



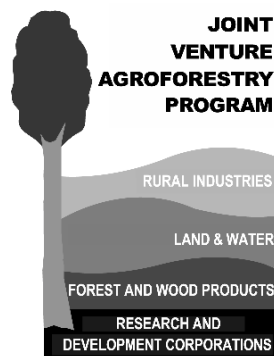
Socio-economic Research to Support Successful Farm Forestry

**Selected papers and abstracts from the
ANU Forestry Colloquium**

28th February 2000 ANU Department of Forestry

Edited by Digby Race

RIRDC/LWRRDC/FWPRDC Joint Venture Agroforestry Program
Supported by the Natural Heritage Trust and the Murray Darling Basin Commission



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COOPERATIVE RESEARCH CENTRE
FOR SUSTAINABLE PRODUCTION FORESTRY

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Foreword

The Department of Forestry at The Australian National University held its Annual Research Colloquium in February 2000 on '*Socio-economic Research to Support Successful Farm Forestry*'. There were more than 20 speakers, including Dr Hans Drielsma (Forestry Tasmania), Dr Neil Barr (DNRE Victoria) and Prof Craig Pearson (Bureau of Rural Sciences). The colloquium was presented in partnership with the CRC for Sustainable Production Forestry and the Joint Venture Agroforestry Program.

The colloquium heard that there are strong forces which are increasing the focus on traditional rural farmland for production of forest products. The NFPS/RFA processes are reserving increasing proportions of our native forests for conservation purposes, and constraining timber production on the remainder. There is a consequent shift to more intensive forest management on smaller areas to maintain production requirements, and forestry is moving out of the hinterland into more settled rural landscapes. At the same time there has been a recognition of international market opportunities with the Plantation 2020 Vision providing a framework for increased investment in forestry, largely on farmland.

Forestry development strategies need to be based on a detailed understanding of the wider socio-economic context of regional communities. Research has shown that the changing demographics in many of Australia's farming communities offers some challenges and opportunities for those promoting farm forestry. Research suggested, if wanting farmers to actively participate in farm forestry (eg. as tree growers), then information, education or training, appears to be most effective if channelled through existing community networks and social structures.

The colloquium concluded that there is a clear role for social science research to maximise the benefits to individuals, communities and the economy from farm forestry, while minimising the pain from the associated structural adjustment by individuals and regional communities.

This report, a new addition to RIRDC's diverse range of over 600 research publications, forms part of our Joint Venture Agroforestry R&D Program, which aims to integrate sustainable and productive agroforestry within Australian farming systems.

Most of our publications are available for viewing, downloading or purchasing online through our website:

- downloads at www.rirdc.gov.au/reports/Index.htm
- purchases at www.rirdc.gov.au/eshop

Peter Core

Managing Director

Rural Industries Research and Development Corporation

Overview of Colloquium

Professor Peter Kanowski

Department of Forestry – Australian National University,
Canberra, ACT.

To mark the millennium, our 2000 Colloquium was presented in partnership with the Cooperative Research Centre for Sustainable Production Forestry, of which ANU Forestry is an Associate Member, and the Joint Venture Agroforestry Program, which is managed by the Rural Industries Research and Development Corporation. We thank both these important research partners for their continuing support.

The idea of an annual Colloquium arose from our wish to better engage in dialogue about our research activities and results with those outside the Department; Jürgen Bauhus' experience with similar events elsewhere led to the Inaugural Colloquium in 1998. The program for the 2000 Colloquium has been further developed in the light of previous years' experience; Digby Race, whose post at ANU Forestry is part-supported by the CRC-SPF, has been instrumental in developing it.

This year's program focused on social sciences research which members of the CRC-SPF are conducting, in the context of the growing importance of farm forestry in Australia. These papers have been published to give readers an insight into the diversity and complexity of issues facing farm forestry development in Australia. The CRC-SPF makes only a very modest investment in social sciences research, but – as this program demonstrates – that investment has achieved substantial leverage and a wealth of results. As rural and regional Australia search for solutions to pressing economic and environmental challenges, research such as that presented here represents an important contribution to the information base of many decision makers in farm forestry, at levels ranging from policy to practice. It exemplifies the science–industry–society linkages central to the CRC program, to the Research and Development Corporations, and to ANU Forestry.

We hope you find these selected papers stimulating. Again, we thank the JVAP for their assistance in publishing these selected papers.

Further information about the research of all Departmental staff – which of course encompasses a much wider scope than the topic of this Colloquium – is available in our 2000 Yearbook. Please let us know if you would like a copy, or access it over the WWW (www.anu.edu.au/Forestry).

