- Crown, form, spacing and growth rates

3rd Field Day

- Logging agreements, OH& S, codes of practice, veg. management, IPA, tax implications
- Harvesting
- Marketing, forest products, options
- Sawmill visit, recovery rates, faults, value adding

4th Field Day

- Post logging management
- Mapping
- Treatment options
- Regeneration
- Fire

5th Field Day

- Property management Plans

Permanent growth plots are established at each site for followup at some future time and as a reference for the farmers. The trees are tagged and numbered and relevant data collected including dbh, tree height, crown health score and product range. Separate regeneration plots are also established. Remeasures of these plots are taken annually over the project life and the data entered into the QFRI database for analysis and future reference.

Each demonstration site is then written up in a detailed case study outlining all the above procedures, techniques, costs and returns. These are then available as a reference for future work.

Conclusion

Combining demonstration sites with in-field adult education processes has proved a very successful approach to imparting information and skills to landholders. Generally landholders from this demographic learn visually, they want to see the process in the field and even more importantly they want to see that the person advocating these systems can put into practice what they preach and not just eulogising theory. The high level of interest and repeat attendance by landholders at field days has demonstrated the increased profile of incorporating forestry into other agricultural activities.

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PARTICIPATORY NEEDS ASSESSMENT: IMPROVING EXTENSION FORESTRY PROGRAMS BY MAKING LEARNERS PARTNERS

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Abstract

Under traditional needs assessment methods, extension educators work with local advisory committees to guide the direction of extension programs in a region. These methods have their place, but more participatory needs assessment methods allow greater freedom to select participants from targeted groups of people than advisory committees do, as membership in the latter is often dictated by formal regulations or appointments by elected officials. These tools also provide opportunities for stakeholders to contribute directly to the development of programs that will meet their educational needs in the most effective ways. The University of Idaho has used focus groups, quality assurance committees, and localized steering committees to enlist direct involvement by forest owners, loggers, and others in designing programs and educational materials intended to help them improve forest management practices. Historically, the majority of participants attending University of Idaho Extension forestry programs were the same people attending repeatedly. In programs planned using participatory methods, fewer than half of the participants have typically indicated previous involvement in forestry education or assistance programs. Seventy-five to ninety percent of these participants typically indicate they will implement improved management practices as a result. Participatory needs assessment methods may be vital to improving extension forestry programs by targeting under-served audiences and empowering self-directed learning. These techniques can be used in tandem with qualitative research efforts to further improve our understanding of forest owners and workers and how to work with them more effectively.

Context

Idaho is located in the northwestern United States, roughly 300 miles from the Pacific Ocean. The majority of the work discussed in this paper was in the four counties of the Idaho Panhandle, the northernmost portion of the state bordered by Washington State, Montana, and Canada. The Idaho panhandle is on the west slope of the northern Rocky Mountains and annual rainfall ranges from 500 to over 1500 mm. Over 83% of the Idaho panhandle is forested, with climax tree species ranging from ponderosa pine (*Pinus ponderosa*) on the driest sites to western hemlock (*Tsuga heterophylla*) on moist sites. Other flora and fauna are similarly diverse with both boreal and coastal species present in addition to common Rocky Mountain species. Over 2,169,500 hectares (44% of all forested land in these counties) are held by over 28,000 private forest owners¹. The remaining land is held by the federal government (39%), state government (9%), and forest industry (8%). The average timber harvest

¹ Ownership data from Bundy, Idaho Department of Lands, 1972. This number has likely increased greatly due to property splits. Private forest owners in this paper exclude forest industry ownerships and so are synonymous with non-industrial private forest (NIPF) owners.

from private forests there has averaged over 177 million board feet annually since 1987, with an estimated value² of \$71 million for mill delivered logs, or \$106 million milled.

Individual forest owners receive limited, on-site technical forestry assistance from state foresters and a wider range of services from private consulting foresters. University of Idaho Extension has the lead responsibility to provide education programs for private forest owners.

Traditional Extension Needs Assessment

As natural resource scientists, we often have a subject matter-bias in extension efforts; extension is simply a matter of figuring out how to “make them ‘get’” the knowledge we believe is most important. We generally have a better understanding of natural resource science than those without formal training in forestry. But, knowing forest science is only part of the extension effort. Extension programs are not fruitful without adequate understanding of peoples’ specific problems, questions, and learning styles.

Under traditional needs assessment methods, extension educators work with local advisory committees (with membership often dictated by formal regulations or appointments by elected officials) to guide the direction of extension programs. In addition to these groups, many extension forestry programs in the United States rely on input from forest owner associations and forest industry groups, much in the same way that agricultural extension programs get advice and input from agricultural commodity associations.

Participatory Extension Needs Assessment

These traditional extension needs assessment methods provide a degree of participation in extension program development, and sometimes provide for legitimisation by elected officials and other stakeholders. But they often represent a minority of people who need the extension programming. For example, in Idaho, less than 2% of the 13,400 forest owners of more than 10 acres are members of the state forest owner association. Nationally, that percentage is likely less than 5% (Marchant 1996).

Other needs assessment methods allow greater freedom to target underserved groups of people than advisory committees and commodity groups typically do. The University of Idaho has used focus groups, quality assurance committees, and localized steering committees to enlist direct participation by previously un-reached forest owners, loggers, and others in designing programs and educational materials intended to help them improve forest management practices.

Focus groups

In 1991, the University of Idaho received grant assistance through the Idaho Forest Stewardship Program, a cooperative effort of many agencies and organizations, to conduct a series of educational activities designed to strengthen the stewardship skills of private forest owners.

² Values estimated at \$400/MBF for mill delivered logs, and \$600/MBF for milled products (in American dollars).

A common criticism of past University of Idaho Extension forestry programs and other U.S. extension forestry programs (Marchant 1996) is that "the same people always come". Idaho private forest owners were surveyed in 1987 (Force and Lee 1991), but that report did not analyze educational needs of "inactive" private forest owners (landowners with limited participation in forestry education or assistance programs). We used focus group interviews to design programs to reach a wider spectrum of forest owners than had traditionally participated in Idaho forest owner education or assistance programs.

A focus group is a carefully planned and moderated one-two hour discussion, held in a permissive, non-threatening environment, with 5-10 participants. The moderator unobtrusively guides the discussion through a pre-established "questioning route". Notes are taken by an assistant and sessions are usually audio or video recorded for later analysis. Focus groups can generate a wider range of specific ideas than mail or telephone surveys, because participants interact and draw detailed responses from each other. Focus groups have been used for many years by social scientists and market researchers. Their use has spread to news organizations, educational institutions, and other groups.

We held focus group interviews with randomly selected "inactive" private forest owners, to strengthen the likelihood that Idaho forest stewardship educational programs would attract them. To recruit interviewees, we randomly called forest owners then asked them questions to screen out forest owner association members and participants in forestry technical assistance, cost share, or education programs. People who made it through the screens were invited to participate in the focus groups.

We used information from those focus group interviews (e.g., Figure 1) to develop an annual series of workshops, field days and other educational activities titled "Strengthening Forest Stewardship Skills". Per focus group results, the program features a comprehensive calendar of events; a wide array of topics, and programs offered at multiple locations and varied times (e.g., week-day evening programs, week-end field programs, etc.).

Figure 1: Idaho forest owner extension program preferences identified in 1992 focus group interviews.

Focus group participants preferred programs which:

- they heard about repeatedly, through several sources;
- were held on a weekday evening or a weekend ("8 - 5" jobs had prevented many individuals' participation);
- were held within 20-50 miles of their residence;
- were three hours long or less for evening programs, and 6-8 hours long for weekend programs (more than 3 hours because day is already "killed");
- were not held during harvest seasons;
- Were held in day time, if in winter;
- were offered at optional times and places;
- they knew about well in advance (participants expressed a strong interest in an annual or quarterly list of events);
- promotions suggested were well prepared (ex: a course outline, clear goals);
- were offered at different levels, for landowners with varying levels of expertise;
- mixed teaching methods; and
- featured objective presenters.

Since 1992, between 400 and 900 people have participated annually in a total of 168 forest stewardship programs on 33 different topics. On program evaluations, fewer than 40% of the respondents typically indicate previous participation in forestry education or assistance programs. In our "keystone" forest stewardship program, a six-week forestry shortcourse designed to coach forest owners in writing their own forest stewardship plans, that number has never been higher than 26%. Seventy-five to ninety percent of these participants typically indicate they will implement improved management practices as a result. Grant funding for "Strengthening Forest Stewardship Skills" has been renewed annually since 1991.

Focus groups can also be modified for different contexts. For example, we used two focus group interviews to get input on extension programming on ecosystem management from the same group of Inland Northwest forest owners -- before and after a three-day symposium on the topic. Focus groups are also commonly used in combination with other research or needs assessment methods (e.g. designing mail or telephone survey instruments or to interpreting survey results).

It has become fashionable to call any form of group process a "focus group". Focus groups have distinct differences, strengths, and weaknesses compared to advisory committees or nominal group process sessions. For example, focus groups are designed to obtain a range of perceptions about a specific topic, idea, or product, rather than a prioritised list. For more information on conducting focus groups, there are a number of good references, including Krueger (1988) and Morgan (1997).

Quality Assurance Committees

Focus groups can be used to target specific audiences or issues and can reveal unimagined insights to improving extension forestry programs. But they still function primarily to gather input – participants do not generally plan specific programs or publications. Quality assurance committees ("QAC's") go a step further; providing

some needs assessment, but also involving a sample of learners to interact and participate as active partners in program development (Havens and Trail 1976).

A quality assurance committee consists primarily of people who will be using the program or material (e.g., forest owners, loggers) and secondarily of stakeholders (e.g., state foresters, consulting foresters, etc.). As with focus groups, QAC's allow more freedom to include people who would not necessarily be appointed to "formal" advisory committees. QAC's may also be attractive to individuals who do not want to commit to general advisory committees but are more willing to contribute their time to something with a clear, concrete result (e.g., a publication).

We have used QAC's to prepare scripts for videos on forest water quality and leave tree selection, and a handbook for conservation district supervisors. In those efforts, QAC members helped assess initial specific education needs; critiqued the education product during all phases of its development (e.g., by reviewing draft scripts or publications); helped focus product marketing, both in design and publicity after release; and promoted the final product with their peers.

Taking this effort to build learners directly into educational material development has helped ensure our extension publications and videos are well suited to learners' needs and learning styles. For example, in water quality video evaluations (mailed 15 months after the video release), most people who viewed the video rated it as good to excellent, and 87% of the adult respondents indicated they would implement improved management practices as a result.

Structure of QAC meetings and correspondence depends on participants' preferences and the nature of the project. It is often best to place landowners/forest laborers and natural resource professionals in separate groups, as the former often defer to natural resource professionals in a group setting. An alternative is to weight the committee membership dominantly to landowners/forest laborers. The committee can meet once or twice then rely primarily on mail and telephone correspondence for further activity, or meet more often for in-depth interaction on the project. It is often helpful to start with a fairly open discussion of the issues, to stay open to fresh ideas, then move into a more formal outline or text. QAC comments may be sparse until participants have something tangible to respond to (Schnepf 1989). QAC members often share draft documents with peers. Encouraging this captures a wider range and depth of input.

Localized Steering Committees

Historically, few U.S. extension programs were targeted directly to loggers. That changed with *Logger Education to Advance Professionalism* ("LEAP"), a national extension program piloted in Idaho and several other states. LEAP features over 20 hours of training designed to increase loggers' understanding and skills related to forest ecology, silviculture, and water quality.

Because loggers were not represented in either local extension advisory committees or the forest owners association, we needed to do some direct needs assessment with them. We established local steering committees of loggers to help guide LEAP format, timing, and content. Membership included a broad range of loggers from

different communities and types of operations (e.g., those using ground-based and cable logging systems, one-person operations and larger logging firms, etc.).

These committees modified LEAP from two separate 2-day programs on water quality and silviculture into one integrated 3-day program with a stronger insect and disease component. The names of loggers who served on the committee are included on the annual brochure announcing the programs, both to recognize their service and signal potential participants that loggers had helped in the program development.

Over 700 Idaho loggers have attended LEAP since 1993. On exit evaluations, 88-100 percent of the participants have indicated they would implement improved management practices as a result of the program.

Loggers are frequently criticized about forest practices. In addition to getting real input on program development, the LEAP steering committees have helped loggers trust that the experience they bring to the program is valued. I believe this has also helped internalize their investment in continuing education. Many Idaho loggers have traditionally resisted efforts at developing any kind of formal or informal credentials for logging, fearing a more restrictive regulatory environment. Idaho loggers' and forest industry's experiences with LEAP and on LEAP steering committees helped create grassroots support for Idaho's new "Pro-Logger" program, run by the state logging association, that requires all participating loggers to take LEAP, and an additional 16 hours of continuing education annually. In 1999, most of Idaho's major forest product companies started requiring their loggers to participate in the program.

Localized steering committees have been an effective way for us to enlist local people in developing programs for new or under-served audiences. Many extension programs have committees of this type for different events and programs. One could strengthen the participation of steering committee members much more than we have with the LEAP committees thus far (e.g., having them present parts of programs, etc.).

The Scholarship of Engagement

Foresters have been accused of taking an "omnipotent", "father knows best" attitude towards the public and forest owners (Behan 1989; Luloff 1995). Much research and needs assessment on private forest owners in the United States has relied on mail and telephone surveys. Surveys can be useful, but many U.S. forest owner surveys have seemed to ask similar questions and report pretty similar findings. By themselves, I do not believe surveys adequately challenge the way we think about and interact with private forest owners.

Focus group interviews are commonly used as a qualitative research method. Qualitative approaches can provide an antidote for our own disciplinary and institutional biases and bring us fresh ideas about forest owners and how to work with them (Bliss and Martin 1989). One value imbedded in varying degrees in qualitative research approaches is an emphasis on not treating those being researched strictly as objects – even aspiring to making them partners -- in the effort to tell their story from the ground up (Bogden and Biklen 1992; Creswell 1998). Coincidentally, one of the major themes in adult education is the concept of adults as self-directed learners.

Adult education programs are stronger to the extent learners are active partners in the process – what Malcolm Knowles introduced to the U.S. as “andragogy” (literally “leading adult learning”) as opposed to pedagogy, which originally referred specifically to teaching children, but over time has been used to refer to all teaching (Ingalls 1976).

Participatory qualitative research approaches (Reason 1994), strike me as having rich parallels with extension, and would seem to be a natural vehicle to simultaneously conduct extension and research programs. In conversations with peers at other U.S. universities, I am frequently struck by how often faculty with extension appointments find it difficult to work through the promotion and tenure process -- work in extension/outreach is commonly given less weight than research. Tying to participatory qualitative research approaches for Extension needs assessment, programming, and outcome evaluation could simultaneously broaden and deepen our understanding of private forest owners and provide unique opportunities to document and validate scholarship in extension and research. Such an approach would also dovetail nicely with a growing discussion in the U.S. on “the scholarship of engagement” (Simpson 2000; Kellogg Commission 1999).

Conclusion

Participatory needs assessment methods may be vital to improving extension forestry programs by targeting under-served audiences and empowering self-directed learning. These techniques can be used in tandem with qualitative research efforts to further improve our understanding of forest owners and workers and how to work with them more effectively.

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EDUCATION AND RESEARCH: A CASE ANALYSIS WITH THE CENTER FOR FOREST PRODUCTS MARKETING AND MANAGEMENT

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Introduction

Cooperative efforts in forestry and wood products are not necessarily new concepts. For many decades groups have tried pooling their efforts to improve forest management and identify new markets for wood-based products. One of the first successful recorded efforts in the United States goes back to Roger's³⁰ (1934) forest cooperative near Cooperstown, New York. Rogers developed the concept of a cooperative that would be a centralized management and utilization arrangement that would bring together the needs of the forest landowner with the interests of the wood user. Members of this cooperative had the requirements of practicing good forestry that included:

Selective cutting in mature stands;

The amount cut would be based upon annual growth;

Immature timber shall not be cut except for improving the spacing or composition of the forest;

Clear cuts shall be small and only made when new growth is assured; and

Every tree to be cut, either for sale, fuel, or other home use shall be carefully selected and marked. This effort became known as the Otsego Cooperative.³¹

Simon and Scoville³² studied forest cooperatives throughout the U.S. in 1979 to evaluate their purposes and success. They concluded that cooperatives provide the landowner with greater access to professional forest management and marketing services. The services were quite adaptable to small landowners and they offered services in the form of handling sales of traditional forest products, exploring new markets and alternative products and encouraging proper forest management. These authors found that services included improving timber stands, providing forest management plans, cruising and marketing timber, negotiating contracts, supervising harvests and furnishing market information. The cooperatives average stumpage price for timber was approximately 11 percent higher than prevailing local prices.

³⁰ Rogers, R.H. 1934. Centralized Management and Marketing Applied to the Woodlands in the Cooperstown Forest Unit. Unpublished Thesis, N.Y. State College of Forestry, Syracuse.

³¹ USDA Information Bulletin 17. 1950. Otsego Forest Products Cooperative Association of Cooperstown, New York.

³² Simon, D.M. and O. J. Scoville. 1982. Forest Cooperatives: Organization and Performance. ACS Research Report 25.

In 1979 a forest products marketing and management cooperative was formed in central Maine to market the forest products of small woodlot owners. The cooperative first marketed firewood produced by members in the areas around central Maine. They also had plans to market pulpwood to paper companies and develop markets for logs and lumber produced by the woodland owners. The overall objective of the cooperative was to improve the return to members from the products sold from their woodlands.³³

Most recently Kozak and Hartidge³⁴ (2000) describe three types of cooperative ventures. The shared use of manufacturing facilities can provide businesses and individual proprietors with access to common machinery and services which otherwise may be too expensive for them to use or unavailable in the region. A "business incubator" is often used when companies share common real estate or buildings. Members may receive a discount on utilities or common administrative services such as accounting. These authors describe a true cooperative as a group who collectively purchase assets that the individuals could not afford by themselves. Members may share work areas, office space, and administrative tasks. Common goals or business interests normally link these businesses or individuals. These researchers conclude that, *"The corollary is that without guidance, leadership and regional interest, any type of shared facility or cooperative is destined to fail."*

Forest Products Marketing in the United States

In the United States the forest products industry has been traditionally production oriented. With what appeared to be an unlimited low-cost resource, during the nineteenth and twentieth centuries manufacturing commodity wood products at the lowest cost was the primary strategy utilized. Very little effort was made to understand the needs of consumers of wood products since everything that was made could be readily sold. However, during the latter part of the last century, the United States saw increasing concern for the environment and multiple uses for forests became the standard for publicly owned lands. Since the majority of our softwood resource was on public lands, the value of standing timber escalated during the 1970s. This resulted in a slow shift from a production orientation toward a marketing orientation in the forest products industry.

This trend was identified by a few early leaders in the academic community and was lead by Dr. Stuart Rich from the University of Oregon. Dr. Rich's Book, *The Marketing of Forest Products*³⁵, was one of the first texts dedicated to the subject. Dr. Jim Boyer from the University of Minnesota was also one of the early leaders on this subject developing a program that combined wood products and business applications at the University of Minnesota during the early 1980s. Dr. Steven Sinclair saw an opportunity in the late 1980s to develop a curriculum at Virginia Tech that would focus specifically on forest products marketing. Dr. Sinclair then published a second text on the subject, *Forest Products Marketing*³⁶ in 1992.

³³ Farmer Cooperatives. 1981. Cooperatives Part of Maine's Development of Agriculture, Forests and Fish Resources, pp 13-14.

³⁴ Kozak, R. and C. Hartidge. 2000. British Columbia. The Forest Chronicle 76 (1) pp 151-158.

³⁵ The Marketing of Forest Products: Text and Cases. 1970. McGraw Hill, New York. 700 pp.

³⁶ Forest Products Marketing. 1992. McGraw Hill, New York. 401 pp.

In the development of his curriculum and textbook at Virginia Tech, Dr. Sinclair took a marketing approach to his work and initially contacted a number of companies in the industry that would provide input to his program. He queried owners and managers of forest products companies on classes students should take for an emphasis in marketing and what skills were needed by students for employment in forest products marketing. During these early conversations, Dr. Sinclair recognized a strong need not only for students, but also for research and continuing education in forest products marketing. This core group of companies became an advisory team for Dr. Sinclair and was the foundation for the Center for Forest Products Marketing, a cooperative effort among the industry, trade associations, government agencies and the Department of Wood Science and Forest Products at Virginia Tech to meet the needs of the industry in the science of forest products marketing.

The Center for Forest Products Marketing and Management

The Center for Forest Products Marketing and Management (the Center) was established in 1991 to assist forest products companies in the management of their operations and the marketing of their products. The Center has grown from a few early members to over 70 companies that participate in assisting the development of young individuals to be prepared for employment within the industry. Center members include major international corporations such as Georgia-Pacific and Willamette Industries to locally owned pine sawmills like Morgan Lumber Company in Red Oak, Virginia. Major trade associations that belong to the Center include the Hardwood Manufacturers Association, the Appalachian Hardwood Manufacturers Association, the Wood Component Manufacturers Association and the Virginia Forest Products Association. Two Experiment Stations of the USDA Forest Service are active supporters of the Center. From hardwood lumber to softwood plywood, Center members represent all major wood products.