Contents

FOREWORD	IV
OVERVIEW OF COLLOQUIUM Professor Peter Kanowski	V
A CRC PARTNER'S VIEW ON FARM FORESTRY Dr Hans Drielsma	1
SOCIAL RESEARCH TO SUPPORT SUCCESSFUL FARM FORESTRY Professor Craig Pearson, Dr Sheridan Coakes & Heather Aslin	11
IT'S NOT EASY BEING GREEN: PERCEPTIONS OF THE 2020 VISION FOR PLANTATION FORESTRY IN AUSTRALIA Jacki Schirmer	22
STRATEGIES FOR IMPROVING LANDHOLDERS' RESPONSE TO FARM FORESTRY DEVELOPMENT Digby Race & Amabel Fulton	40
FARM FORESTRY AND REGIONAL DEVELOPMENT: COMMUNITIES MAKING COLLABORATIVE DECISIONS. Tim Tabart, Amabel Fulton & Professor Rob Clark	53
MODELLING NON-INDUSTRIAL PRIVATE FOREST TIMBER SUPPLY: AN ECONOMIC APPROACH Dr Sarah Jennings & Anna Matysek	66
FORESTRY AND REGIONAL AUSTRALIA: CHANGES FOR THE GOOD? Professor Roy Rickson	76
FARMING COMMUNITIES AND CHANGE: WHAT CAN WE EXPECT FROM FARM FORESTRY? Dr Neil Barr	78
DECISION MAKING IN THE FARM FAMILY BUSINESS: IMPLICATIONS FOR THE ADOPTION OF FARM FORESTRY Amabel Fulton, Professor Rob Clark, Paul Dargusch & Tim Tabart	79
REFINING NORTH FOREST PRODUCTS APPROACH TO FARM FORESTRY DEVELOPMENT John Hewitt & Stephen Manson	80
PRIVATE NATIVE FOREST MANAGEMENT IN SOUTH EAST NSW: CHALLENGES, OPPORTUNITIES AND APPROACHES Dr Jürgen Bausch, Simon Greenaway & Peter Deane	81
IMPACTS OF ISOLATED TREES: WHAT'S THE DIFFERENCE? Amanda Ozolins, Dr Cris Brack & Dr David Freudenberger	82

N.S.W. LOCAL GOVERNMENT LAND USE POLICY DEVELOPMENT PROCESSES: IMPLICATIONS FOR FARM FORESTRY Christina O'Grady & Dr John Field	83
BIOGRAPHICAL NOTES ON PRESENTERS	84
APPENDIX 1: COLLOQUIUM PROGRAM	98

A CRC Partner's View on Farm Forestry

Dr Hans Drielsma
Forestry Tasmania,
Hobart, Tas.

Introduction

There are strong forces which are increasing the focus on traditional rural farm lands for production of forest products. This paper reviews these drivers and the social responses apparent in rural communities. It is suggested that forestry is only one factor in a much broader and dynamic landscape of rural social change and that if we are to contribute to successful farm forestry, an appropriate research agenda must comprehend this broader landscape and adopt models and theoretical approaches which can put sense and order into it.

Forestry in the Landscape

The National Forest Policy Statement and Regional Forest Agreement (RFA) processes are reserving increasing proportions of our native forests for conservation purposes, and constraining timber production on the remainder. There is a consequent shift to more intensive forest management on smaller areas to maintain production requirements. For example, under the Tasmanian RFA, an additional 400,000 ha of forest have been reserved, and a program of regrowth thinning (1,600 ha/annum) and hardwood plantation establishment (5,600 ha/annum) has been initiated on public lands alone, to ensure that future yield capacity is not reduced. In pursuing these more intensive programs, forestry is moving out of the hinterland and into more settled traditional rural landscapes.

At the same time, there has been a recognition of international market opportunities. Australia has a mix of available land, conditions amenable to vigorous tree growth, technical forestry and business skills and a stable political climate which are attractive to investment in profitable forest enterprise. This has been encapsulated in the Plantation 2020 Vision and is driving increased investment largely on farmland.

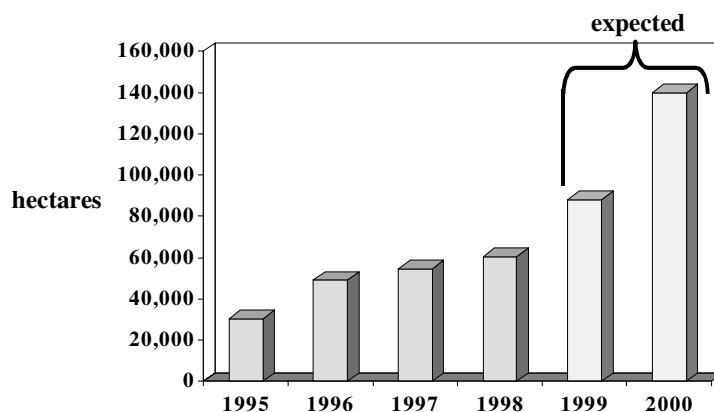
Recent growth in the establishment of new plantations within Australia has been phenomenal (Figure 1). The Plantation 2020 Vision seeks a trebling of the national estate by 2020, which requires an annual establishment rate of 80,000 ha. This goal has been exceeded in the last planting year, and is predicted to greatly exceed it, in the current year.