For their donations, Center members can hire quality undergraduate and graduate students trained specifically in forest products marketing, regular market intelligence studies, input on the research conducted, and continuing education for the industry. Four faculty members are involved in the teaching and research activities of the Center. Three of the faculties are trained in forest products marketing, while one is an industrial engineer focusing in the areas of production management for the industry. The staff of the Center includes a market analyst, a marketing and communications manager, a senior secretary and a director, who is one of the marketing faculties.

The educational program is focused both at the undergraduate and graduate level with a strong emphasis on wood science, supplemented with extensive courses in the College of Business at Virginia Tech. Courses in the Department of Wood Science focus on the fundamentals of wood science with emphasis in the areas of forest products business, marketing and management. Classes in the business college include marketing, personal selling, production management, organizational behavior and market research. Undergraduates start at positions with Center members as sales representatives, production managers, marketing research specialists or trade association representatives. At the graduate level, students normally focus on Center members research needs as directed by the

research committee. Upon completion of their work, graduate students often find work as middle managers or researchers with government agencies or associations. Center members provide intern opportunities for undergraduate students while enrolled and are often the first to offer full-time employment upon graduation.

The continuing education program for the industry has focused upon marketing and sales classes as they apply to the forest products industry. Courses are held throughout the US in cooperation with other universities or at individual company locations. The courses developed and taught include Forests Products Marketing, Selling Forest Products, E-commerce for the Wood Products Industry and Advanced Sales Training for the Forest Products Industry. New courses are developed and taught upon the recommendation of Center members.

The research of this cooperative effort is directed by a steering committee that provides direction for the Center's market analyst. Past research has investigated wood material use in the furniture, cabinet, flooring and pallet markets in the US. Other studies have investigated the recycling of pallet lumber and treated lumber, third party certification issues, wood in industrial applications, non-timber forest products, international markets in Germany, Great Britain and China, and adoption of technology by the forest products industry. Center members receive complete reports from the research efforts upon completion of the project. A current major research thrust for the Center is finding new markets for the utilization of low-grade hardwood lumber.

Publications from the Center include a quarterly Research Update that describes a current research project, a quarterly Center Focus that informs members of other issues the Center is working on, a quarterly Market Update that describes current market issues facing the wood products industry and full-research reports upon completion of the specific research project. The Center coordinates company visits to the College for recruiting efforts and internship opportunities. It has one annual meeting for all Center members and one other meeting for the research steering committee to establish priorities for the coming year.

Results of the Cooperative Effort

To assess the educational programs in the Center and the program offered in the Department of Wood Science and Forest Products at Virginia Tech, a mail survey was conducted of 279 alumni during May 2000. Undergraduate and graduate students were asked to evaluate instructional areas on the importance to their careers and how well they believed the Department prepared them in these areas. Center member employers were also contacted to evaluate the strengths and weaknesses of our students. To determine the educational needs of the subject area, a composite score was calculated by subtracting the preparation rating from the importance rating and weighting this difference by the importance rating:

$$\text{(Importance to Career Success rating - Preparation rating)} * \text{Importance to Career Success}$$

This study provided us with those subject areas which respondents believe are most important in their careers and what areas the Department should emphasize

during student development. Besides this quantitative information, participants were asked for career and background data. An overall rating of the Department on preparing them for their careers and assistance in finding employment was also requested.

A total of 91 responses were received, resulting in an overall response rate of 33%. Forty responses came from undergraduate alumni and fifty-one came from graduate alumni. Overall, undergraduate students rated the Department a 3.93 out of 5 on preparation for their careers. In the category of assistance in finding employment undergraduate students rated the Department a 4.21 out of 5. Undergraduates were also satisfied with their potential for career advancement, rating it a 3.93 out of 5. The starting income for undergraduates averaged \$26,500. Most undergraduate alumni started in positions as management trainees or entry-level sales.

Undergraduate alumni rated problem solving skills, personnel management skills, knowledge of business practices, writing skills, and computer skills as the most important to their career success. These alumni felt that they were prepared best in the areas of marketing skills, wood properties, wood drying, writing skills, and wood processing. When the educational need score was calculated the most important areas were business practices, management skills, management science, problem solving skills, and public speaking skills. This group felt that the least important subject areas for their careers were wood chemistry, accounting, and economics. Undergraduate alumni felt they received the least preparation in the areas of accounting, management science, and business practices.

Overall, graduate students rated the Department a 4.10 out of 5 on preparation for their careers. In the category of assistance in finding employment graduate students rated the Department a 3.19 out of 5. Graduate students were satisfied with the potential for career advancement, rating it a 3.94 out of 5. The starting income for graduate students averaged \$32,600. Most graduate alumni started in positions working in academics, research, or upper management in private industry.

Graduate alumni rated problem solving skills, writing skills, public speaking skills, computer skills, and personal management skills as the most important in their career success. This group felt that they were best prepared in the areas of public speaking, wood properties, statistics, problem solving, and writing skills. The graduate alumni's educational needs were in the areas of personnel management, business practices, computer skills, problem solving skills, and writing skills. This group felt that least important to their careers were accounting, wood chemistry, wood engineering and wood drying. They believe they received the least preparation in the areas of accounting, business practices, and economics, which was similar to the undergraduate students.

In general Center employers responding to the survey gave favorable impressions of the education given our graduates. All would hire our graduates or would recommend our program to prospective students. The employers ranked the skills they deemed important for our graduates' career success. The most important skill was problem solving. Computer skills, marketing skills and knowledge of marketing were equally ranked as second by employers, while math

skills and knowledge of business practices followed closely behind in importance. When asked how our graduates were prepared, employers ranked our graduates as best prepared in computer skills, knowledge of wood properties, knowledge of wood chemistry, math skills, writing skills, problem solving skills and knowledge of wood engineering. According to these employers, areas in which students can improve included, more education in quality control, emphasize industrial experience, and more understanding of the wood fiber based industry. Table 1 summarizes their ratings of the students.

Table 1: Center Employer's Ratings of Students on Subject Matter

Top 5				
	Importance		Preparation	Educational Need*
Undergraduate	Problem Solving (4.60)		Computer (4.40)	Business Practices (4.64)
	Computer (4.40)		Wood Properties (4.14)	Marketing (3.52)
	Marketing Skills (4.40)		Wood Chemistry (4.14)	Mgt Science (3.46)
	Marketing (4.40)		Math (4.11)	Personnel Mgt (3.33)
	Math/Business Practices (4.30)		Writing/Problem Solving/Wood Engineering (4.00)	Problem Solving (2.76)
Graduate	Problem Solving (4.67)		Computer (4.33)	Problem Solving (3.13)
	Writing (4.50)		Math (4.33)	Personnel Mgt (2.86)
	Personnel Mgt (4.33)		Marketing (4.20)	Writing (1.49)
	Math (4.17)		Writing (4.17)	Accounting (1.05)
	Computer (4.00)		Problem Solving/Marketing Skills (4.00)	Wood Engineering (0.26)

*Educational need = (Importance to Career Success rating - Preparation rating) * Importance to Career Success

From the results of this study, we have adjusted our curriculum to meet the needs of employers. We have regular contact with employers of our undergraduate students through the Center members and in conversation all are very productive employees. The internships are evaluated upon the student's completion with the results of the evaluation shared with all parties.

Conclusion

The Center for Forest Products Marketing and Management is a cooperative effort among the forest products industry, government agencies, trade associations and the Department of Wood Science and Forest Products at Virginia Tech. It was established 10 years ago to provide marketing education and intelligence for its membership. It has grown from a small number of firms to over eighty partners and seven staff members that cooperate in educating young adults in the marketing of forest products. This cooperative effort is unique since it is based upon marketing and management education and is not product or production oriented. Members have recently evaluated the program and we are currently making adjustments based upon their suggestions. This cooperative effort had demonstrated how industry, private and government agencies collaborate to benefit all the members.

FACTORS AFFECTING PROPERTY OWNER DECISIONS ABOUT DEFENSIBLE SPACE

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Introduction

“Defensible space” refers to that area between a house and an oncoming wildfire where the vegetation has been modified to reduce the wildfire threat and allow fire fighters to safely operate. Typically, creating a defensible space involves thinning of flammable native trees and shrubs, removal of dead vegetation, and planting of more fire resistant plant materials around the house. The defensible space concept conveys several important ideas including homeowner responsibility, being proactive, vegetation management, house survivability, and firefighter safety.

To fire prevention agencies and extension educators, having an effective defensible space is essential to living more safely in high fire hazard environments. In recent decades, considerable effort has been expended by these entities to encourage property owner implementation of defensible space practices. Despite this effort, people living in high fire hazard areas have been slow to adopt these practices. The resulting frustration of fire fighters and extension workers is captured in the following statement from a University of California publication:

‘This information has not only been available to the public, it has been poured over them... and many (ie. wildland/urban interface zone) residents have gotten the message, they just don’t act on it.’ Adams et al. (1997).

What factors deter property owners from taking the actions necessary to create a defensible space? Answering this question is key to achieving widespread implementation of defensible space practices. Hodgson (1996) suggests that in order for individuals to take action, they must have the motive, means, and opportunity. When one of these (i.e., motive, means, or opportunity) is lacking, action will not occur.

If the goal is to have property owners employ defensible space practices, it is important to understand the factors that affect their decisions to take action. Based on a review of four surveys involving property owners living in high fire hazard areas of California and Nevada and the authors’ personal experiences, this paper reports on fifteen factors that influence property owner decisions to adopt defensible practices and categorizes them by the factor types of motive, means, and opportunity.

Identification of Factors

The identification of factors that affect homeowner implementation of defensible space practices were primarily derived from review of the following publications and project reports:

“Fire Hazard: The Dimension of Resident’s Attitude” (Loeher 1984): This article summarizes a PhD Dissertation that evaluated residents’ beliefs regarding fire hazards and expectations of their fire service in the Santa Monica Mountains of southern California.

“Strategies for and Barriers to Public Adoption of Fire Safe Behavior” (Hodgson 1995): Hodgson assesses public perception of defensible space by surveying homeowners living in high fire hazard areas near the northern California communities of Grass Valley and Paradise after a wildfire event.

“Report of the Living With Fire Survey Results” (Alan Bible Center for Applied Research 1998): In this survey, 462 randomly selected residents of high fire hazard neighborhoods in western Nevada were interviewed to determine their attitudes and knowledge levels concerning wildfire and defensible space.

“Preliminary Results: Incline Village Fire Survey” (McCaffrey 1999): As part of her PhD Dissertation, McCaffrey surveyed approximately 100 residents of the Lake Tahoe community of Incline Village to determine their beliefs about the wildfire threat and the actions necessary to reduce the hazard.

From this review, thirteen different factors affecting property owner decisions to implement defensible space were identified. Two additional factors, based on the experiences of the authors, were also added. Please note that the factors listed below are not presented in any particular order (i.e., Factor 1 is not necessarily more important than Factor 2, etc.). The factors, however, are presented according to type: motive, means, or opportunity.

Factors Affecting Property Owner Decisions about Defensible Space

Motive Factors

Unaware (“I didn’t know there was a wildfire threat to my neighborhood”): Some property owners do not realize they live in a high fire hazard area. This lack of awareness is often associated with people who have recently moved to the area. Without the knowledge that a threat exists, there will be no motivation to take action. Loeher (1985) did not consider this an important reason in explaining why property owners failed to create a defensible space and stated “residents are better informed about their exposure to risk than they are given credit for...” Similar conclusions can be drawn from the other surveys. For the most part, property owners living in high fire hazard areas are aware of the threat.

Denial (“It won’t happen to me” or “I don’t believe it”): Despite awareness of the wildfire threat, some individuals will refuse to acknowledge that they are at risk. This attitude is similar to the chain smoker that is familiar with the health risks, but chooses to ignore the ramifications. When asked, “Why don’t people implement defensible space practices?” a small percentage of Incline Village respondents

answered because they thought the danger had been exaggerated or that wildfire was unlikely (McCaffrey 1999).

Fatalism ("It's all fate. When your number is up, it's up"): The review of the survey results suggests a few property owners do not implement defensible space practices because they are fatalists (i.e., whether a house burns or not is a matter of luck). Hodgson (1995) found that less than one in ten of the property owners surveyed were fatalistic. Obviously, individuals who put their fate in hands of "Lady Luck" may not be motivated to take action.

Futility ("It won't make a difference"): Although there is good information to the contrary, a number of property owners do not create defensible space because they feel it will not be effective in protecting their homes from wildfire. About 20% of the people surveyed by Hodgson (1995) did not think defensible space would help save their property. Property owners that do not believe defensible space will be effective will lack the motivation to take action.

Irresponsibility ("It's not my job"): Some property owners may be aware of the wildfire threat, but do not take action because they do not consider it their responsibility. These individuals often believe it is the fire department's job to protect their home from wildfire. Sometimes coupled with this belief is a misconception about the abilities of firefighters to control an intense wildfire. Loeher (1985) considered this a major factor in Santa Monica Mountain property owners' decisions to not create a defensible space. He stated, "What is astonishing is that 37% (i.e., of homeowners surveyed) felt no sense of responsibility whatsoever..." Approximately one-third of the survey respondents felt that "public officials" were solely responsible for minimizing the wildfire threat. In contrast, 90% of the western Nevadans surveyed believed that property owners had a "high" or "very high" level of responsibility for reducing the wildfire threat to their homes.

No Incentives ("If it was really important, my insurance company would give me a break on my premium"): Although probably only a contributing factor, a few property owners felt that the costs of implementing defensible space concepts should be offset by lower insurance rates. About 70% of Incline Village residents thought that homeowners with an effective defensible space should have reduced insurance premiums (McCaffrey 1999).

Insurance ("So what, my insurance company will build me a new house"): Some property owners discount the need to create a defensible space because their homes are adequately insured. A veteran California fire fighter states, "There are people out there who take care of some of their serious valuables like pictures and things that they can't replace; once they find secure places for them, they don't care if the house burns down." The loss of a well-insured house to wildfire may also present an opportunity to some people. After the 1991 Tunnel Fire near Oakland, California, about 66% of the people who lost homes decided to rebuild on the same site. The houses they rebuilt were 28% larger than the original structures (Adams et al. 1997).

Unnatural ("It's wrong to cut trees"): There are property owners that are opposed to the removal of trees and other native vegetation because they value the wildland look, wish to minimize disturbance to the natural setting, and/or believe it will

degrade wildlife habitat near their homes. Hodgson (1995) found that about a third of the property owners surveyed believed that one should make as few changes to the natural landscape as possible. Western Nevadans felt that potential conflicts with the naturalness of the landscape were a major reason why people did not create a defensible space (Alan Bible Center for Applied Research 1998).

Aesthetics and Function ("It won't look good"): People value the landscapes surrounding their homes for reasons other than just defensible space. There is a perception by some property owners that an effective defensible space will result in an unattractive landscape that will not compliment their home or contribute to their property value. There is also a perception that landscape functions or uses, such as privacy hedges, shade trees, and windbreaks, would not be compatible with defensible space concepts.

Discomfort ("I don't want to because of snakes, lyme disease, poison oak, etc."): Hodgson (1995) found that some residents were reluctant to create a defensible space because of perceived hazards of working outdoors in a wildland setting. Since a large number of the people moving to wildland areas have urban backgrounds, there may also be an exaggerated perception of risk associated with these potential hazards.

Means Factors

Cost ("I don't have the time or money to do it"): The costs (i.e., money and time) of implementing defensible space practices are considered by some to outweigh the benefits of reduced fire threat. Hodgson (1995) concluded that the perceived monetary expense, labor, and time requirements were major barriers to creating a defensible space by northern California residents. In western Nevada, the cost factor was believed to be a less important deterrent to defensible space implementation (Alan Bible Center for Applied Research 1998).

Unknowledgeable ("I don't know what to do"): A lack of knowledge concerning how to implement defensible space practices prevents some property owners from creating defensible space. Loeher (1985) found that Santa Monica Mountain homeowners were uncertain about which wildfire threat reduction practices were most worthwhile and how to implement them. Western Nevada property owners felt that lack of knowledge was an important reason for the failure of some property owners to create a defensible space (Alan Bible Center for Applied Research 1998). Hodgson (1995) found that about two-thirds of the residents thought they would need to learn new things about landscaping in order to create an effective defensible space, but over half thought defensible space concepts would be easy to understand.

Disposal ("I don't have an easy way to get rid of that stuff"): An important factor for some property owners is the inability to dispose of the plant material generated by the creation of a defensible space. Hodgson (1996) states, "Brush disposal is perhaps the thing that fire protection officers need to pay the most attention to; it is the most difficult and dangerous of the problems land owners face in converting their property." If property owners do not have the means to dispose of the slash, they may not create a defensible space in the first place.

Opportunity Factors

Illegal ("It's against the law"): In some areas, federal laws, local ordinances, and homeowner association restrictions inhibit or prevent the creation of defensible space. Property owners do not have the opportunity to implement defensible space practices if it is illegal.

Lack of Ownership ("The problem is on my neighbor's property"): In certain instances, the presence of flammable vegetation on an adjacent parcel can pose a threat to a property owner's house. Without the cooperation of the adjacent landowner, an individual does not have the opportunity to create an effective defensible space.

Application to Extension Programming

If the goal is to have property owners employ defensible space practices, it is important to understand the factors that prevent them from taking action. Once these factors are understood, extension resources can be strategically directed to address the real reasons for property owner failure to create a defensible space. Extension programs do little good if the objective is motivation and the problem is lack of opportunity or means. When developing extension programs aimed at achieving widespread adoption of defensible space practices, be sure to address the real problem.

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INNOVATIONS IN FORESTRY TEACHING AND LEARNING. LESSONS FROM THE AUSTRALIAN MASTER TREEGROWER PROGRAM

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Abstract

The Australian Master TreeGrower program is an eight-week educational program for those landholders that have made or will make a contribution to the development of farm forestry in their region. The program is run as a partnership between the University of Melbourne's, Department of Forestry, the local organising body(s) and the landholders. The first Master TreeGrower program was run in late 1996 in the Otways of Victoria and since then over 700 participants have completed one of 35 programs across Australia.

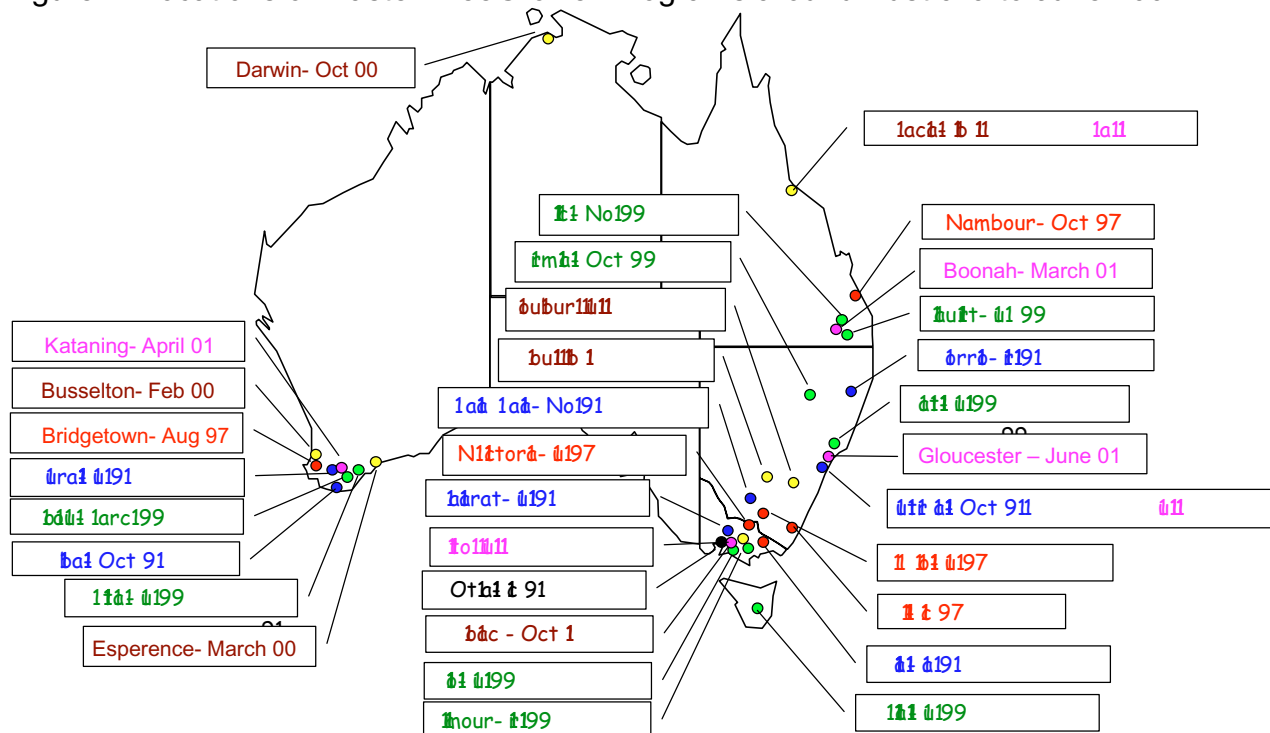
The program has been a tremendous success in building the knowledge, confidence and networks of those that participate. This paper reviews some of the reasons for the programs success.

Background

With the financial support of the Myer Foundation, the RIRDC/LWRRDC/FWPRDC Joint Venture Agroforestry Program, The Natural Heritage Trust and the National Farm Forestry Program, the Department of Forestry has developed the Australian Master TreeGrower (MTG) Program. The MTG involves the presentation and coordination of a series of short regional outreach programs in agroforestry and farm forestry designed for leading farmers and regional extension agents with the provision of ongoing support.

From the first program held in late 1996 in the Otways of Victoria, a further 34 programs, with over 700 participants, have been completed around Australia (see Figure 1). Further programs are planned until 2003.

Figure 1: Locations of Master TreeGrower Programs around Australia to June 2001.



Each regional MTG program is presented as a partnership between the Department of Forestry, a regional organising group(s) and approximately 20 landholders. Each program nominally involves a total of 50 hours covering 8 group sessions that are delivered over a 6 to 10 week period. The MTG program has no formal accreditation as an academic or skills based course and has no predetermined curriculum or examination.

In 2000 the program was awarded the \$10,000 Allen Strom Eureka Prize for excellence in Environmental Education Program by the Australian Museum and in 2001 the Institute of Land and Food Resources Outreach Achievement Award. This paper reviews the program's success and identifies the factors leading to this success.

What is success?

An evaluation program has been running consistently since mid-1997 in assessing participants' experiences immediately and 12 months after the programs completion. This formal evaluation process combined with three, mid-term review workshops (held in 1997, 1999 and 2000) and observations and discussions with participants and regional coordinators indicate the program has been extraordinarily successful (see Table 1) in meeting the stated aims of the MTG program. Those aims being:

- To help landholders recognise and critically evaluate commercial tree growing opportunities;
- To encourage landholders to play a more active role in farm forestry development by providing knowledge that instills confidence;
- To support regional farm forestry, agroforestry and landcare programs by providing a program that can be tailored to regional requirements; and

To encourage strong communication links between participants, extension officers, researchers and industry through the MTG program.

Table 1: Evaluation of participants' responses to the MTG program on the final session of the program.

Question to Participants at the end of the MTG program	Participant response		
	'No Better'	'A Little Better'	'Much Better'
My understanding of farm forestry is now:	-	14%	86%
My practical ability in farm forestry is now:	0.5%	34%	66%
I can now give advice on farm forestry that is:	0.2%	41%	59%
My ability to evaluate opportunities in my region now	0.2%	34%	66%
My ability to develop farm forestry projects is now	0.5%	29%	70%
My understanding of farm forestry interests of other people in my region is now	0.7%	23%	76%
My opportunities for networking with other people in farm forestry is now:	0.2%	17%	83%

Sample size in all questions: 407

What makes the MTG work?

Although success is dependent on the skill and commitment of the many coordinators, presenters and participants, there are clearly elements of the MTG program structure and delivery that attracts commitment and underpins success. The MTG program involves education, skills training, network development and leadership preparation. All these aspects are nested within a philosophy that puts the landholders motivations first, an adult learning approach (Knolwes 1990) and a uniform structure that reinforces the philosophy and learning principles. Combined, each of these elements contributes to the success of the Australian Master TreeGrower program.

A philosophy that respects landholder's motivations

The MTG program acknowledges the central role of the farmer as the principle decision maker and the one who is ultimately responsible. Farm forestry is therefore a result of a *decision by a landholder to commit resources (land, capital, labour etc), either alone or in partnership, into the establishment and or management of forests on their land*. The landholder's motivations is therefore the basis for all MTG programs and without this as the starting point, the program will simply not be relevant to those we are trying to support.

But it is neither possible nor desirable to try and predict the range of motivations or their importance for landholders involved in farm forestry. Farmers grow and manage forests for a variety of reasons (Wilson *et al* 1995), but they are also motivated by personal aspirations such as "passing the farm on in a better state" or allowing for generational transfer without the need to subdivide the land or simply to work in a more aesthetically pleasing environment. It is clearly unrealistic to expect a range of "best bets" or "recipes" will suit more than a small percentage of farmers (Campbell 1994) and not only does the environmental

landscape vary from farm to farm so to does the social and economic landscape. The importance of distinguishing between an approach that advocates particular farm forestry options and one that promotes good design is critical.

Therefore rather than trying to transform farmers into foresters, the MTG program argues that forestry must be adapted to fit into the culture of the farming community. Industry, government or community groups still have a legitimate role in advocating for particular outcomes or products, but those promoting these outcomes must recognise that their motivations may be quite different to those they hope to influence (Barr *et al* 1992). Therefore, rather than allowing stakeholders to use the MTG to advocate their best-bet options, the program encourages them to specify their own performance criteria and outline how they might reward (or penalise) farmers who do, or do not, meet these criteria. It is then a decision for the landholder on how this information is integrated into their farming business, but ultimately it is the commitment of the landholder and acceptance for their decisions that will ensure sustainable and successful farm forestry outcome.

The MTG program in assisting farmers identify, design and evaluate their own farm forestry options measures success against the landholder's own personal performance criteria. Whether this results in an increased commitment to forestry (such as more trees planted) will depend on the individual circumstances and is not in itself an effective measure of the success of the program. But working with farmers and rural communities through this process can highlight research and development needs by exposing points of failure in the design or implementation of farm forestry systems that provide farmer satisfaction.

As extension agents we may be able to influence landholder's decisions but we cannot control them. Pre-determined outcomes that ignore landholder motivations must be avoided to ensure that all opportunities that may be appropriate are considered

A commitment to learning based on adult learning principles

It is not uncommon on the first session of an MTG program to have a group of 20 of so farmers with a combined forestry, farm forestry or revegetation knowledge bank of over 250 years, varying degrees of formal and informal education, a general conservatism and wariness but enthusiasm. The principles outlined below (adapted from Knowles 1990, Vella 1994 and Fells 1999) ensure a positive learning experience for participants during the MTG program.

Principle One: Build on local experiences, use and recognise individual and group knowledge

All participants in an MTG program will bring a wealth and diversity of experiences to the MTG program. It is essential that this knowledge is recognised, respected, and built upon throughout the program. Farm walks and business tours led by the participants are therefore an important element of the second half of the program as it not only demonstrates the importance of adapting forestry designs to suit individual circumstances but also allows the sharing of knowledge and experiences. Here participants (learners) also become teachers or 'experts' by

telling their own stories and sharing their experiences and interests. This builds empathy, trust and confidence amongst the participants and increases the likelihood that relationships established during the program will be maintained.

Principle Two: Make the learning environment comfortable, safe and encouraging

Many of the participants come to the program with little formal education, are anxious about their own perceived deficiencies and particularly showing these in public and to their peers. A safe and encouraging environment, both socially and mentally is essential to ensure a positive learning experience. To help this the MTG program avoids formal University assessments, ensures as many sessions as possible are in familiar surroundings (such as farm paddocks) and presents a uniform program that other landholders have all successfully completed. In effect, the traditional view of a University's authority and formality is kept at arms length from the program while still allowing credibility to be derived from an association with a formal learning institution.

Principle Three: Ensure that the learning activity meets the needs and relates to the problems of the group.

The Australian MTG program is appropriate for some, but not all. The MTG program focuses on those that have already or are likely to make a significant commitment to forestry, and develops a program around these participants unique potential to contribute to farm forestry development. An essential requirement of the program is for regional coordinators to meet with influential regional farm foresters during the programs development to ensure there is a demand and that the program covers regionally important issues. Also during the first session participants are asked to raise issues that they would like to see covered in the second half of the program. If the programs structure and objectives did not meet participant needs, landholders would simply vote with their feet.

Principle Four: Ensure action and reflection and participants are involved in their own learning

There seems to be little doubt that adults learn by doing, but 'doing' is not the building of knowledge unless there is reflection. During and between all MTG sessions, there is always action and time for reflection. (The requirement for time and space (see principle six) is essential). The MTG program also employs an action learning style (Clark and Timms 1999) to ensure that all styles of learning (Honey and Mumford 1986) are catered for through a process of planning, acting, observing and reflecting. This also ensures learning is participatory and meaningful to the participant's immediate requirements.

The emphasis is on the process of adaptation and learning as opposed to content and outcomes.

Principle Five: Have activities that involve, that are simulating, are participatory and are immediately applicable

The simplest way to ensure this is to focus on problem centred learning around real life situations rather than subject centred. Too often programs are based

around linear notions of farm forestry development starting from the planning subject, then the planting subject, then the pruning subject and so forth. The MTG program bases all learning on problem solving, preferably in the paddock and preferably directly related to the participants immediate needs.

Principle Six: Allow time and space for reflection

This principle overlaps all other principles, because participants require time to feel comfortable in the group and time (and space) to reflect on what is being discussed and how the information will be incorporated into their immediate work environment. Importantly time is required to build confidence in both the group dynamics and knowledge being built. This is often seen in the 'chatting' at morning and afternoon tea, bus rides and discussion after the days events which are all important times for reflection and important for the development of the regional programs identity.

Principle Seven: Build group and individual confidence by encouraging and rewarding

The use of the title "master" is recognition of the participant's knowledge, experience and personal commitment and is used to link, encourage and reward. The small ceremony at the end of all MTG programs, with the awarding of the MTG 'certificate of appreciation' and MTG gate sign is an official acknowledgment of the participants potential and in effect rewards participants for their knowledge, enthusiasm and participation. For those participants that have little formal education this is extremely important. This is also an important way of formally linking participants together and the presentation of the MTG gate sign and hat helps in building a group identity and regional peer group of committed farm foresters.

Principle Eight: Respect

Respect overlaps all the other principles and is an essential over arching principle of the MTG program. Landholders desire to be decision-makers and resist being treated as objects or something that can be used by others. The dialogue of learning is between two adults whose knowledge and experiences are equally respected. Trying to change a farmer's culture does not generate respect.

"The way the course is structured by following the needs of the group was excellent" (Gloucester, NSW)

"The program was very flexible, each participant used it for their own needs" (Hunter, NSW)

"I thought it was a good program. Structured well and good format. Gave people information for people to go off and learn more. Gives me confidence to learn more on my own" (Seymour, Victoria)

"The whole program was very educational. Particularly sharing of experiences from each participant and field visits. The group, although a diversity of people was very safe to express oneself in". (Armidale, NSW)

A structure that supports the MTG philosophy and learning principles

The MTG approach to the diagnosis, design and evaluation of farm forestry opportunities is based on three steps:

- Identification of farmer design criteria and performance measures for success (Session one);

- Description of consumer product/service specifications, associated rewards or penalties, possible trading mechanisms and the manipulation of trees to achieve these specifications (Sessions two to four); and

- The evaluation of possible design options against 1 and 2 including an assessment of risks, uncertainty and opportunities for negotiation (Sessions five to eight).

Because the program advocates a design process, rather than a particular outcome, participants quickly recognise that they must take responsibility for the process if they are to define appropriate farm forestry opportunities and effectively negotiate with consumers. The MTG framework that is used in all programs across Australia allows this to happen by mimicking the diagnosis and design process, as well as ensuring participant's motivations are central to the learning experience and that participants are in control of the process. (A more detailed description of the MTG programs framework can be found in Reid and Stephen (1999) or at the MTG web site- www.mtg.unimelb.edu.au)

Within the MTG structure there are several inbuilt mechanisms that ensure participation, action and reflection.

Let them judge the market for themselves

Rather than expect farmers to share our confidence in future markets for forest products the program encourages farmers to make their own judgements and interpret the risks associated with their participation in forestry markets.

Hand over the "tools" of forestry

Monitoring growth and productivity is a key to understanding production systems and making management decisions. The MTG program includes the provision and training in the measurement of tree and forest growth so that farmers can begin making their own assessments of productivity in order to judge the likelihood of achieving production targets.

Share the principles of management

The production of forest products and services can be achieved in many ways. The design, management and methods used should be developed in a way that is appropriate for the individual's own circumstances. Conventional forestry systems are based on well-founded silvicultural principles and by sharing these principles with farmers the program encourages them to consider and interpret new designs that meet their own requirements. In many cases these will look very different from those adopted by other producers of forest products.

Allow for multipurpose design

Land managers can't afford to focus on single issues, they must manage their land for a balance of social, environmental and economic values. Multipurpose farm forestry, appropriately designed by land managers is encouraged and seen as legitimate in the MTG program, even though these designs may compromise single objectives or preferred outcomes set by land management or forestry agencies.

Don't shy away from risks

Trees die, markets fail, science does not always have the answer. There are risks in farm forestry that must be understood by those that are committing their resources and time to farm forestry. Ignoring or hiding the risks doesn't allow for a fully informed decision to be made nor does it allow for landholders to be accountable for their decisions. In these circumstances failures tend to be blamed on the extension advice, the forestry departments or whoever but rarely the landholder themselves. To fully learn means to be fully involved.

Ask 'specialists' to discuss not lecture

Expertise in areas such as land degradation, farm management, shelter, fire, silviculture, and other topics covered in each MTG program is provided by invited specialists. Rather than simply making formal presentations the specialists are encouraged to participate in discussion and highlight design principles in a way that is relevant to the farmers. It is critical that presenters acknowledge the problems and constraints faced by farmers and factors outside their "discipline" that might influence farmer decisions and project design. Engaging specialists in on-farm problem solving sessions with landholders has proven to be the most successful means of enhancing communication and learning.

"People with all the knowledge were so practical. You dread it when people come from Uni with all their waffle. There was nothing airy-fairy. They gave you all the negatives, they said how you wouldn't make much money, they said how it takes ages for changes in salinity. Nothing was biased" (Duranillin, WA)

"I really enjoyed it. It was a lot to take in and the fact that there is no infrastructure set up and that takes people's confidence away. There's one thing of getting trees up and getting them going, then a minefield of milling etc. It's important to feel that you've got some idea about it all" (Seymour, Victoria)

"I thought it was an excellent course. We are not going to be big forestry growing people, but learning how to integrate farm forestry with our agriculture was very useful" (Wellstead, WA)

The outcome: Formal and Informal networks

Participation in programs like the MTG is a "socialisation process" in which information is gained by personal contact with natural resource management professionals and other landholders (Mills *et al* 1996). Socialising with others having similar interests also reinforces the social and personal acceptability of

becoming involved in farm forestry. Effective networks, be they formal or informal, ensure that individuals always have access to support as they work through the issues at their own pace - or as their trees grow.

Building effective networks takes time, which is why the MTG program is not delivered in a continuous block but rather spread over an 8-week period. But it is from these linkages that individuals will share knowledge, information and experiences that will allow for changes in behaviour and the reality of farm forests integrated into the rural environment for all their multiple purposes.

This effectively means allowing farmers to lead and this is what farm forestry is all about.

"The networking is where we get the ideas. It's a new industry, many of us have been farmers all our lives but there is much to learn". (Albany, WA)

Conclusion

The MTG program has been extremely well received by landholders and extension practitioners based on a number of simple ideas. It is a program that targets a specific audience for a specific reason and as such the MTG program should not be seen as the only extension or education approach, but rather an educational program to complement existing regional extension activities. Having said that, we believe that the principles outlined above can be applied to landholder education and extension programs across a range of land management issues.

Although the MTG program has changed over the years and will continue to evolve, its success is built on a principle of respect for the primary decision-makers, the landholders and their motivations in committing to farm forestry. Without this as a central tenet to the MTG program, the program's success, if at all, would have been fleeting and another example of a landholder educational program that never really lived up to its heroic expectations.

"One of the best courses I've ever been involved with. An excellent course. The course was tightly organised and sent off really well. The best course I've ever done" (Busselton, WA)

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FARMER AND LANDHOLDER CONTRIBUTIONS TO AUSTRALIA'S COMMERCIAL PLANTATIONS

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Abstract

In Australia almost all of the cleared land available for forest expansion is privately owned, and managed by farmers and other landholders. In 1999, ninety per cent of new plantations were established on private land (NPI, 2000). The rate of plantation expansion therefore largely depends on the decisions of private landholders to integrate forestry into farming practices or, in other cases, to instigate major changes in landuse by the sale or leasing of their land to commercial forest companies.

Until recently there has been limited knowledge on the extent to which farmers have adopted farm forestry, or contributed to national plantation development. Consequently there has been a lack of recognition of the important contributions that farmers and other individual landholders have made to the national plantation industry. However, this situation is changing, as this paper explains.

In 1998 the Commonwealth Farm Forestry Program (FFP) provided funding to the National Forest Inventory (NFI) for three years to establish a National Farm Forest Inventory (NFFI). The aim was to develop mechanisms to quantify the farm forest resource and its contribution to the national plantation estate. The outcome, in coordination with the NFI's National Plantation Inventory (NPI), is a capacity to report on the extent of farm forest plantations in Australia. These outcomes were delivered in the *Plantations of Australia 2001* report (Wood *et al.* 2001). The paper draws on this report to explore findings from the NFFI and NPI relating to the size and nature of small grower plantations and the contributions of private landholders to the development of industrial plantations.

Introduction

Farmers and other landholders contribute to commercial plantation development in a number of ways. They include landholders establishing small plantations (or woodlots) on their own land; landholders providing land to plantation companies through joint venture or lease arrangements; and landholders providing skills, machinery and labour in the development of plantation projects. However, 'landholder contribution' in this paper only refers to their participation through the provision of land, either by planting their own land with commercial trees, or by providing land to other parties, to produce a commercial tree crop.

Australia has a long history of plantation development, commencing in the late 1800's. By the early 1900's all States and Territories had strategic trial plantings, principally of softwood species. Most of these early plantings were by State forest agencies on public land and they were successful in identifying a small number of

superior species. Subsequent large scale plantings were also initially mainly by States, followed later by a small number of large, private forest processing companies on private owned land and leased public land. There were also sporadic bursts of plantation investment on private land driven by tax minimisation schemes, but until recent times the overall levels of private investment were low. For example, of the remaining plantation estate planted between 1960 – 69, only ten per cent is known to be privately owned (Wood *et al.*, 2001a).

During the 1990's significant government and industry based initiatives were developed to remove impediments to plantation development and in particular encourage greater private investment in plantations, for example, the Wood and Paper Industry Strategy, 1995, Plantations for Australia: The 2020 Vision, 1997 (Wood *et al.*, 2001b). These programs, together with the privatisation of government-owned plantations and major drivers such as tax investment schemes, have produced a clear shift from predominantly public to predominantly private investment in plantations. Increased private ownership, and State and Territory policies of not clearing of native forests (NFPS, 1992), has resulted in the majority of new plantations, in the last decade, being established on cleared agricultural land.

Plantation ownership

Plantation ownership arrangements have become more diverse over recent years. This is partly due to recent State legislation that allows for the separation of land and tree ownership (for example, Forestry Rights Act 1996), plus the advent of leasehold and joint venture schemes which enable two or more parties to combine land, capital and other resources to produce commercial tree crops. Leasing schemes have been popular with farmers wanting to enter into forestry as the costs associated with plantation establishment and management are usually met by industry or government. In return for providing their land, farmers receive a proportion of the plantation profits and/or an annual fee. Such schemes help satisfy the needs of those plantation companies and agencies wishing to secure land without purchasing property's and also provide supplementary or mainstream income to landholders. Curtis and Race (1998) have described the numerous benefits of leasehold and joint venture schemes to both farmers and growers.

In spite of the important contribution of plantations to the Australian forest products industry, the monitoring of ownership trends until recently has been limited. This reflects the simplicity of earlier ownership arrangements, where the State agencies and a small number of large industrial players owned the majority of plantations. Under these arrangements State agencies usually collected plantation statistics on behalf of all growers, which could be amalgamated to produce national statistics. This situation changed in 1997, when Australia's first comprehensive National Plantation Inventory was prepared (NFI, 1997) to meet new industry and government requirements. The report provided plantation statistics for 15 wood supply regions, but no ownership information was included. This omission was due to a number of reasons, particularly a competitive environment that had developed between growers, many of whom were reluctant to have such information published, as well as it being too early to appreciate the rapid shift in ownership trends.

Following the first NPI in 1997, there was growing recognition of the need to capture information on smaller grower plantations as part of future inventories. This information is required for policy, industry and reporting purposes. To this end, the NFFI was established in 1998 to facilitate nationally consistent data collection and reporting on all farm plantations, with the ultimate aim of incorporating it within the NPI.

Due to the evolving complexity of ownership, in 2000 the NPI developed two ownership types, which distinguished between ownership of the land and ownership of the trees. In addition to the public and private classes for each type a 'joint' class was used for tree ownership, defined as both public and private parties having some equity in the tree crop (Table 1). On this basis, the NPI reported tree ownership for the 1999 plantation estate was equally distributed between public and private, with an additional 8% (107,000 ha) held in joint ownership between public and private entities (NFI, 2000). A limitation of this classification system was that it did not identify the level of joint ventures occurring between private companies and private landholders.