Most of this new establishment is focussed on traditional rural lands - mainly cleared farm/grazing lands. It is concentrated in the regions of south-west Western Australia, south-east South Australia/Western Victoria (the "Green Triangle"), north coastal New South Wales, and northern Tasmania.

Tasmania has developed a concept for "forestry in the landscape", which recognises a gradient of forest management intensity, capital investment and productivity which fits

comfortably into the wilderness - urban landscape continuum. More natural, lower intensity, longer rotation regimes are located closer to the wilderness end, thereby reducing pressure on wilderness and associated biodiversity values. On the other hand, it follows that more intensive, shorter rotation systems are located closer both to markets, but also inevitably, human communities (Figure 2).

Area of new plantation (hardwood + softwood) established in Australia annually



* Source: National Plantation Inventory, BRS

Figure 1

Concept - segmented forest product resources

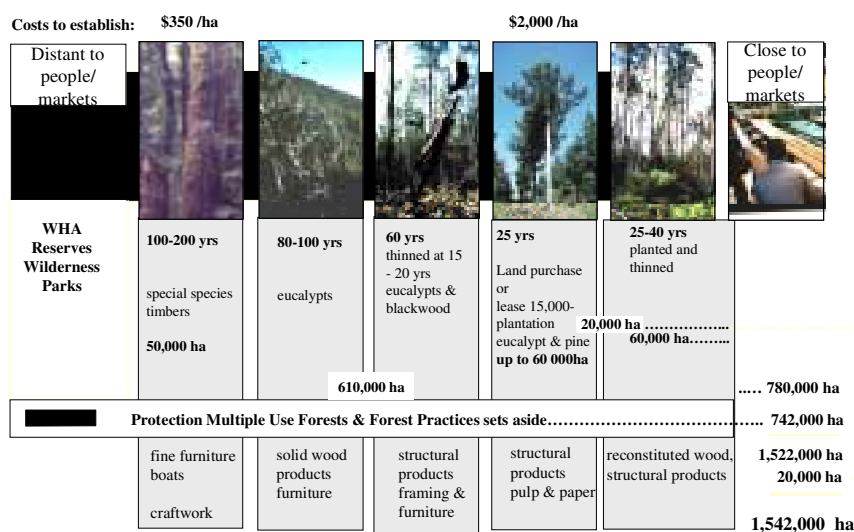


Figure 2

The Rural Community

There is a great deal of community support for tree farming, albeit with some ambivalence and internal contradiction of community and personal attitudes.

This is illustrated by recent polling in Tasmania (Figures 3 & 4). There is a strong recognition of the nexus between plantations, and conservation gains in native forests, and about 60% of the population see the use of farmland for this purpose as good. Interestingly, at a regional level, in the more rural north west of Tasmania, where plantation activity has had a particular focus, the support for plantations remains strong, but not if established on farm land. The strongest support for plantations is in the more urban south.

These shifts in the rate and nature of forestry activity are perceived differently in different segments of the community. In rural communities the shift in plantation activity is raising significant issues. It is creating a new focus for social unrest in the traditionally difficult forestry socio-political landscape.

Recent consultation processes in Tasmania have identified a range of both general community and more local neighbour issues. They reflect similar concerns arising in other regions of Australia.

General community issues include:

- *Community fragmentation/isolation:* resulting from loss of neighbours as farms are purchased/leased for plantations, and residents leave.
- *Loss of social capital and infrastructure:* as farmers leave the land, thresholds for viable community organisation, infrastructure (eg. bus routes) may be crossed.
- *Loss of productive agricultural land:* there is a perception that farmland, particularly prime cropping land should be retained for that purpose, and a fear that plantation establishment will degrade its value for food production, or at best render it unavailable for excessively long periods. “You can’t eat wood!”
- *Imports on road and bridge infrastructure:* a perception that log cartage traffic is more damaging to rural roads than traditional cartage of farm produce.
- *Reduction in Local Government rating base:* arises both in terms of rate liability of land purchased by Government owned enterprises, and the potential reduction in rateable value consequent on removal of farm or residential infrastructure.
- *Local employment loss to urban centres:* a fear that employment opportunities decline, or at best favour contractors or work forces removed from the local rural environment.
- *Loss of rural landscape amenity:* as cleared lands are established landscapes inevitably change.