This limitation was addressed in the development of a new reporting framework which allows for the integration of the NPI and NFFI and identifies a variety of tree and land ownership arrangements. This new reporting framework enables unique sectors of the plantation resource to be identified and quantified, which include a number of sectors where farmers and other property owners play a direct role.

Table 1: Ownership categories developed by the National Plantation Inventory, 2000.

Land ownership	Tree ownership	Description
public	public	<i>State agency owning trees on crown land</i>
public	private	<i>Private company owning trees on crown land</i>
public	joint public & private	<i>Joint Venture ownership of trees between State agency and private company on crown land</i>
private	public	<i>State agency owning trees on private land</i>
private	joint public & private	<i>Joint Venture ownership of trees between State agency and private company on private land</i>
private	private	<i>Private tree ownership on private land in either an outright, leasehold or joint venture arrangement</i>

A reporting framework for farm forestry

The NFFI was instigated after a pilot study to identify appropriate methods for collecting farm forest resource data. Due to the large number of individual owners and the scattered distribution of farm forests it was determined that data collection should occur through a national network of regional farm forestry groups (Sun *et al.* 1998). The core of this network resulted from a major initiative of the Commonwealth Farm Forest Program to support the establishment of Regional Plantation Committees (RPC's) throughout Australia. In addition to RPC's, the NFFI network includes about 45 additional representatives from regional tree grower groups, cooperatives, non government associations and State agencies.

These groups have close ties with regional growers and a strategic interest in collating regional resource information for their own purposes.

During 1999, as the NFFI began to establish formal links with appropriate regional and State groups, a need emerged to more clearly define the 'farm forest' sector for which data was to be collected and reported. It was especially important to ensure that the NFFI and NPI did not duplicate data collection efforts. This led to the definition of the NFFI project as the collection of data 'on those plantations outrightly owned by individuals with a total plantation estate of less than 1000 hectares'. Although this definition of plantation farm forestry excludes some enterprises, for example, joint ventures, it more clearly targets the sector where facilitation and encouragement of data collection is most needed. This definition also integrated well with the plantation sector the NPI was collecting data on and ensured a total coverage was achieved.

In June 2000 it was recognised by the NFFI Steering Committee that reporting on the small grower sector alone by the NFFI did not adequately capture all types of farm forestry. There was a need to capture data on a wider number of landholders undertaking plantation development, particularly those occurring through partnerships with industrial growers. As a result, the NPI undertook to identify that portion of the industrial sector established through partnerships with landholders, by requesting industrial plantation owners to identify the percentage of their plantation area under leasehold, joint venture and outright ownership of trees and land (see definitions).

This approach recognises particular sectors of the plantation estate and allows each sector to be quantified from a resource perspective, as well as providing a gauge to the level of landholder participation in each sector. Because farm forest plantations occupy a range of scales (figure 1), and have a range of outcomes farm forestry activity was captured through both the NFFI and NPI, by:

NFFI data collection focusing on the small grower sector, ie plantations owned outright and established by individuals (zone 1 on figure 1);

The NPI, while focusing on industrial plantations, requesting data from all industrial growers on the percent area, of their plantation estate under leasehold and joint venture (zone 2 of figure 1).

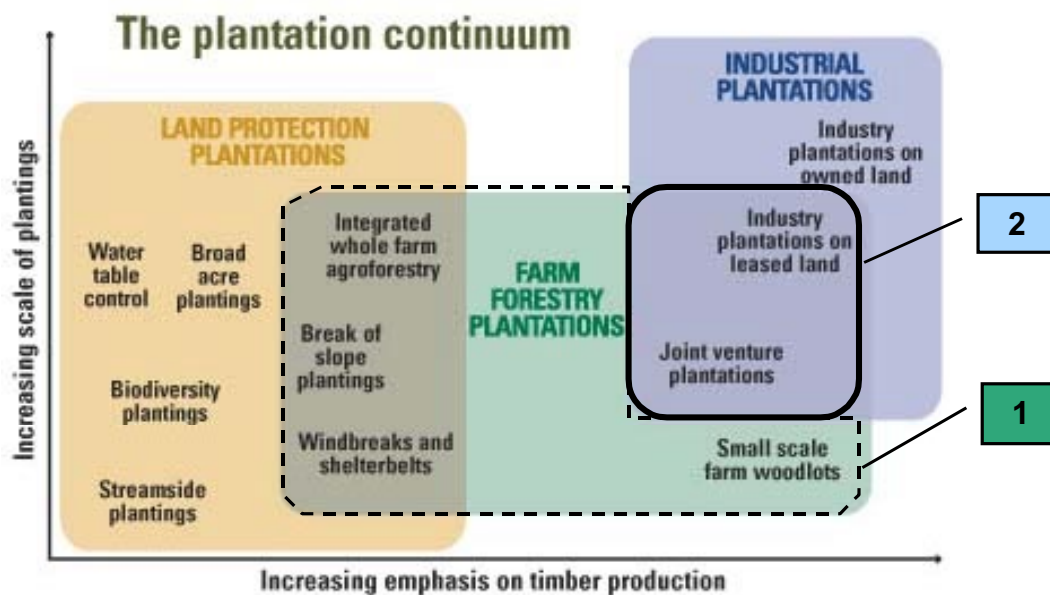


Figure 1: The plantation continuum

Results from Plantations of Australia 2001

The small grower estate

The NFFI identified 67,000 hectares of small grower plantations. These plantations represented approximately 5% of Australia's plantation resource of 1.485 million hectares (as at September, 2000).

Hardwood species make up the majority of the small grower plantations, with 33,510 hectares (50 per cent) being single species stands, plus an additional 8,190 hectares (12 per cent) of predominantly mixed species stands. Softwood species comprise 24,340 hectares (36 per cent) of the total. Eucalypt species dominate the hardwood sector, particularly *Eucalyptus globulus*, which totals 13,100 hectares and comprises 39 per cent of the single species hardwood resource and *E. nitens*, which totals 9,300 hectares or 28% of the single species total. These two species are also highly represented in the industrial sector, as recorded by the NPI. Other major eucalypt species of the industrial sector include *E. pilularis*, *E. grandis*, *E. dunnii* and *E. regnans*, but these are not highly represented in the small grower resource. Instead species such as *E. camaldulensis*, *E. cladocalyx*, *E. saligna*, *Corymbia maculata* and the oil mallee eucalypts in Western Australia occur in higher levels. This is due to a number of reasons, such as alternative markets being sought and different geographic regions being planted.

Although the area of small grower plantations has steadily increased since 1970, farm forestry is still in its infancy in Australia. Plantings during the 1970s and early 1980s were dominated by softwood species, mostly *P. radiata*. However, the level of hardwood establishment nearly quadrupled from 2,040 hectares during 1985–1989 to 7,980 hectares during 1990–1994. The first widespread establishment of hardwood plantations in the farm forestry sector occurred in Tasmania and

Western Australia in the late 1980s. This coincided with the start of major industrial hardwood plantation developments in these States.

The area of small grower hardwood plantations continued to increase from 7,980 hectares during 1990–1994 to 19,480 hectares during 1995–1999. This resulted from continued strong growth in Tasmania and Western Australia and increasing interest in other States especially the Green Triangle region of SW Victoria/SE South Australia, North East Victoria, and Northern Queensland (see Figure 5 for RPC map). In contrast, softwood plantation establishment rates reduced over this time after peaking at 3,850 hectares in 1975–1979. More than a third of the current total small grower resource has been planted since 1995. Table 2 shows the current State totals.

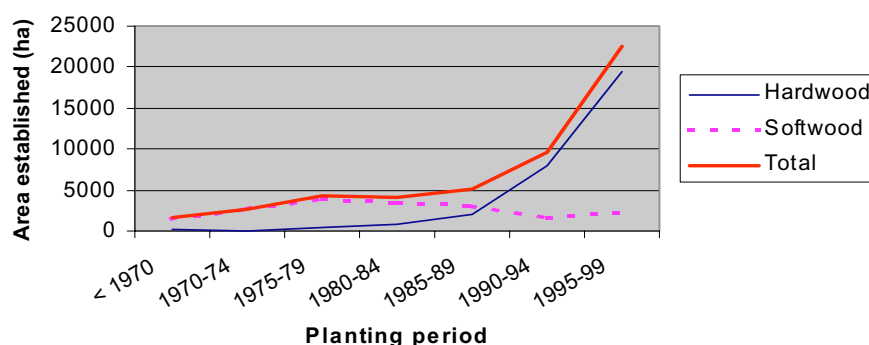
Table 2: Areas of small grower plantations (hectares)

<i>State</i>	<i>Hardwo</i>	<i>Softwo</i>	<i>Mixed</i>	<i>Unknow</i>	<i>Total</i>
NSW	388	3,881	2,698	915	7,862
NT	15	0	29	0	44
QLD	253	378	2,660	0	3,292
SA	2,021	3,367	718	0	6,106
TAS	11,700	4,400	0	0	16,100
VIC	7,584	11,467	2,002	33	21,086
WA	11,542	850	104	0	12,496
TOTAL	33,504	24,343	8,190	948	66,983

1= mixed contains predominantly group plantings of mixed hardwood species.

Additional information on national programs relevant to the establishment and monitoring of species and management trials is also contained within the Plantations of Australia report.

Figure 2: Small grower plantation establishment rates in Australia

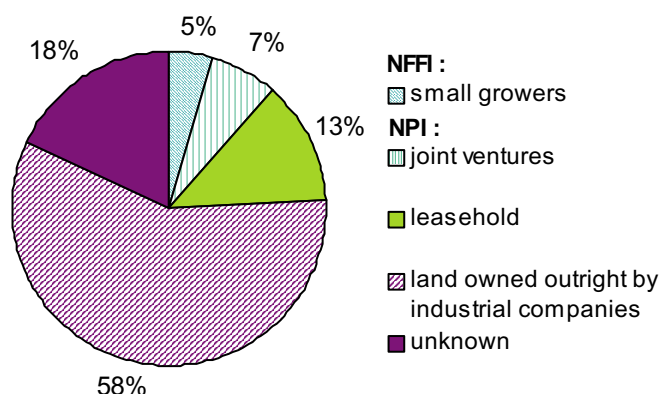


Joint ventures and leasehold

The NPI identified that 20 per cent (293,000 hectares) of Australia's industrial plantation area was established on either leased land or through joint ventures. Thirteen per cent of the industrial resource, approximately 189,000 hectares, is on leased land. This is land made available to a forest grower in exchange for a regular payment, where the grower has sole primary production and access rights to the trees. A further seven per cent of the industrial resource, approximately 104,000 hectares, has been established through joint ventures where both parties have shared equity in the final product. The NPI also identified that 61% of the industrial resource, or 858,000 hectares, is on land purchased outright by industrial growers.

In total, the 3 components in which farm forestry occurs (ie small growers, leasehold and joint venture), accounts for at least 25% of the total plantation estate (Figure 3). It should be noted, however, that leasehold and joint ventures may not always include individual landholders. For example, where a private company leases public land or is in joint venture with another State agency.

Figure 3: Percent areas of identified sectors within Australia's plantation estate



Number of landholders involved

Small growers

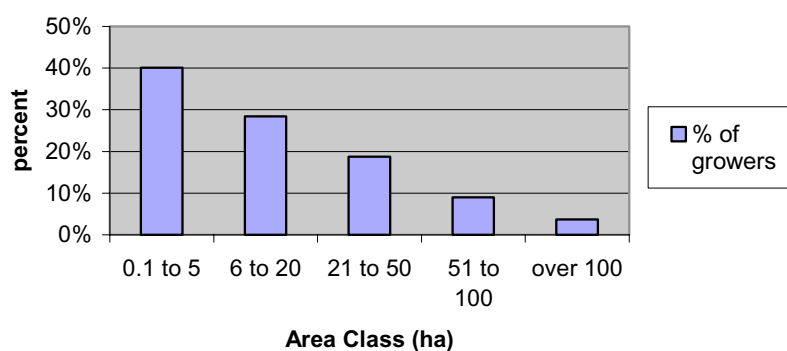
Quantifying the number of landholders involved in small grower plantations was not an objective of the NFFI and as such was not recorded in the core dataset. The database includes only resource parameters, including species, area, location and year of planting. However, the manner in which data was provided to the NFFI from some regions provides some insight into the number of landholders involved in plantation development. These are described in the following two case studies.

Gippsland Case Study, Victoria

According to data provided by the RPC, Gippsland Farm Plantations, small growers manage 6,970 hectares of plantation. These are comprised of 520 individual stands in 267 individual ownerships. Approximately 40 per cent of growers have up to five hectares (Figure 4), and there is a generally linear reduction in the percent of growers with larger holdings, made up of one or more stands. The median holding size is 8.8 hectares.

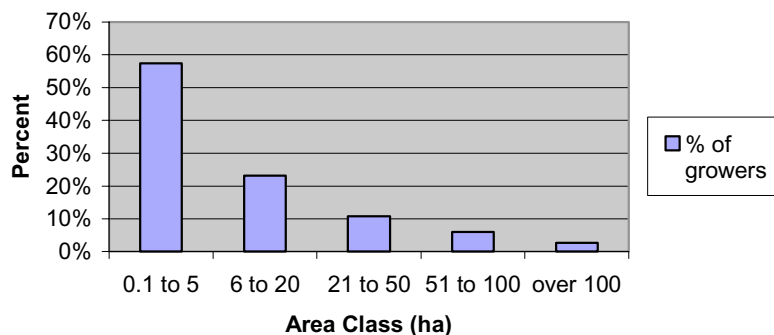
Green Triangle Case Study, Victoria/South Australia

Figure 4: Per cent holdings of plantation of different sizes in Gippsland RPC region



Data provided to the NFFI identified a total of 5,548 hectares of small grower plantations in the Green Triangle region of Victoria and South Australia. A subset of data provided, covering 4,792 hectares, identified 583 individual stands and 298 individual growers contributing to the resource. Assessment of plantation holdings (Figure 5) shows that nearly 60% of growers in this region have up to five hectares, resulting in a smaller percent of growers with larger holdings compared with Gippsland. This is reflected in a lower median value (3.4 ha) of holdings per small grower in the Green Triangle RPC region.

Figure 5: Per cent holdings of plantations of different sizes in Green Triangle RPC region



Using five hectares as a best estimate of the national average holding suggests that approximately 13,400 landholders contributed to the NFFI.

Joint ventures and leasehold

A total of 293,00 hectares, representing 20 percent of the total resource, was identified as either joint venture or leasehold plantations. Leasehold and joint venture schemes, therefore, have been utilised as an important mechanism for plantation expansion to occur on cleared agricultural land. A significant proportion of this amount (approximately 125,000 hectares) accounts for arrangements exclusively between industrial and/or government parties and does not involve landholders, such as the leasing of public land by private plantation companies. Although the number of landholders participating cannot be accurately quantified, the remaining 168,000 hectares can be used to provide an estimate. Assuming an average holding of 40 hectares¹, results in approximately 4,200 landholders involved in various partnership arrangements with government or industry to produce plantation timber.

Implications for forestry extension

Data collection activities and findings of the NFFI and NPI have direct links to the provision of forest related information throughout Australia. They provide statistical data that underpins an improved understanding of existing plantations for industry and regional planning, and foster networks that encourage coordination and wider interest in farm forestry. From an extension perspective benefits include:

Identifying regional networks: the NFFI has established strong links with many small grower representatives across Australia. These groups have a strategic focus on regional development and could be involved in extension activities in their respective regions.

Understanding the regional profile: accurate, current resource information enhances understanding of what growers are planting with respect to species, size, age and location, the number of landholders involved and potential products. This information is important for cooperative planning and marketing and could influence the type and quality of extension provided.

Identifying players and stakeholders: NPI data shows that 20 per cent of the resource is established through joint venture and leasehold schemes. Under such schemes industrial growers often form partnerships with landholders to secure land. New opportunities could exist for extension services to be provided to farmers by industrial forest managers through such partnerships and possibly built into contacts between both parties.

Conclusion

A national reporting framework has been established that clearly identifies and quantifies different plantation sectors in which farmer and other landholder contribution occurs. The NFFI focuses on the small grower sector and the NPI, while focusing on the industrial sector, identifies that portion of industrial plantations which include joint venture and leasehold schemes.

The small grower sector totals approximately 67,000 hectares, representing approximately five per cent of the national plantation resource. In addition, at least 20 per cent of the resource, or 293,000 hectares, has been established through joint venture and leasehold arrangements, of which 168,000 hectares is estimated to involve landholders. Using available information it is estimated that 13,400 landholders contribute to the small grower resource and an additional 4,200 are involved in farm forestry through joint venture and leasehold schemes with industrial growers.

Timely and useful resource information, at a scale that is relevant to planning, provides important benefits to regional farm forestry groups for strategic planning, marketing and attracting regional investment. The framework developed for farm forestry reporting addresses the complexity of current plantation development and the options landholders have for being involved in farm forestry activities. Inventory outputs are being used to develop clearer regional profiles and can assist in developing better designed and implemented extension programs.

Definitions

According to the NPI data request industrial plantation managers were asked to provide a percentage breakdown of their plantation estate under leasehold, joint venture and outright ownership according to the following definitions:

leasehold - leased land where you have the sole primary production and access rights of the trees;

outright – outright ownership of the trees and land;
 Joint venture - joint ownership of the trees with another party (both have some equity
 - this does not have to be equal but each party has a greater than 10% share).

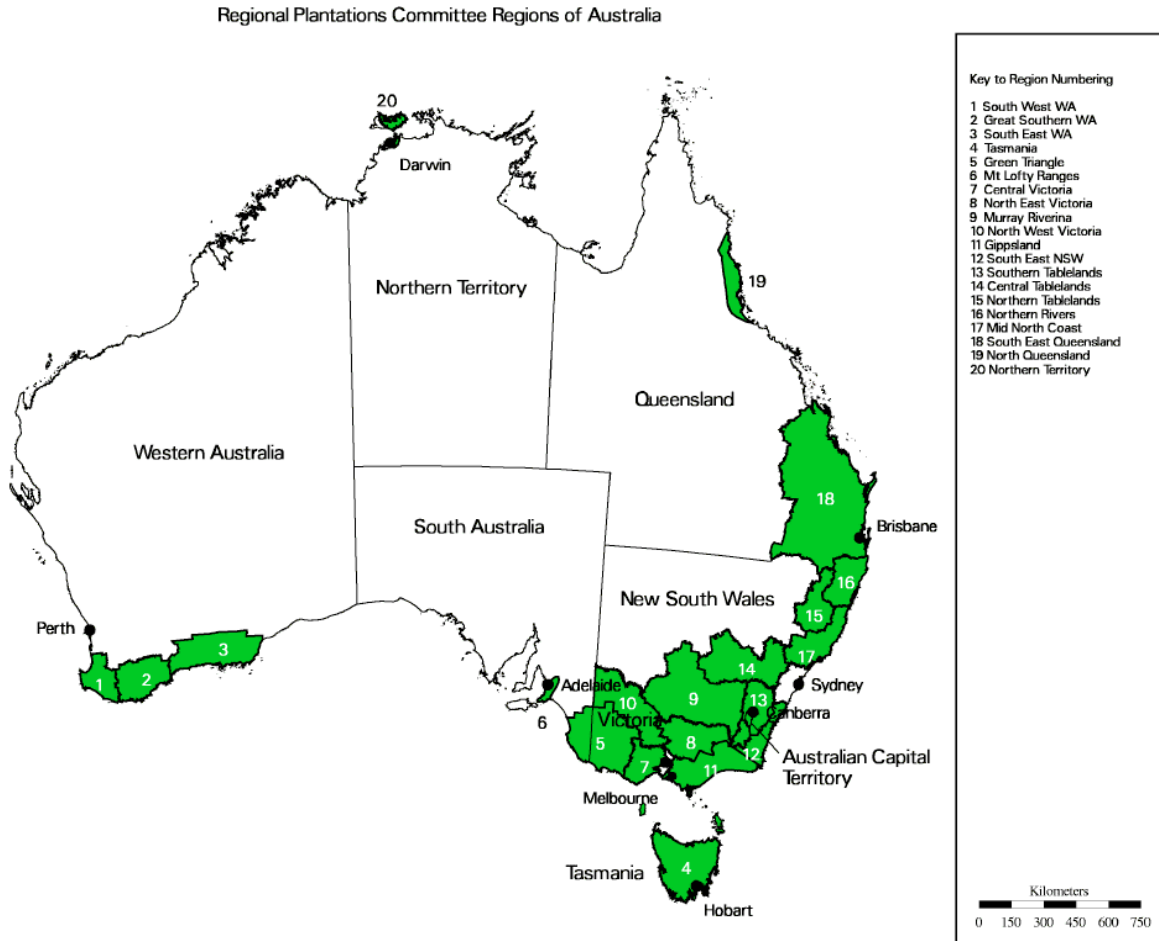


Figure 6: Regional Plantation Committee regions of Australia

Note: some regions do not have a formally recognised Regional Plantation Committee.

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SEED AND INFORMATION SUPPORT FOR FARM FORESTRY: FARMERS AS RESEARCHERS

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Abstract

Farm forestry is an option available to land owners in a very diverse range of bioclimatic and socio-economic regions in Australia. The scope for development and refinement of species and management systems to suit this diversity of growing sites is too large to be tackled solely by traditional forestry research providers. Landowners and farm foresters can, and are, taking more responsibility for their own knowledge generation. With a range of support tools and some basic training and understanding of the scientific process, regional groups and individuals are contributing to general understanding of species performance and growth as well as providing the basis for sound decisions at local and regional level.

The paper outlines work done by CSIRO Forestry and Forest Products with farm foresters across Australia using funding support from the RIRDC/LWA/FWP Research and Development Corporations' Joint Venture Agroforestry Program and the Natural Heritage Trust. It covers connections to breeding and tree improvement work done by the Australian Low Rainfall Tree Improvement Group for farm forestry in lower rainfall areas.

Introduction

Farm forestry is an option available to landowners in a very diverse range of bioclimatic and socio-economic regions in Australia. In areas of medium to higher rainfall (>600 mm), commercial tree plantations are often seen to provide a feasible business option in their own right for landowners. In many lower rainfall areas (400-600 mm) in southern Australia, integration of tree plantings into farms is increasingly seen as desirable way to enhance economic and environmental sustainability of many agricultural systems (Vercoe and Clarke 1997). Thus new plantations in Australia are being established by an increasingly disparate groups of growers using widely varying knowledge bases.

This trend has created a need for both more targeted research, and effective transfer of new and pre-existing information. However, the scope of research required to service the needs of these diverse groups of growers and planting environments is too large to be tackled solely by traditional forestry research providers. In addition, many tree growers and co-ordinating groups are keen to develop their own knowledge base and reduce the time from research result to practical

implementation. Land owners can build on this in sourcing the best genetic material and technology for tree growing endeavours in their local environments.

This desire by tree growers to become more closely involved in developing knowledge and appropriate genetic material was a key-driving factor behind the instigation of the Farm Forestry Seed and Information Support for Commercial Farm Forestry Project (FFSIS) in 1999. Its primary objective is to enhance the economic and environmental benefits of commercial farm forestry through assisting farm forestry growers and investors to select and make best use of native and exotic species for the available sites and products required. The project transfers existing knowledge, extends the knowledge base further in the areas of product testing, productivity modelling and genetics, and establishes the basis for land owner driven species and provenance testing.

The work is being done by CSIRO Forestry and Forest Products with farm foresters across Australia using funding support from the RIRDC/LWA/FWP Research and Development Corporations' Joint Venture Agroforestry Program and the Natural Heritage Trust. The project interacts with a range of other research agencies through the Australian Low Rainfall Tree Improvement Group

The Australian Tree Seed Centre

The Australian Tree Seed Centre (ATSC) was established in the early 1960's as an international centre for *Eucalyptus* seed and information. Since that time it has developed to cover a wide range of woody species of Australian origin and eucalypts now comprise only about half of the species handled by ATSC. Other multipurpose genera of importance now included as work priorities are *Acacia*, *Casuarina*, *Grevillea*, *Melaleuca*, *Sesbania* and *Terminalia*. Total seed stocks exceed 30,000 accessions representing more than 1300 taxa. ATSC's primary objectives are:

- to provide a focal point for the procurement and distribution of seed of Australian indigenous woody species for research in Australia and other countries;
- to assemble and disseminate technical information on Australian woody plants suitable for wood production or in other roles; and
- to scientifically examine genetic diversity of Australian woody species and undertake genetic improvement of selected species.

ATSC is part of Australia's CSIRO Forestry and Forest Products. Associated with this is access to, and direct interaction with, a broad range of research results and capabilities across a wide variety of scientific disciplines. ATSC's own current research programs include species evaluation using both quantitative and molecular techniques, species-site matching, provenance-progeny trials, tree breeding, seed orchard development, essential oils, taxonomic studies, isozyme evaluation, seed germination and seed storage requirements. The latter involves selection and genetic improvement and is a particular focus for ATSC. The Centre has traditionally had a strong international focus because of the large overseas interest in Australian trees. Work in farm forestry has provided an opportunity to repatriate information derived from international research.

The Australian Low Rainfall Tree Improvement Group

The Australian Low Rainfall Tree Improvement Group (ALRTIG) was formed as a result of a resolution made at the National Low Rainfall Tree Improvement Workshop held during 1998 in Adelaide. This workshop brought together twenty major stakeholders in low rainfall farm forestry and tree improvement. These participants were in general agreement that co-operative research is the path to rapid and efficient development of Australia's low rainfall tree genetic resources. Subsequent to the workshop, a partnership consisting of state agencies and CSIRO Forestry and Forest Products was formed with support of the Joint Venture Agroforestry Program. Key species were identified, and the group's activities commenced in August 1999. Work done by the group incorporates the results of trials on private land to increase the efficiency of the tree improvement process. Material identified and developed through ALRTIG has been provided to growers via FFSIS and information derived from farm plantings has passed back to ALRTIG via the same pathway.

Extension and Technology Transfer

The essential links between researchers and practitioners are generally provided by some type of extension and/or technology transfer mechanisms. Extension is generally associated with a classical type service where personnel specifically dedicated to extension work within a prescribed region making regular visits to growers/end users to provide advisory services (MacLennan 1996). Technology transfer involves communicating results of research to appropriate end uses/stakeholders in such a way that it can be understood and evaluated for a range of conditions (MacLennan 1996).

Neither ATSC nor the wider ALRTIG have the resources to provide traditional extension services as well as focus on their research. Instead many stakeholders are engaged as partners in the research and extension process. This has the benefit that boundaries between research, knowledge generation, technology transfer, extension and applied practice become blurred and an efficient flow of information occurs in both directions. Feedback occurs quickly and responses to key issues can be formulated quickly and tailored to particular situations. This can be a nervous process from the scientific perspective as researchers are inherently hesitant about releasing preliminary findings. However if the decision makers are prepared to accept the risks outlined by researchers and adopt a gradual and continuous approach to improvement there are benefits in both directions. From a research point of view, the implementation of results provides an additional refinement to ongoing research and interpretation processes while growers get early access to the latest information. This can be very significant with respect to the selection of genetic material for medium to longer term tree crops.

In the case of species and provenance selection on a regional basis, local groups can establish, monitor and establish trials to provide ongoing information on the relative performance and adaptability of different germplasm with minimal external assistance. FFSIS has provided seed, planting designs, training courses and

monitoring tools to assist with this process. At any time the trials can be utilised for commercial production since they are carried out on private land and largely subject to the needs of the land owners. In the course of FFSIS, several trials have been 'lost' but the alternative of putting trials on Govt owned and/or controlled land can also result in trials being 'lost' to the people needing the information they contain. Local trials on local land established and monitored by local land owners and extension providers confers an ownership of not only the trees but also the information embodied in the planting(s).

Integrated Collaboration

There is an extensive range of native and exotic species suitable for farm forestry but they need to be matched to sites which suit their climatic and edaphic requirements. Conducting field trials to assist such species/provenance-site matching is an important facet of the ATSC's program. As ATSC and CSIRO FFP do not own any land, such trials need to be located on sites owned by other parties. However, rather than leasing or renting trials sites, ATSC has instead preferred to engage interested landholders as partners in the research process. In many of the trials, other stakeholders ranging from Landcare groups through to commercial forestry companies or state forestry organisations are also involved. Each collaborator in a trial makes a significant investment in it and the resulting benefits are shared on a mutually agreed basis.

Through such bi- and multilateral collaboration, ATSC has established more than 70 species, provenance and family trials with a total area of over 100 ha and involving more than 150 species in Australia. This network of trials has provided an effective integration of research, technology transfer and extension – not only are practitioners and end users partners in the research, they also become partners in the technology transfer process. In addition, this approach to conducting research has meant that practitioners and end users are also intimately engaged in the research planning process.

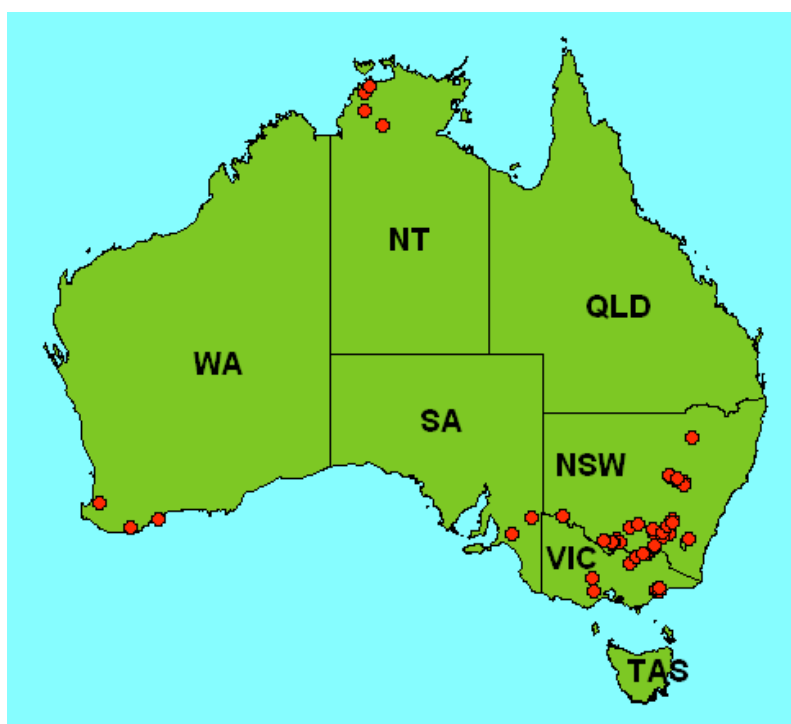
The role of scientists in the early stages is to ensure that medium to long term interpretation will be valid based on careful initial selection of appropriate trial material and the design of the trial planting. Assistance with the development of a monitoring program and guidance with measurement procedures are also important. With all these elements in place, longer term interaction between scientist extension workers and landowners can concentrate on interpretation of results.

Some of the landholders collaborating with ATSC in field trials could be considered farm forestry enthusiasts and opinion leaders. Such leaders can transmit substantial amounts of information and ideas to their peers and other practitioners and provide very effective lateral diffusion of research results (Muth and Hendee 1980).

Table 1. Collaborative field trials established in Australia with resources from FFSIS (CSIRO 2000)

Number of trials	Number of landowners	Total area	Number of collaborating landowners	Number of collaborating organisations	Number of seedlots
> 74	>70	>100ha	>300	>40	>600

Figure 1. Map of trial site locations established with FFSIS



Formal and Informal Communications

The partners in the collaborative trials usually elect to form a management committee. These serve to oversee the trial management, application of outcomes and any matters arising in relation to the trials. Such committees meet formally and/informally on a periodic basis and facilitate the open flow of information.

To communicate with a wider farm forestry audience as well as those involved directly in the research process, staff of ATSC also participate actively in the biennial TreeFest, farm forestry conferences, selected Regional Farm Forestry Network meetings and Landcare/farm forestry field days. In addition to these, which address farm forestry and related activities specifically, staff also attend selected Agricultural field days. Even though the latter focus on agricultural issues, an increasing number of such field days are including or expanding their farm forestry content. Attendance

at these events provides a valuable opportunity for ATSC staff to get feedback directly from growers whilst providing an efficient way to simultaneously communicate directly with a larger numbers of individual growers.

However, efficient technology transfer requires not only personal contacts but also reports in various forms of media (Muth and Hendee 1980). Recognising this, ATSC personnel frequently author papers and reports for peer reviewed scientific journals, popular forestry/farm forestry and natural resource magazines and newsletters. In addition ATSC publishes its own annual newsletter and also disseminates farm forestry information through its own web site (<http://www.ffp.csiro.au/tigr/atscmain>). This web site contains general information on ATSC's activities and publications along with a facility for users to search for currently available seedlots. In the future this information will be expanded to include information of direct relevance to farm foresters and other small forest growers. This web site, which receives around five to ten visits per day by non-CSIRO visitors, is becoming a very useful means of disseminating basic information to growers with access to the Internet.

Through FFSIS, farm foresters have been trained in small workshops covering trial establishment and monitoring. This provides an opportunity to tackle greater detail with an audience taking responsibility for regional trial activity.

Manuals have been produced for both training workshops as reference materials. Through FFSIS, ATSC has worked with other organisation like Greening Australia to add value to their species trialling programs and to reinforce learning of trialling technology. FFSIS has supported the development of the TREDAT database as a means of storing trial and tree planting information in a common and comparable format. A register of trials is one of the early outcomes from this work.

Discussion and Conclusions

Muth and Hendee (1980) suggested that cheerleading is no substitute for truth and knowledge and therefore successful research must involve both credible practitioners and credible researchers. This is very much in line with ATSC's experience. Some of our most successful collaborative trials are those initiated with practitioners who have earlier established credentials as successful tree growers, usually on their own land, and who hold considerable ongoing enthusiasm and dedication for farm forestry. Cultural change to treat tree crops in the same way as other agricultural enterprises provides the basis for research and innovation at the farm level.

Feedback from the practitioners to researchers, based on the practical application and experiences, are integral to keeping the research relevant, applied of high quality. This ongoing dialogue is continually shapes plans for future demonstration plantings, species selection, genetic improvement and utilisation options. Growers can become independent for basic information needs as well as speeding up the processes and precision of experiments carried out by dedicated research agencies. The importance of maintaining a dialogue that sustains mutual recognition of the requirements of each group cannot be over-estimated.

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IMPLEMENTATION OF RIPARIAN FOREST BUFFER SYSTEMS FOR THE RANCOCAS WATERSHED

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Abstract

The Forestry Extension Program of Rutgers University Cooperative Extension is leading a well-partnered effort to improve the water quality of the Rancocas Watershed through the control of nonpoint source pollution. The project is funded through a Section 319 "Nonpoint Source Pollution Control and Management Implementation Grant" administered by the New Jersey Department of Environmental Protection. Two riparian forest buffers modeled on the United States Forest Service's Three-Zone Buffer System have been established on two different sites within the watershed. The differences between the two sites chosen provide the unique opportunity to demonstrate the flexibility and range of design options for riparian forest buffers. Both sites incorporated local community and volunteer efforts and were important components of the buffer implementation. Both sites have also offered and continue to offer educational opportunities for municipal officials, farmers, other landowners, and the general public.

Introduction

The Rancocas Watershed consists of 360 square miles (933 square kilometers) and includes parts of Burlington, Camden, Mercer, Monmouth, and Ocean counties in south-central New Jersey, in the northeastern United States (See Figures 1 and 2 in the Appendix.). The 1990 population of the Rancocas Creek Watershed was 690,000 and is projected to grow to 729,000 by the year 2040. The water demand of 101 million gallons (382 million liters) per day in 1990 is expected to increase to 135 million gallons (511 million liters) per day by 2040. Increases in population size, development, and water demand within the Rancocas Watershed require immediate water quality improvements that can be obtained through the implementation of riparian forest buffer systems.

The Rancocas Watershed has been cited as a priority watershed by the "Draft 1998 Identification and Setting of Priorities for Section 303(d) Water Quality Limited Waters in New Jersey" (NJDEP, 1998). Pollutants have resulted in water quality violations for pH, fecal coliform, lead, mercury, and total phosphorus, leaving the Rancocas moderately to severely impaired. Use impairments include primary contact for recreation, aquatic life support, and fish consumption. The New Jersey Department of Environmental Protection has had in place for some time a system for identifying and monitoring point source pollution discharges in the watershed, and, given the land use development patterns in the watershed, recognized the need to reduce nonpoint source runoff to enhance and maintain water quality within the watershed.

Riparian forest buffers offer one alternative for reducing nonpoint source pollution. Though only in recent years recognized as a pollution control technique, there has been a surge of interest in riparian forest buffers for controlling pollution. Recent research indicates that in many landscapes, forest buffers can be highly effective in trapping, filtering, and converting sediments, various nutrients, such as phosphorus and nitrogen, and other chemicals. Forest buffers also help to maintain the hydrologic and ecological integrity of stream channels and shorelines, and protect fish and other wildlife by supplying food, cover, and temperature control.

Targeting nonpoint source pollution control in the Rancocas Watershed, Rutgers University Cooperative Extension formed a partnership with the United States Natural Resources Conservation Service, North Jersey Resource Conservation and Development Council, Burlington Soil Conservation District, Rancocas Conservancy, Delaware Valley Regional Planning Commission, New Jersey Forest Service, and the United States Forest Service. The four goals established by the partnership were to: 1) inventory cover types of the Rancocas Watershed riparian zone to assure proper species and site selection; 2) control nonpoint source pollution resulting in future environmental and economic benefits; 3) raise awareness, advance knowledge, promote the preservation and adoption of riparian forest buffer systems in the Rancocas Watershed; and 4) ensure continued implementation and success by creating a system to share knowledge, ideas, and results regarding riparian forest buffer system management. To achieve these project goals, two buffers were designed and planted to demonstrate the riparian forest buffer model and an implementation process.

This paper discusses the selection and planting of two riparian forest buffers as a demonstration and educational tool targeted for school children, municipal officials, farmers, other landowners, professional resource managers, and the general public.

Procedure and Implementation

Riparian forest buffer systems are a proven best management practice for the control of nonpoint source pollution. An extensive list of supporting documentation that details the functions and extols the benefits of riparian buffers can be found in an annotated bibliography by Correll (1996). Similarly, research has shown that buffers can effectively reduce nitrates and phosphorus passing through from adjacent areas (Schultz et al, 1995; Ducnuigeen et al, 1997), as well as provide important ecological benefits (Lowrance et al, 1995). The Three-Zone Riparian Forest Buffer System promoted by the United States Forest Service (Welch, 1991) for controlling nonpoint source pollution and improving water quality was selected as a guide for implementing this riparian buffer project. This model calls for three zones that are individual in function but interact with adjacent zones to provide an effective buffer system (See Figure 3 in the Appendix.).

Zone 1 is an area of permanent woody vegetation immediately adjacent to the stream. Its purpose is to control erosion by stabilizing the stream bank. Favorable habitats for fish and other aquatic organisms are created through the production of leaf litter, woody debris, and lower stream temperatures due to shade and retention of dissolved oxygen. Zone 2 is a sustainable, managed forest adjacent to and

upslope from Zone 1. Its purpose includes filtration, deposition, plant uptake, denitrification, and other natural processes that remove sediments and nutrients from surface runoff and subsurface flows. Selective harvesting should occur to remove sequestered nutrients (stored in woody biomass) while providing a potential source for economic gain for the landowner (Lowrance and Sheridan, 1985). Zone 3 is an herbaceous strip adjacent to and upslope from Zone 2. Its purpose is to convert runoff from concentrated flows to a uniform sheet flow. This facilitates the removal of coarse, suspended sediments and sediment borne pollutants. Grass filter strip studies have shown sediment trapping efficiencies to exceed 50% only when concentrated channeled flow is converted to shallow uniform sheet flow (Ducnuiguen et al, 1997). Using the Three-Zone Model, buffer width, as well as each zone width, can vary based on soil type, slope, and ownership.

A four-phase implementation plan was designed to achieve the project goals. In **Phase 1**, both naturally occurring forest buffers, as well as potential sites for restoring forest buffers, were inventoried and evaluated. Where natural buffers were present, buffer width, species composition, soil type, drainage characteristics, flood plain, and land use practice were noted. Potential restoration sites were georeferenced and mapped for possible forest buffer implementation. Recent aerial photography and available geographical information system (GIS) data for the watershed were the primary tools for this phase. Project partners, natural resource professionals, planning and municipal officials in the region, and others familiar and experienced with the watershed were also valuable resources for locating potential buffer restoration sites for the project. Two sites were selected for the project: Iron Works Park along the North Branch of the Rancocas Creek in the municipality of Mt. Holly, and the Coles Roberts Farm, a privately-owned farm in Southampton Township along a small tributary of Little Creek, a major tributary of the Southwest Branch of the Rancocas Creek.

In **Phase 2**, two three-zone, multi-species riparian forest buffer systems on the two sites selected in Phase 1 were planted and established. The Mt. Holly site, (approximately 2.0 acres (0.81 hectares)), was planted in Spring, 1999. The Roberts Farm site (approximately 1.5 acres (0.61 hectares)) was planted Spring, 2000. The design stage for each site included obtaining appropriate authorization from the respective owners for use of the site, inventory of native riparian plant species immediately up- and down-stream of the site, soil testing, and species selection for the design.

The Mt. Holly site. Located in a municipal park on the south side of the stream, the first 5 to 10 feet (1.5 to 3.0 meters) of the 15-foot-wide (4.5-meter) Zone 1 had existing trees, and no site preparation was required for additional plantings. Site preparation in Zones 2 and 3 (approximately 60 and 25 feet (18 and 7.5 meters) wide, respectively) was accomplished with a backpack sprayer application of glyphosate followed by rototilling with a small farm tractor. Herbaceous and grass seed mixes, and 600 mostly container-grown trees and shrubs representing 50 different species were obtained from native plant nurseries in the southern New Jersey/southeastern Pennsylvania area.

The seed mixes were combined with cat litter for more even distribution and were hand-planted by Rutgers and Mt. Holly personnel.

Two volunteer dates were arranged with the community for planting the trees and shrubs. Small wire flags were color-coded by species and placed in Zones 1 and 2 prior to the planting dates, indicating where each tree or shrub was to be planted. Flag placement (tree location) mimicked nature as closely as possible. A tractor and auger were used to dig holes next to each flag for planting the container-grown material. Volunteers from the community planted and mulched each tree and shrub. Volunteers included local high school students, cub scouts, members of local environmental groups, and neighboring residents. Rutgers personnel planted additional native grass plugs and wildflower seeds in Zones 2 and 3.

The buffer planting was completed with the creation of a wetland area in a poorly drained corner of the site. A backhoe removed all soil down to the clay layer, and topsoil donated by a local Mt. Holly firm was used to in-fill the wetland. After shaping, a depression was left in the center, and Rutgers personnel planted native shrubs and plugs of grasses, sedges and rushes in and around the water-filled wetland.

The Roberts Farm site. A typical agricultural site located in a pasture, the west side of the stream had little existing woody vegetation in Zone 1 (the first 15 feet (4.5 meters) from the stream) and none in Zone 2 (the next 45 feet (13.5 meters)). The east side was in an early stage of ecological succession from pasture to woodland. Site preparation in Zone 1 consisted only of removing some undesirable vegetation before planting. Zone 2 on the west side was site prepared by rototilling with a small farm tractor, while Zone 2 on the east side was not site-prepared. The existing pasture became Zone 3. Twenty different species of trees and shrubs were planted in Zones 1 and 2, totaling 750 seedlings and 200 container-grown plants. Trees and shrubs were planted in rows on the west side of the stream, and inter-planted into the existing successional vegetation on the east side. The larger, container-grown plants were interspersed with the seedlings. Selected species included several with future income potential for such things as timber, fence posts, floral materials, fruit, and nuts.

To eliminate damage from cattle and deer, a solar-powered electric fence was installed around most of the planted buffer. One hundred-and-twenty-five, 4-foot-high (1.2 meters) tree shelters or tubes were also installed on selected trees both within and outside of the animal fence for demonstration.

Almost all of the labor for installing the buffer was provided by local high school students and volunteers.

Phase 3 provided information and education on riparian forest buffers to targeted audiences primarily in the Rancocas Watershed. Community outreach has included interpretive signs, field day programs, informational meetings, distribution of articles

to the media, and publication of fact sheets. Phase 3 activities were intended to increase target audience awareness, advance knowledge and understanding, promote community ownership of the Rancocas Watershed Riparian Forest Buffer System Project, and, in the long-term, to facilitate preservation, adoption, and implementation of riparian forest buffers by watershed landowners.

Phase 4 of the project's implementation plan is to coordinate with other agencies and organizations to promote riparian forest buffer systems in New Jersey and ensure the long term success of riparian forest buffer system management throughout the state. A web page will be developed and maintained to facilitate the exchange of information on riparian buffers within the state. Thus, a network will be created where information and educational resources may be shared for the improved management of multi-species riparian forest buffer systems.

Results and Discussion

Riparian forest buffer restoration is a management alternative or opportunity for many forest landowners, homeowners and municipalities. By successfully establishing two riparian forest buffers, the project is meeting its stated objectives for demonstrating riparian forest buffer implementation. Over 100 community volunteers participated in the implementation of the buffers. The owners of both sites, the town of Mt. Holly and a private farmer, were also instrumental in project implementation and are important for the maintenance and long-term success.

Using a mix of traditional programming methods including seminars, day-long programs, and field meetings, over 12 events targeting municipal officials, farmers and landowners, natural resource management professionals, and high school students have reached over 300 key individuals and 180 students living and working within the Rancocas Watershed. Several hundred more individuals viewed a table-top display and poster developed and exhibited during Mt. Holly's day-long 'Race Day and Environmental Fair' held in July, 1999. Attractive and informative but succinct signs were designed and erected on both buffer sites. Though difficult to document, literally thousands of people, from both within and outside of the watershed, annually pass the strategically placed signs. The educational value and importance of properly and prominently displayed signs for successful demonstrations cannot be overlooked.

The local newspaper media was also instrumental in reaching the general public. Four different newspapers with local and regional distributions provided coverage with articles about riparian forest buffers and the project's objectives, including an on-site "photo opportunity" for the New Jersey Department of Environmental Protection's Commissioner. Two informational fact sheets on riparian forest buffers, and the Mt. Holly buffer, specifically, will be available Fall, 2001, for use with a variety of audiences, including the general public.

In addition, the differences between the two sites chosen for buffer implementation provide the unique opportunity to demonstrate the flexibility and range of design options for riparian forest buffers. Both are native, multi-species, three-zone riparian

forest buffers. Because of the demonstrational and educational objectives of the project, the selection criteria were practically the same, especially for visibility and accessibility. In addition to the basic and primary function of controlling nonpoint source pollution, both are intended to demonstrate the feasibility of riparian forest buffers and their multiple benefits. The Mt. Holly site, however, is in a heavily-trafficked urban park, while the Roberts Farm site is a typical agricultural site on a working farm. This required and permitted wide latitude and differences in buffer design between the two sites.

The heavy use and visibility of the Mt. Holly site offered design opportunities for aesthetics and greenway/wildlife corridor benefits that actually may equal or outweigh the usual, primary functional benefits of a forested buffer for nonpoint source pollution control. Immediately upstream from the site the stream is forested, and some distance downstream is a wooded park followed by another forested area. Thus, the newly established riparian forest buffer is the first step in connecting these areas and providing a forested greenway for wildlife useage and travel, as well as enhancing water quality. Incorporating 50 species of native trees and shrubs into the buffer; using primarily container-grown stock; planting to mimic how these species might naturally occur in a riparian forest; including wildflower seeding in Zones 2 and 3; and incorporating a small, functioning wetland in one corner, are not necessarily requirements or features that every landowner or municipality will or should include in forest buffer restoration. However, these features enhance appearance while remaining functional, demonstrate 'what can be done' with buffer design, and should encourage landowners and municipal officials to more readily adopt this best management practice. The buffer design also included informative signs at both ends of the buffer as well as a footpath through Zone 2 to accommodate fishermen and encourage pedestrian usage.

A 'typical' agricultural site was purposely selected for the second site. The design is simpler than that of the Mt. Holly site, and reflects the primary function of a riparian forest buffer, which may be more attractive as an alternative for farmers and landowners considering buffer restoration on their own properties. The Roberts Farm site design incorporated only 20 native tree and shrub species into Zones 1 and 2, and relies on the native grass and herbaceous species already present to populate Zones 2 and 3. Seventy-five percent of the trees and shrubs were planted as bare-root seedlings and the remainder as larger, 3- to 5-foot-tall (0.9 to 1.5 meters) contain-grown stock. Planting was accomplished primarily in rows both by machine and by hand. Fifty percent of the tree and shrub species were also selected based on potential for future management and commercial products such as timber, fence posts, floral materials, nuts, fruit, and wood for 'smoking' when cooking. As for many areas in New Jersey, fencing was required to protect the new planting not only from the farm's cattle, but from depredation by white-tailed deer. The buffer design effectively provides water quality and environmental benefits, wildlife habitat, and is aesthetically pleasing, while being easier to implement, requires lower 'up-front' investment, and has potential for future economic return from various forest products.

Conclusion

The goals of this project, "Implementation of Riparian Forest Buffer Systems for the Rancocas Watershed", included the implementation of two native, multi-species, three-zone riparian forest buffers in the Rancocas Watershed to demonstrate the use and benefits of buffers; provide educational opportunities to advance awareness and understanding for school-aged youth and the general public; and to promote adoption of this best management practice by farmers, landowners, and municipal officials. One unique aspect of the project is the opportunity to demonstrate the flexibility and range of design options for riparian forest buffers using the Three-Zone Model. The heavily-trafficked, urban Mt. Holly site provides the opportunity to showcase function while incorporating recreation and aesthetic features. The typical agricultural site incorporates function and future management options while optimizing initial investment. Both utilize native species, both will offer educational opportunities well into the future, and local community involvement and volunteer efforts were essential for the success of both. Together, they demonstrate the range and flexibility for designing riparian forest buffers and offer a model for sites both within New Jersey and elsewhere.

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Figure 1: Map of the United States

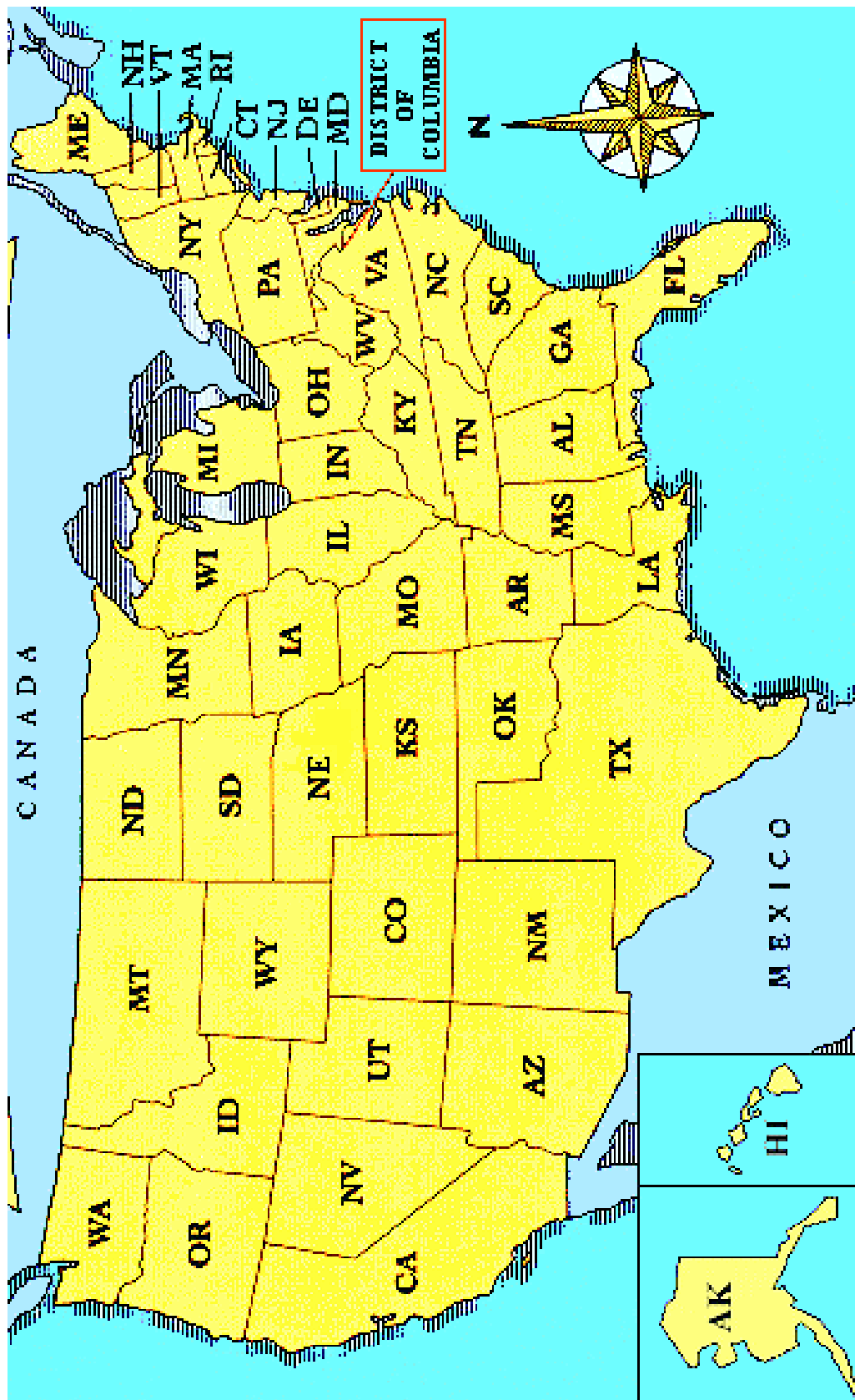


Figure 2: Map of New Jersey and Project Area

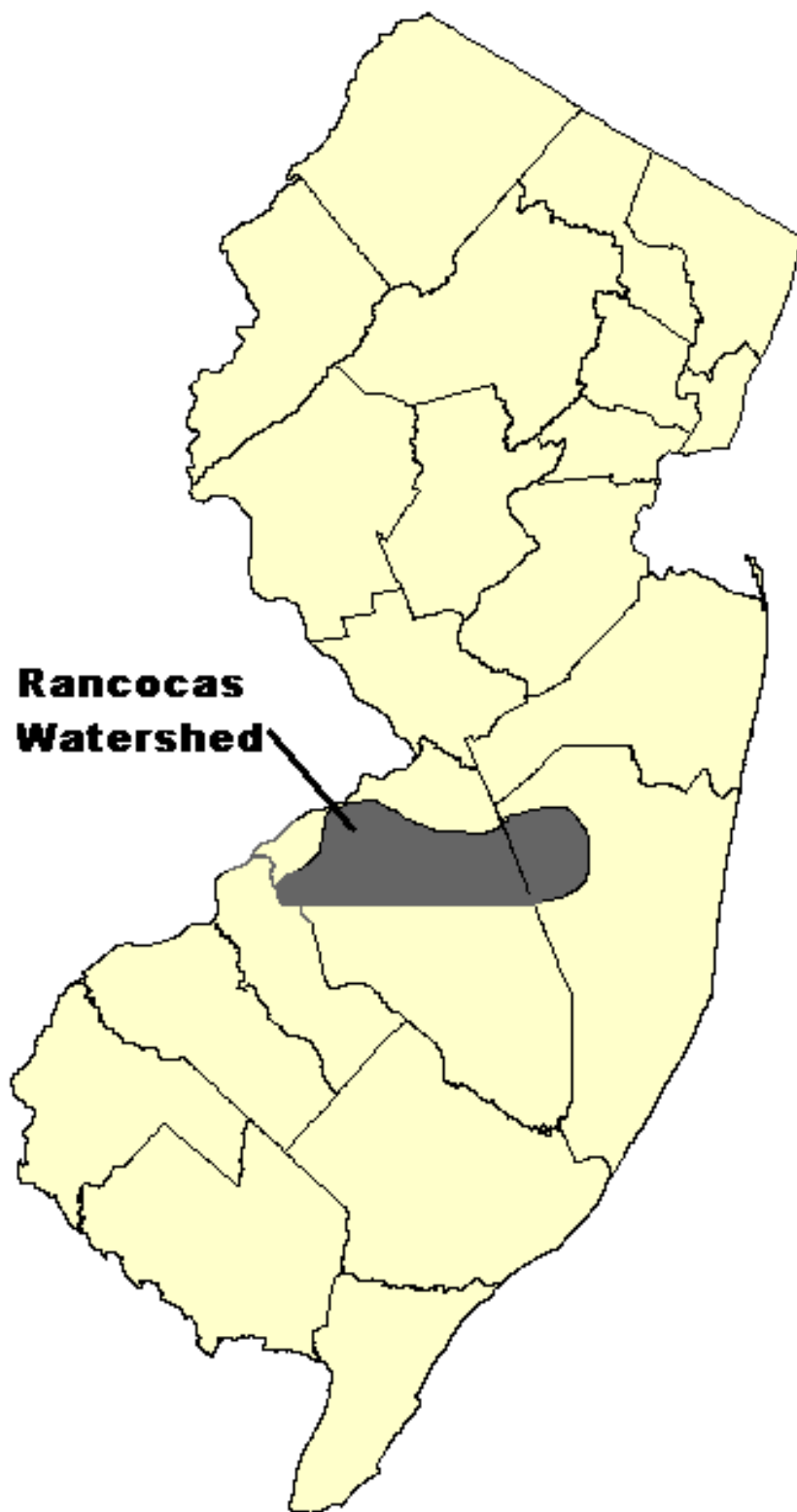
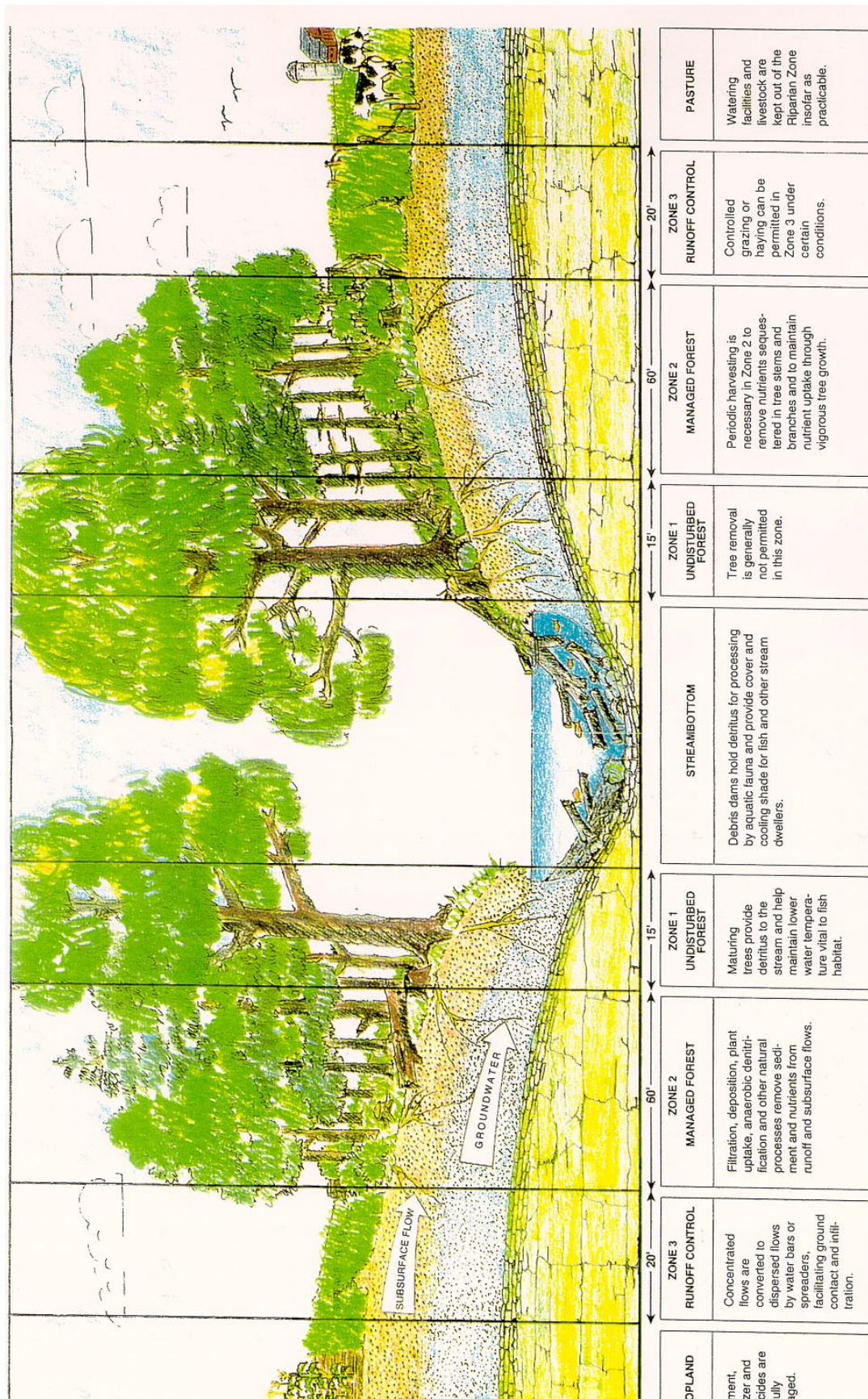


Figure 3: The Streamside Forest Buffer: The Three-Zone Model (Welsch, 1991)

NEW TECHNOLOGIES AND NEW OPPORTUNITIES: SUPPLY AND DEMAND MARKET DEVELOPMENT FOR SUSTAINABLE PRIVATE FORESTRY

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Abstract

Introducing a Market Development initiative spearheaded by ENGO 'The Wilderness Society' that has significant potential to facilitate agro-forestry extension work and improved outcomes for conservation, agro-forestry, farming, construction industry, and community stakeholders. There is clear evidence that private land re-forestation will play a key role in addressing complex multifactorial land degradation issues, and the massive local and regional extinction events cascading through the southern and eastern states of Australia. With limited support forthcoming from the public sector, and declining private incomes available to address these problems, there is an urgent role for land management strategies that boost on-farm incomes and stabilize rural economies, while assisting land use decision-making in a whole-of-region environmental context. Agro-forestry appears to offer tremendous opportunity in these areas.

However significant barriers exist, including landowner access to high-value markets for timber products, community concerns over industrial plantation establishment, and un-addressed management challenges with regard to remnant vegetation and non-forest ecosystem values. This paper introduces a local-scale market development initiative that has relevance Australia-wide to the aims of stakeholders, and offers new opportunities for agro-forestry extension as part of an integrated approach with conservation and community interests. With a brief overview of local environmental priorities and objectives, the paper discusses, with practical examples, ways in which the approach can facilitate win-win outcomes for those involved.

Introduction: Forest Ecosystem Degradation and Management Concerns

For those unfamiliar with details of the Australian context, timber extraction and to a larger extent historically forest clearing for agriculture has had profound impacts on forest values. Although covering only 18% of the continent (ABARE 1995) forests contain a high proportion of biodiversity but only about 25% of the 1750 forest estate is relatively unaffected by clearing or harvesting (CSIRO 1996). Overall an estimated 45% has been removed (Willis & Tonkin 1999). Ecosystems have, however, not been evenly affected: the most severely degraded include rainforests, 75% of which have been cleared (CSIRO 1996). 80% of NSW and Victoria's formerly extensive Box-Ironbark forests have been cleared (Willis & Tonkin 1999) (VNPA 1999).

In a wider context these degraded areas are part of the 48% of Australia's landmass significantly disturbed in the last 200 years (Graetz *et al* 1995). Linked to this disturbance are the extinctions to date of over 100 species, and the endangering of over 1000 more (CSIRO 1996). Recher predicts the extinction of 50% of terrestrial avifauna over the next 30 years alone (Recher 1999).

While land clearing continues to present the major threat in some areas (notably Queensland) focus has in many states (notably Tasmania, Victoria and West Australia) switched to the degradation of remnant values by forestry operations. Ecologically the implications of management practices include increased erosion, removal of ecosystem components, and a "real possibility (of) massive loss of biodiversity"(CSIRO 1996). The 1996 Commonwealth State of the Environment Report listed 10 species as under 'present and future threat' of extinction directly from forestry operations (CSIRO 1996).

Debate centers on the use and management of remaining forest areas, which have significant economic and social values. Nearly 30% of remnant forest areas are privately owned land (Clark 1995) and largely unprotected. Only 16% of native forests are in conservation reserves. 30% are state forest (largely available for logging), 26% are on crown land (with generally low timber values, used for grazing). Plantations, publicly and privately owned, are equal to slightly less than 3% of the native state forest estate but produce more than half of Australia's sawn timber (ABARE 1995).

Silvicultural practices criticised by conservation groups include rotation lengths which prevent the development of essential hollow-bearing trees; the effects of clear-felling on species ratios and biodiversity; the effects of the regenerative burn on soil structure. There are wide concerns over the paucity of reliable data of impacts on fauna and flora populations; the adequacy of highly fragmented conservation reserves, the effects of roading on soil compaction and the spread by logging activities of feral or pest organisms (Willis & Tonkin 1999).

Conservation groups including The Wilderness Society campaign for the development of an improved plantation sector in parallel with the preservation in reserves of remaining forests *including remnant vegetation on agricultural land* as a practical strategy to simultaneously protect economic, social, aboriginal, environmental and heritage values. This is the philosophical approach behind the 'One-Stop Timber Shop'.

Importance of other non-timber values

Research commissioned by the Australian Conservation Foundation and the National Farmers Federation estimated \$25,150 million investment necessary in tree establishment to address salinity and acidification across up to 30% of Australia's arable landscape (ACF/NFF 'Repairing the Country' 2001), as well as a further \$8,310 M for biodiversity plantings. Developing accreditation schemes for Carbon credits and Biodiversity offsets, will have profound effects on the financial viability of private forestry, but is without the scope of this paper.

ENGO's and Private Forestry establishment/ management

A national annual gathering of Australian ENGO's working on forest related issues, the National Forest Summit, met in Victoria earlier this year to develop among other things a combined groups position on plantation establishment and management. This meeting developed policy objectives adopted in 1999 stating that:

The forest movement condemns the clearing of native forests to establish plantations;

The forest movement supports the utilisation of existing plantations to ease the pressure on native forests;

The forest movement will actively encourage improvement in environmental management practices within those plantations;

The forest movement will undertake research to identify limits to further establishment of industrial plantations;

The forest movement opposes the export of unprocessed plantation logs;

The forest movement opposes the intensification of native forest management

While all groups in 2001 agree that current forest management practices in Australia do not protect ecological values, opinions vary on the long-term role of monoculture plantations in timber production, and on implementation of private forestry. Priorities differ significantly across the country, from the protection of large contiguous areas of unmodified woodlands in northern Australia, to protection of small remnant vegetation areas in the south.

Key recommendations from the Victorian Plantation Management Position Statement are indicative of concerns and priorities of Australian ENGO's with regard to Private Forestry:

Planning Controls: plantations not to be 'as of right'; identification of cumulative impacts including on catchment hydrology, priority vegetation protection areas;

Management Plans: open and consultative processes include data on soil and water values, yields, operational plans;

Design: promote the protection, restoration and conservation of the environment and biodiversity; Wildlife corridors, streamside zones and a mosaic of stands of different ages and rotation periods shall be used in the layout of the plantation. The scale and layout of plantations shall be consistent with the patterns of forest stands found within the natural landscape; Diversity in the composition of plantations is essential, so as to enhance positive economic, ecological and social outcomes. Such diversity may include the size and spatial distribution of management units within the landscape, number and genetic composition of species, age classes and structures;

Species: use of indigenous species, no use of GMO's;

Protection and Restoration: no clearing of native vegetation; 30% of area to be managed for conservation outcomes; priority for uneven aged plantations;

Pest Management: aerial application of herbicides banned; native animals not to be killed; Chemical residues must not enter waterways especially in domestic water supply catchments. Water testing will be undertaken;

Social, Environmental, Economic And Heritage Impact Assessment: Monitoring of plantations shall include regular, government funded, social, environmental, economic and heritage impact assessments conducted on a local and regional basis; and

Environmental And Heritage Performance Reporting: mandatory auditing of information included in the standardised environmental reports; environmental auditing system appropriate to smaller farm forestry operations and plantation owners will be developed.

Moving forward: ENGO endorsed Private Forestry

The Summit endorsed research into development of an FSC-type approach to third-party certification of plantations (subject to certain definitions) as a key to moving forward on timber management issues in Australia. There was consensus that the distance to ecologically sustainable management on either Public or Private forests was simply too great to consider Certification for the foreseeable future. The implications for Private forestry are profound. There will be no ENGO support for private forestry that seeks utilize or clear remnant indigenous vegetation, and unequivocal support for purpose established plantations in either an agricultural or industrial plantations requires bridge building on all sides.

If Private Forestry in Australia wishes to obtain market leverage from eco-preferability then brand-building with backing of the ENGO sector is essential. Any fracturing or dilution of this will confuse the brand and destroy its value. It is looking at this time as if the only other potential eco-label, the Australian Forestry Standard being promoted by the Australian Government will be endorsed by Australian ENGO's for a variety reasons.

The defacto position for most groups until Certification is in place is support for purpose-planted plantation timbers over timber from either public or private forests. Plantation timber herein is defined as "*Trees planted and managed in an agricultural context for which wood production is the major objective*".

Markets for Eco-Labelled Private Forestry timber products

Market for eco-branded high-value and appearance grade timbers

Community interest in and concern about environmental issues remains very high at approx 70% of the population. While this has been on a slight decline over the last 5-10 years, it may be expected that coming 'crunches' particularly from salinity pressures and water availability will move this figure upwards.

Environmental awareness or concern is not reflected in buying patterns at this level however. Consumer sentiment survey and other data consistently show that about

10% of the population (the 'dark greens') will preference environmentally preferable products, and pay more for them. About 25% will preference, but are more price sensitive. A similar percentage will preference, if price is not a factor. International markets indicate similar figures with 8% of the European market and 14% of the US market buying Eco-Certified timber.

On this basis eco-preferred private forestry product in say, furniture, could be expected to demand a premium market for 10% of the population. With Australian's spending approximately \$11 per person per year on furniture goods this alone is a sizeable market opportunity if the product can be clearly branded, whether manufactured in Australia or, increasingly, offshore.

Similar trends can be found in another key market, the construction sector which over the last three years has experienced a sharp rise of awareness in environment and related issues. This is expected to continue flowing regulatory reforms (starting with energy efficiency) and community awareness of the high impact of the construction sector on degradation and emissions impacting on brief requirements in the public and increasingly private sectors.

Consider Architects commitment to Energy Efficient/Ecological Architecture (Whitman 1998), for example;

41% demonstrate in practice some commitment to EE/ESD.

30% consider ESD to be among the most important factors when designing.

31% consider ESD to form part of good design.

90% say ESD is very/important to them

19% said ESD was a most important factor in new commissions and an important factor of good design.

Smaller practices <10, particularly <5 are relatively more committed

Architects aged 51-65 are relatively more committed with the less committed being aged 31-40.

Women are more committed than men.

In focus groups with ESD-aware Architects (August 2001) carried out by the 'One-Stop Timber Shop' high levels of interest were evinced in having clear information about the environmental preferability of timber products, with the majority indicating that up to 20% of clients would pay more for clearly identified eco-preferred products.

Clearly there is a considerable market for Private Forestry products to attract premium prices in the Eco-Preferred marketplace in boutique and structural/ sawn timbers if they can be clearly differentiated.

Brief Summary of Key Constraints

Standing volume constraints & distribution

Volumes of mature hardwood plantation timber suitable for sawlog using mainstream technologies are extremely limited from either private or public forestry. In Victoria the only commercial volumes (and limited at that) are of Sugar Gum (*Eucalyptus*

cladocalyx). In New South Wales and Queensland no commercial volumes are known of in hardwood timbers. In West Australia innovative work being done with *E. globulus* in generating sawntimber from trees as young as 10 years.

Challenges to delivering value-added product to market

The scattered and small quantities of timber available – either currently or in the foreseeable future for private forestry – make delivery of a product to manufacturers equipped for large volumes and a market undifferentiated for eco-preferred products very difficult.

Chain of custody and product eco-assurance

With no third-party Eco-Label in place, and no chain of custody documentation trails, it is difficult to see how ENGO support for eco-preferred private forestry plantation timber can be achieved.

Achieving market penetration & recognition

With a large number of small cooperatives springing up around the country, with inevitably different brands, standards and philosophies, market penetration and brand-building necessary to generate premium returns is all but impossible.

Managing growth & quality control: planning for the future

Without a clear and agreed standard and approach in place delivering a consistent and even-quality product to the premium marketplace will continue to be difficult and tested by any market uptake pushing and exceeding resource limitations. In such situations the pressure is always to lower standards, with a potentially catastrophic brand impact in this sector.

The 'One-Stop Timber Shop' Response: a snapshot

The 'One-Stop Timber Shop' was developed to address these issues and provide a brand-building marketing opportunity for eco-preferred products and services. In the absence of FSC or other ENGO recognized certification system, a different approach that learns from overseas work is required.

The 'One-Stop Timber Shop' provides an interface which:

Provides consumers with information and opportunity for the use and purchase of eco-preferred wood products.

Provides market development services to producers and users of eco-preferred wood products.

Builds brand recognition for eco-preferred wood products.

It is delivered by three channels:

Online through the 'One-Stop Timber Shop' web site

In print through the 'Forest Friendly Building Timbers' book

Via telephone through the 1300 76 77 88 service.

Technology Coming of Age

The 'One-Stop Timber Shop' has been developed at a time when online technologies are becoming truly accessible to Australian populations for B2B and B2C uses, notably in the rural sector. Sample statistics (sourced from ABS 2000 and NOI 2000, 2001) are:

An estimated 50% of households will be online by Nov 2001. American Express research (Oct 2000) suggests 70% of Australian's will be online by Oct 2001.

Online access and computer use continues to grow rapidly in all sectors (number of household with PC's increased by 22% over two years to Nov 2000)

Regional access to online technologies increased by 76% to Nov 2000 to 40% of regional adults from all sites. Regional online uptake outstrips metropolitan growth.

Largest increases by age groups is in older demographics, most markedly in the over 55's.

Over 20% of adults access the Internet from work.

While one of the lowest users of online technologies 12 months ago, (and still with the lowest rate of own home pages) the construction sector has recorded one of the highest rates of growth at 171% over two years to Nov 2000 to over 40%.

The construction sector was the highest user of the Internet for information searches (27%) and email.

Buying related online transactions were at median levels with other sectors, c. 22%.

Selling-related activities were lower (25%) leading only mining, manufacturing, health and community services.

Property and business services are the second-highest users of the Internet

The small and very small business sector records the highest rates of uptake, with this sector also making the most use of the Internet for email and information searches (25% for businesses with 1-4 people)

Cost and lack of skills were considered to be more of a barrier to net uptake for small businesses.

'One-Stop Timber Shop' services

Database of Timber, Merchants and Processors

An online searchable database of current stocklists for recycled timber merchants is ideally suited to transfer to the boutique timber market. The search engine allows users to search by categories that include price, size, availability, grade and species.

Forest-Friendly Timbers - Applications Information

Recognising that most consumers do not search for a species but rather for uses, this feature takes users through an application based decision tree. Timber and non-timber alternatives may be listed, and a search for 'Flooring' will return plantation timbers, imported bamboo, and a variety of wood-based products.

Specification Guidelines & Technical Data

The challenge, once a product has been selected, is often ensuring it is used in a project, and to appropriate standards. There may be difficulties in determining details or technical information for less common products. This section targets the construction professional and address these issues.

Timbershop Classifieds

Timbershop Classifieds is a resource whereby individuals and businesses can advertise product for sale, or wanted for purchase. Delivered to targeted businesses via fax and more broadly by the Internet.

Policy and Market Development

This section addresses the needs of Local Governments, Councils, Institutional and Corporate bodies seeking to develop a policy on the use of timber and wood products in their operations and procurement practices.

Information and Education Kits

Targeting information needs experienced by The Wilderness Society over many years, this section includes 'Designers' Client Briefing Sheets', market leaders 'Trend Datasheets', as well as University and school level 'Infokits'.

Buyer's Guide

This section, closely linked to the FAQ section discussed below, provides real-world advice on the purchase and use of forest friendly timbers.

Frequently Asked Questions (FAQ's)

This is a wide-ranging section aimed at giving succinct responses and referrals to commonly asked questions. Responses tackle such questions as 'What is the difference between a plantation and a forest' and 'Where can I find out more about Forests in my area?'

Timbershop Forum

The Timbershop Forum is an email discussion forum available though the site or as a list-based free of charge subscription service. It allows users to request advice and post news items to the email Timbershop community.

Timbershop News

Late-breaking information on emerging products, developments and campaign updates are found at the Timbershop News page. An essential web-forum item.

Application to Private Forestry

Aggregate supplies: single desk marketing approach

Via its support by a National leading ENGO, commercial set-up and industry focus the 'One-Stop Timber Shop' offers an opportunity to aggregate producers and provide a single point of contract for manufacturer's, consumers, or industries servicing the Private Forestry sector. With the majority of timber trading crossing state borders, a national and international interface is required. The brand-building capability of the service (by being vertically integrated) generates enormous power to assist producers and the sector in developing and identifying markets, services and outlets.

Link growers to processors and buyers

The aggregation properties of the 'One-Stop Timber Shop' approach mean that producers will be able to list volumes on the service to sale by auction or other suitable mechanism for a single point of contact for related businesses. This has tremendous potential to overcome the inertia created by distributed, small-scale producers with little or no market leverage.

Optimise returns by branding and selling to high-value markets

The brand building capacity of Timbershop via its participation in direct selling, leading ENGO backing and aggressive market focus on higher-value items provides an opportunity for the service to become a leading outlet for Eco-preferred private forestry product.

Market development and Eco-Labeling with third-party credibility

The service provides a potential circuit breaker to the problem of eco-labelling if cost-effective chain-of-custody documentation can be developed. There is some indication that this may prove to be possible.

Leveraging existing PF developments

A practical example where PF stands to gain market awareness and build profile is with the Sugar Gum timbers being marketed by Corrangamite Farm Forestry Network. Blessed with a relatively sizeable volume of clearly purpose-planted timber in a mature form, the Cooperative is in a strong position to develop and build the product in local boutique markets. The 'One-Stop Timber Shop' looks forward to developing this exciting opportunity provided key issues can be met including chain of custody documentation.

Next Steps

Call for expressions of interest

There is tremendous potential in the private forestry sector for commercial and environmental returns. An industry that has such potential to deliver positive returns to fundamental environmental services at the same time as building rural economies and capital capacity is a powerful agent for positive change for Australian land and resource management.

The Wilderness Society's 'One-Stop Timber Shop' has to date concentrated its efforts on a not dissimilar boutique market – the recycled timber market – and commercial volume softwood plantation species and products. It is keen to work with parties and partners in the private forestry sector.

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PRE-CONDITIONS FOR SPONTANEOUS AGROFORESTRY IN HILLY REGIONS OF VIETNAM: IMPLICATIONS FOR EXTENSION

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Abstract

Recent research in the uplands of north central Vietnam, backed up by evidence from other cases, suggests that there are five essential conditions for spontaneous adoption of agroforestry enterprises by resource poor households:

ease of access to markets for the forestry products;

benefits (economic and other) from agroforestry are higher than from alternatives;

a viable forestry production technology is available and known to farmers;

farmer access to sufficient areas of land and security of tenure to that land; and

farmer confidence in being able to control risk, such as fire, pests, theft.

Despite this evidence, the promotion of tree based conservation farming on sloping lands in Vietnam commonly follows a conventional transfer of technology model of extension which focuses mainly on addressing perceived lack of 'knowledge of a viable production technology'. Typically this involves "educating" farmers about alternative technologies, setting up demonstration plots and providing tree seedlings at subsidised prices. These approaches, applied quite successfully in promoting agricultural practices in homogenous farming areas, have generally failed to bring about widespread adoption of the agroforestry technologies being promoted by the government in complex upland farming situations, such as exist in Vietnam.

It is becoming clear that attempts to bring about widespread agroforestry (and hence soil conservation) on steep lands may require economic and institutional interventions designed to address all five essential conditions of the enabling environment. This will require a much broader definition of extension than is commonly applied in Vietnam. This paper aims to provide a simple decision support methodology for assessing the feasibility of agroforestry and for designing interventions that address essential conditions for spontaneous agroforestry.

Introduction

In Vietnam agroforestry is promoted as an ideal option for rehabilitating 'barren hills' – those 10 million hectares of sloping land that have been denuded of forest cover and degraded by shifting cultivation, burning and other practices (Morrison and Dubois, 1998). Agroforestry is seen as a means of achieving sustainable management of sloping land - by providing the tree cover required to reduce erosion as well as livelihoods for upland farmers (MARD, 2000).

Current approaches used by government in Vietnam for promoting agroforestry are borrowed from agriculture and are based on technical extension agents directing production according to plans and targets, instead of supporting farmers in the development of locally appropriate technologies and practices (Christoplos, 1995; Hoang Huu Cai *et al*, 2001). Agricultural improvement strategies are based on a system of central planning in which extension workers are mainly responsible for communicating production targets to farmers and educating them on government policy and recommended practices.

Although this transfer of technology (TOT) approach, based on disseminating 'model' technologies (Peters, 2001), has contributed to boosting developing agricultural production in areas where natural, socio-economic and production conditions are quite homogenous (Hoang Huu Cai *et al*, 2000), this approach has been strongly criticised for failing to reach resource-poor farmers in marginal conditions (Cox *et al*, 1998). It has generally failed to bring about any widespread change in farmers' agroforestry practices in Southeast Asia (Morrison and Dubois, 1998; Foerster and Nguyen Huu Tho, 1999). Many poor farmers in remote areas, including forest dwellers, cannot access extension services, or they find the recommended technologies too complicated and expensive in external inputs (Hoang Huu Cai *et al*, 2000).

Extension for agroforestry may require quite different approaches to suit the needs of farmers in a diversity of situations. Agroforestry crops are long term, strongly influenced by resource rights and tenure, and are usually only one component of a complex production system (Anderson and Farrington, 1996) that may include agricultural cropping, homegardens, fishponds, livestock management, collection of forest products and wage labour (e.g. Wollenberg and Nawir, 1998; Woods, 2001). The complexity and variability of agroforestry systems make the relevance and acceptability of recommended land use changes often highly site specific (Cardoso *et al*, 2001; Bernet *et al*, 2001). In addition, tree planting is often promoted by government as a strategy primarily for soil conservation, which introduces objectives that may not be shared by farmers.

The central issue of concern in agroforestry extension is 'what types of support or intervention are required to bring about the achievement of policy objectives and how can these be effectively provided by development institutions and government?' In this paper agroforestry extension is defined as *any social, economic or institutional intervention that is intended to provide a more favourable environment for farmers to experiment with, develop and introduce tree crop enterprises as a component of their production systems on sloping land.*

The assumptions that underpin the Enabling Environment for Agroforestry (EEA) approach outlined in this paper are that farmers make decisions on tree planting under a variety of influences, including site conditions, silvicultural knowledge and skills, tenurial and benefit sharing arrangements, market forces, national policies, regional development and neighbouring communities (Apel, 1998; Wollenberg, 1998b; Byron, 2001) and that all farmers are 'experimenters' who seek to optimise returns to land, labour and capital, consistent with cultural norms and individual aspirations (IIRR, 1999).

The aim of this paper is to outline a decision support methodology for designing local level agroforestry extension programs, with three key attributes. Firstly it provides for the broad range of possible interventions or 'policy levers' available (Sikor, 2001). Secondly it assumes that the fundamental basis for extension is farmer decision making that takes place in a local context that is largely beyond the direct control of any formal administrative structure (Christoplos, 1995). Thirdly it integrates the local context into the design of extension programs.

The intended audience is extension practitioners and rural development policy makers in the field of upland agriculture and agroforestry in Southeast Asia and particularly in Vietnam.

The 'enabling environment' approach to agroforestry development

Background on the concept of the enabling environment

Farmers in certain areas of Vietnam have spontaneously developed various agroforestry practices in response to market opportunities such as for bamboo in Thanh Hoa Province (Woods, 2001) or for pulp wood in Vinh Phu Province (Rambo, 1997). While farmers are often criticised for their failure to adopt recommended agroforestry technologies (MARD, 2000), these examples suggest that farmers will develop and adopt their own agroforestry systems if certain economic, institutional and social conditions are favourable (Apel, 1998). This concept is termed here the 'enabling environment for agroforestry' (EEA).

The concept of enabling environment is not new (e.g. Scherr, 1992; Arnold and Dewees, 1998; Vanclay 1992). It has surfaced in a number of different fields and contexts, including 'the enabling environment' for poverty reduction (Hainsworth, 1999), for community forest management (Apel, 1998) for agricultural extension (Christoplos, 1995), as well as for forest product based enterprises (Wollenberg, 1998c). The recognition of the importance of the enabling environment for agroforestry stems partly from a number of recent studies that advocate intervention at the macroeconomic level to achieve better local forest management (Sikor, 2001; Kaimowitz *et al*, 1998; Ndoye and Kaimowitz, 1998). The investigation of context as a basis for designing R & D interventions is a well developed process (Walker *et al*, 2001).

The enabling environment approach shares some common features with the 'farming systems perspective' of the 1980s that recognised the influence of environmental, technical, social and economic factors on the adoption of innovations (Frank and Chamala, 1992; Petheram and Clark 1998). However, such perspectives sometimes had a pro-innovation bias (Rogers, 1983) that tended to focus on constraints to a particular innovation, rather than to factors that inhibited experimentation and spontaneous development based on indigenous knowledge. The approach suggested here places more emphasis on creating favourable conditions for spontaneous innovation based on indigenous agroforestry knowledge than on externally derived technology innovations. Indigenous knowledge in this context is defined as *'ideas, experiences, practices and information that have been generated locally, or are generated elsewhere but have been transformed by local people and incorporated in the*

local way of life. Indigenous knowledge incorporates local technologies but also social, cultural and economic aspects.' (Okali et al, 1994:35).

Prospects for improving the sustainability of sloping land management in Southeast Asia by creating favourable conditions for agroforestry are probably better than in temperate ecosystems because farming practices across much of the tropical uplands traditionally incorporated some form of tree cultivation, forest utilisation or regeneration (Byron and Arnold, 1999). Tree crops have some different characteristics from agricultural crops, such as being long term and strongly influenced by resource rights and tenure, having a relatively low value (Anderson and Farrington, 1996), but providing high returns to labour (Menz and Grist, 1997; Woods, 2001) as well as sometimes providing a form of social security (Woods, 2001). Because of the different characteristics of tree crops and agricultural crops there is the possibility of using economic and institutional policy making to tip the balance in favour of tree crops and away from agricultural crops, on sloping land. Achieving this, particularly if it meant substituting agroforestry for shifting cultivation, could contribute significantly to the achievement of policy objectives for reforestation of degraded 'barren hills' in Vietnam (Kerkvliet and Porter, 1995; Rambo, 1997).

However, although national level policies recognise that institutional factors (such as lack of secure tenure over land) can impede agroforestry adoption, and Vietnam's national land allocation program reflects this understanding (Morrison and Dubois, 1998), these factors have not been incorporated in the local practice of agroforestry extension in Vietnam. This problem has also been recognised in Australia and is attributed partly to the difficulty in operationalising ecologically sustainable development across a range of spatial and temporal scales (Walker et al, 2001).

Contrasts between EEA approach and the traditional TOT models of extension?

The enabling environment approach advocated here:

- allows the forms of intervention most likely to influence agroforestry development to be determined locally on the basis of participative analysis of existing constraints (Scherr, 1992);

- integrates economic, social and institutional factors of the enabling environment and depends heavily on participative research, monitoring and evaluation;

- provides a holistic framework for research, extension and technology development in agroforestry; and

- is aimed at solving household livelihood and land management problems rather than to disseminate innovations (van de Fliert, 2000; Izac and Sanchez, 2001).

Further characteristics relate to the strategies used for achieving policy objectives, the ways in which success is evaluated and the type of information flow between farmers and planners (Table 1).

Table 1: Contrasts between the TOT approach currently in use in Vietnam and the proposed EEA approach.

	Technology transfer approach	Enabling environment approach
Strategy for achieving policy objectives	To facilitate adoption of officially selected and recommended technologies	To create the conditions under which households spontaneously develop agroforestry based enterprises
Lack of success attributed to:	Individual non-adoption – farmers seen to make ‘wrong decisions’	Social, institutional or economic context fails to support indigenous agroforestry innovation
Focus of evaluation:	Individual household (farm)	Net effect of interventions on whole community and landscape
Parameters used for evaluation :	Degree of participation (e.g. percentage adoption)	Overall impact on land use and benefit to households
Problem diagnosis	Made at bureaucratic level on behalf of whole community	Made at household level by individual households
Intervention strategy	Convince farmers to change to recommended technologies	Provide an enabling environment that is more supportive of agroforestry cf. alternatives
Type of information flow between farmers and planners	One-way. Information limited to informing farmers about government policy, regulations or new technologies	Two-way. Any type of information required to improve households’ decision making capacity. eg., cropping systems, prices, markets, etc.
Assumed causes of low production or persistence of unsustainable practices	Lack of knowledge about modern technologies	Flaws in the enabling environment for agroforestry
Recognition of linkages between agroforestry and household livelihood strategies	Weak –technologies promulgated in isolation	Strong – recognition that households manage complex and integrated production systems
Source of management/ technology innovation:	Mainly external, imposed, limited range of options (prescriptive)	Mainly indigenous, farmer experimentation to meet individual household circumstances, unlimited range of options
System conceptual boundaries	Mainly economic and technical realm of agriculture and natural resource management	Comprehensive, e.g., can include social, economic and institutional factors
Forms of intervention (Extension tools)	Credit tied to particular technologies, subsidised inputs, education, regulation.	Capacity building, training, policy and institutional reform. Building ‘social capital’. Market factors

Identifying the key factors of the enabling environment for agroforestry

External influences such as lack of infrastructure, poor seed quality and availability, unfavourable input or output price policies, regulatory barriers, tenurial disincentives and market barriers are some factors that may inhibit agroforestry development (Scherr, 1992). Results of recent research carried out in Thanh Hoa Province (Woods, 2001) supported by observations made in a broad range of situations (Byron, 2001) isolated five conditions that need to be met before agroforestry will be adopted spontaneously by farmers (Box 1).

Box 1: Five conditions for spontaneous agroforestry in hill areas of Vietnam

There is a market for agroforestry products and means of transport available.

The economic returns from agroforestry are higher than alternative uses of the land.

A viable production technology is available and farmers have knowledge of it.

Farmers have secure access to sufficient areas of land on which to grow trees.

Farmers are confident of being able to control risks, such as fire, pests, theft.

Applying the EEA approach for assessing the local FEASIBILITY for agroforestry enterprise

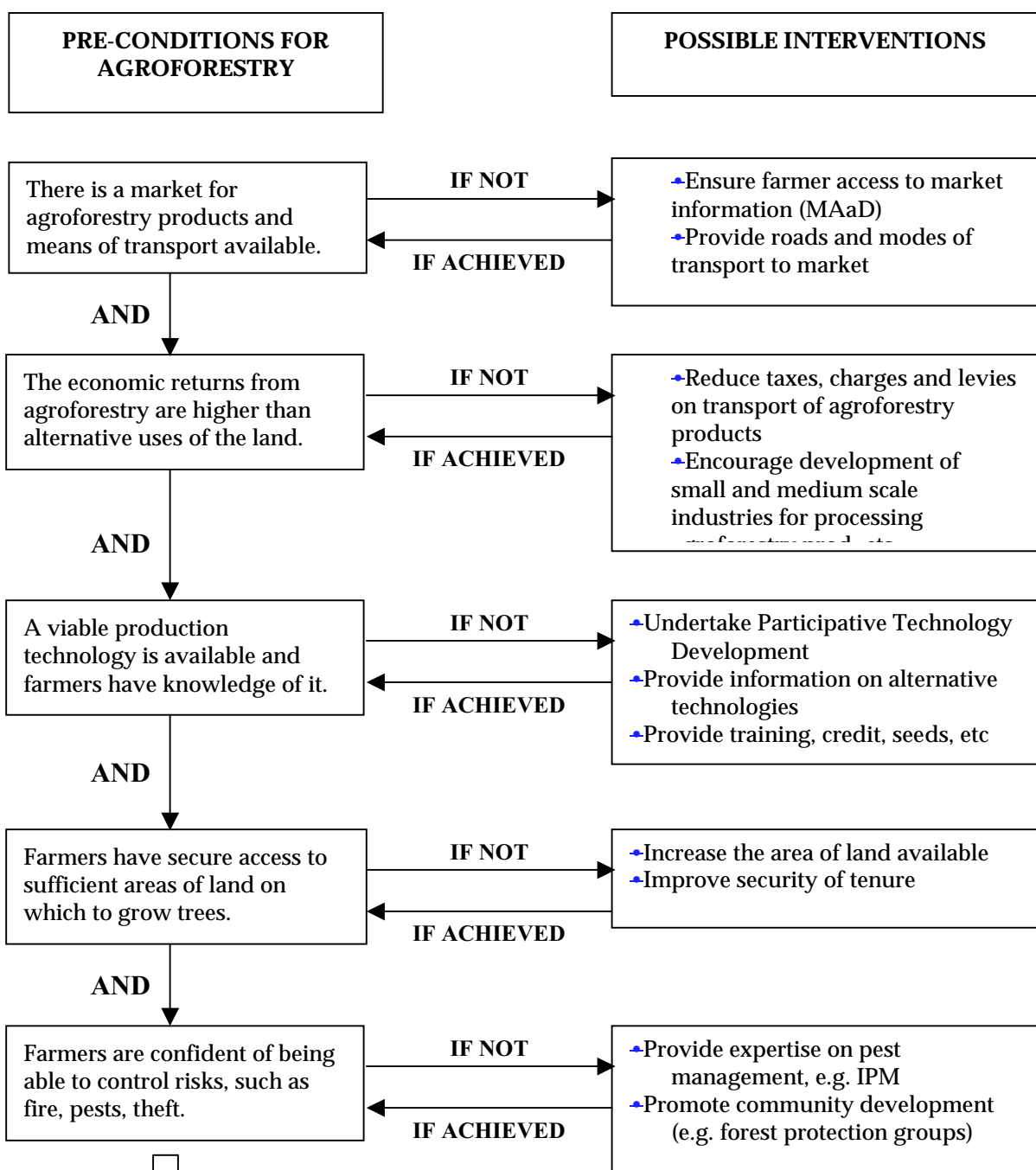
In addition to their ability to provide cover and thereby reduce soil erosion, trees have inherent ecological advantages over agricultural crops, such as utilising solar radiation more efficiently, exploiting nutrients and water from deep within the soil profile and greater ability to survive drought (Ffolliot, 1995). However, promotion of small scale forest product enterprises is only one possible strategy for sustainable land management and there is no guarantee that forest based enterprises can contribute to development or conservation in all situations (Wollenberg, 1998c). In Tonga, for example, where indigenous agroforestry systems are rapidly giving way to commercial cultivation of pumpkin squash for export (PRAP, 1999) it is unlikely that agroforestry enterprises could compete economically.

The EEA approach described in this paper may be useful for assessing the feasibility of agroforestry enterprises in any particular target area and thereby avoid wasting extension effort in inappropriate situations. If, on the basis of a topical PRA (Step 2 of the procedure outlined below), the prospects for creating the five pre-conditions for agroforestry enterprises appeared to be uneconomic or physically impossible, other avenues for achieving sustainable use of sloping land could be pursued.

Applying the EEA approach for planning and implementing local level agroforestry EXTENSION programs

The conceptual framework for applying the EEA approach for planning and implementing an agroforestry extension program is depicted in Figure 1. Despite the stepwise process indicated in Figure 1, no hierarchy in the enabling conditions is intended. According to the EEA concept *all* pre-conditions need to be achieved simultaneously to result in spontaneous agroforestry enterprises (Byron, 2001).

Figure 1: Conceptual framework for using the EEA approach to guide the design of extension programs for agroforestry.



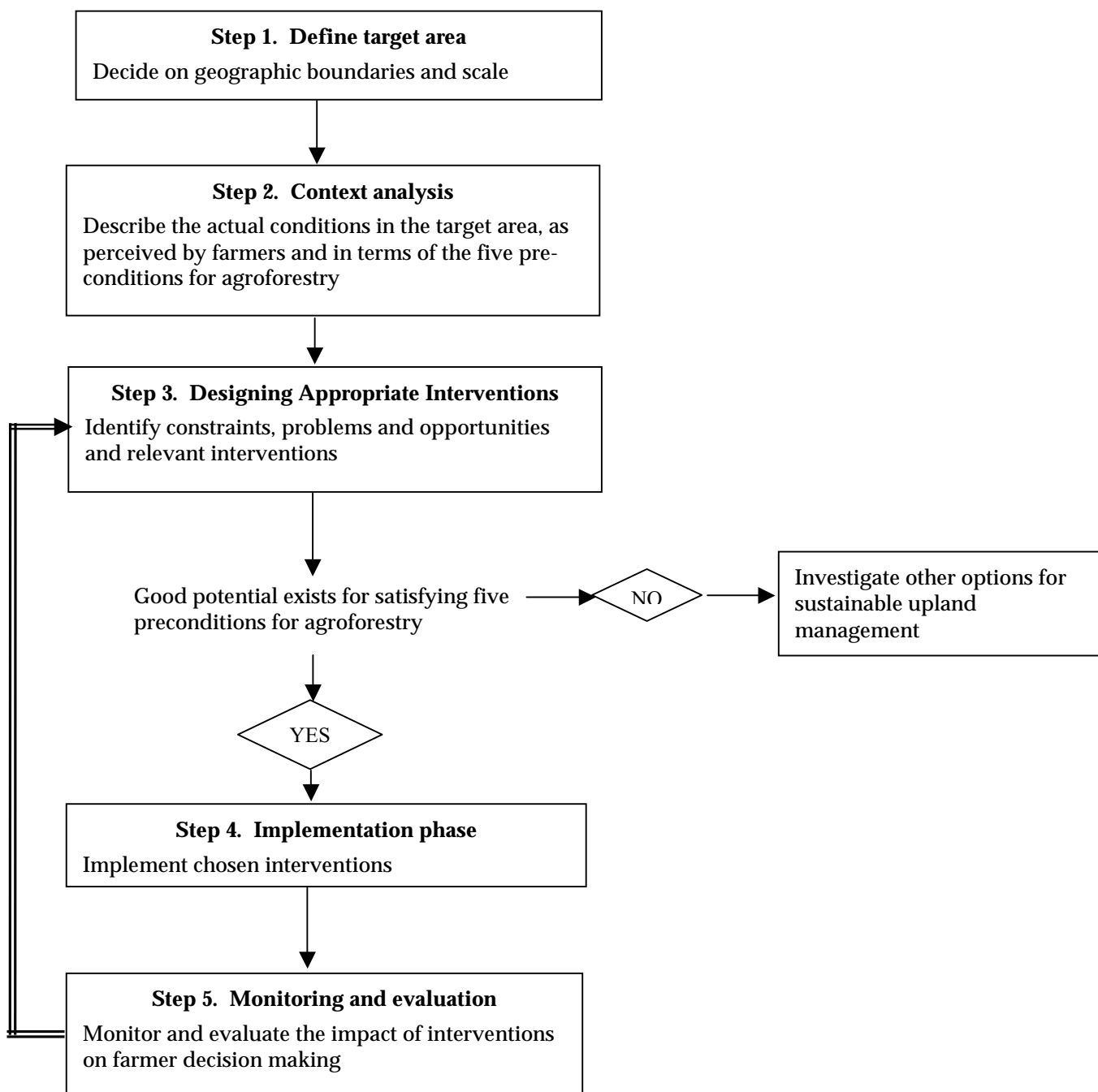
Methodology for designing an agroforestry extension program based on EEA

There are five steps involved in the process of planning and implementing an agroforestry promotion program based on EEA (Figure 2). They are (1) determine the boundaries and scale; (2) analyse the context for agroforestry as perceived by farmers in the target area in terms of the five key pre-conditions listed above; (3) identify the forms of intervention most needed to alleviate the constraints identified; (4) apply the chosen interventions and; (5) monitor and evaluate the impact of those interventions on farmer decision making. The sequence of steps outlined conforms broadly to the basic steps in other approaches to enquiry and problem solving in the natural resources context (e.g., Wilson and Morren 1990; Clark *et al*, 1997).

Step 1: Decide on boundaries and scale

The most appropriate scale for designing interventions using the concept of enabling environment is likely to be at the local to regional scale, or in the Vietnamese context, Commune to District level. The objective in deciding the scale is that there should be as little variation as possible within the chosen area in social and economic conditions, market forces, policy influences, transport facilities and other conditions.

Figure 2: Five steps in the process of designing an agroforestry extension program based on EEA.



Step 2: Describe the actual conditions within the chosen area (agroforestry context analysis)

The object of this step is to understand, from the farmers point of view, the current status of the five pre-conditions for agroforestry (Figure 1). In other words it must discern how farmers perceive the prevailing conditions, rather than be a reflection of official policy or 'what is supposed to be'. It also seeks to explain farmers current agricultural and land management decision making in terms of social, economic and institutional arrangements as they are perceived by farmers. Description of current agroforestry practices and how they contribute to the household production system would be an important component. This will require some description of the entire household production system to allow the importance of the tree component to be balanced against other resources (Abel and Prinsley, 1991).

Methods therefore need to be participative and farmer centred and similar to those used in PRA. This is not however a general description of the conditions for agriculture but rather a 'topical PRA' (Cardoso, *et al* 2001) designed specifically to address social, economic and institutional factors of importance to agroforestry (Figure 1). It must also include a quantification of patterns and trends in relevant parameters so that the dynamics of the local situation are understood (Izac and Sanchez, 2001). The end result of Step 2 is a description of the actual socioeconomic and institutional conditions for agroforestry and an assessment of the constraints that could most readily be alleviated with the resources available.

Step 3: Designing appropriate interventions

Information from activities carried out in Step 2 is used to decide on interventions most likely to promote spontaneous agroforestry development in the project area. Possible interventions include; improving roads and modes of transport to market, reduce taxes, charges and levies on transport of agroforestry products; provide information on alternative technologies as well as seeds, training, credit; increase the area of land available or improve security of tenure of that land (Figure 1). Other interventions could be to improve the local implementation of national policies, such as ensuring that allocation of forest land to households is carried out across the target area.

There is a decision point at the end of Step 3. If the prospects of improving the enabling environment for agroforestry appear unlikely to be achievable at a reasonable cost and within a reasonable period of time, a decision may be made to investigate other options for achieving the policy objectives of sustainable sloping land management. This recognises the fact that agroforestry is unlikely to be the best avenue for achieving sustainable sloping land management under all conditions and that other rural development options exist such as reducing households reliance on upland agriculture through job creation or making more efficient use of households' lowland paddy fields (e.g., Sikor, 2001).

Step 4: Carry out selected intervention

Because the factors that are thought to be important to farmer decision making on agroforestry span economic, institutional and social factors (Figure 2) the scope of possible interventions is much broader than for traditional extension programs based on technology transfer.

In Step 4 the interventions selected are implemented. Some of these interventions will require close involvement with farmers, while other may not. Improving access to markets for agroforestry products, thereby improving the returns to farmers may involve repealing state trading monopolies and would not necessarily require the participation of farmers, for example.

Step 5: Monitor and evaluate the impact on farmer decision making on agroforestry

The objective in this stage is to understand how the interventions affected household decision making, i.e. to establish the linkages between farmer decision making and intervention strategy. A continuous process of participative review and adjustment should continue through the projected life of the intervention.

Possible challenges in applying EEA model for decision making on agroforestry extension

The implementation of the EEA approach described in this paper will require the establishment of partnerships between stakeholders, including farmers, researchers, extension workers and policy makers, at various levels from village to national (Izac and Sanchez, 2001). This is likely to require extensive training of extension staff in participative, farmer based methods of research, evaluation and partnership building processes.

Other obstacles that may need to be overcome in implementing this strategy through existing extension organisations in Vietnam are that some interventions that may be needed, such as land allocation policy and market structures may be considered to be outside their traditional mandate, such as occurred in Kenya (Holding and Kereko, 1997).

The EEA approach described requires a broader definition of extension than that commonly used in Vietnam in the past. This is consistent with calls in Australia to broaden the scope of extension to include the five domains (1) defining research and development needs, (2) facilitating linkages with formal research, (3) facilitating information exchange, (4) facilitating informal research and learning and (5) developing methodologies and processes (Coutts, 2000).

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