- *Increase/decrease price of rural land:* both effects are claimed and decried. Either land prices are forced beyond the reach of the next farming generation to stay on the land, or are driven down, robbing the current generation of their rightful expectations for superannuation.

Social attitudes to plantations

Tasmania, Oct 1999

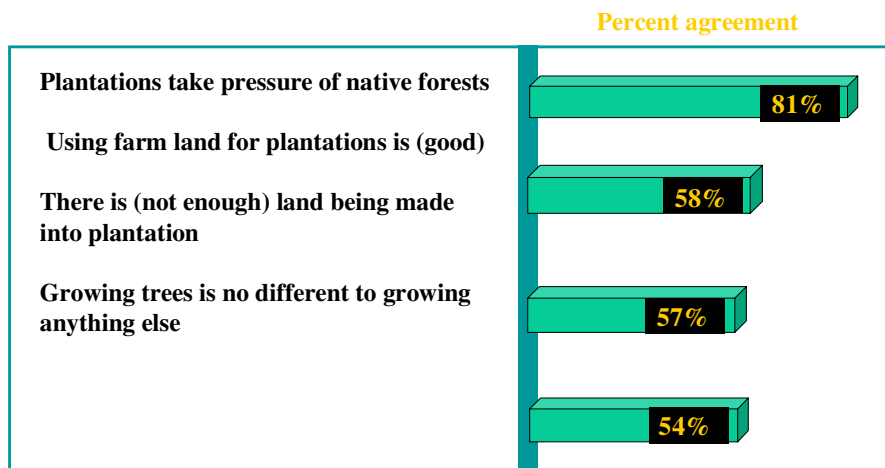


Figure 3

Social attitudes to plantations

Tasmania, Oct 1999

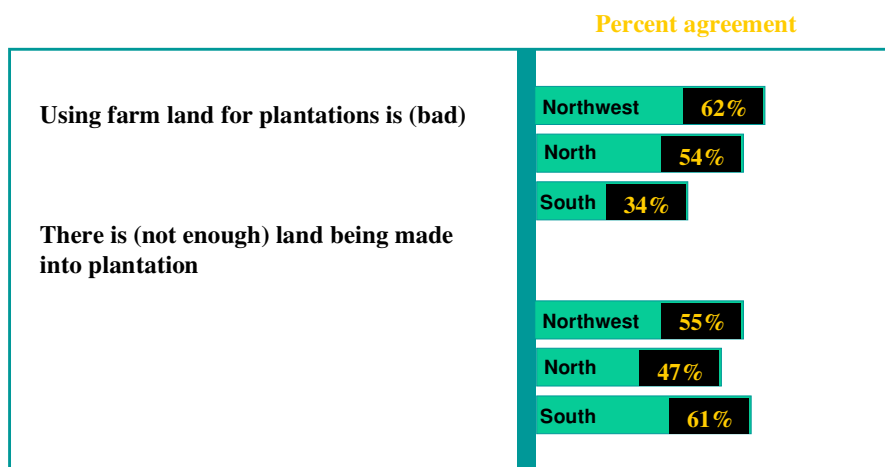


Figure 4

Neighbour issues include:

- *Shading/root competition*: are seen as problems along boundaries, particularly for more intensive adjoining crops and for residences and lead to calls for planting setbacks.
- *Vermin and weeds*: concerns about plantations harbouring a variety of pest, which impact on neighbouring farms. “You breed `em, we feed `em!” Associated issues arise in respect of the standard of boundary fencing, and responsibility for providing it.
- *Chemical use*: notwithstanding the fact that silvicultural regimes usually require far less chemical application than most crops, there is a perception that plantations introduce harmful chemicals into the environment. This is becoming increasingly an issue with the growth in organic farming.
- *Water yield/quality*: a concern that plantation activities will dry up, or severely reduce water supplies to downstream farmers, or degrade its quality.

These issues reflect a mix of social and environmental concerns. They are held irrespective of any objective evidence as to their relevance or severity, and it is beyond the scope of this paper to evaluate how reasonable or not, these concerns might be at a detailed level.

I suspect, however, that these concerns are driven more by a fear of change than that forest plantations are inherently more socially or environmentally undesirable than farming. Our society is imbued still with the romanticism of the agrarian ideal, and rarely does the discussion turn with equal vigour to the environmental consequences of farm chemicals, land clearing and stock trampling on biodiversity and water quality. Nor has the debate evaluated the social consequences of structural change in the political economy of agricultural.

We know that different rural industries (mining, agriculture, forestry, tourism) lead to the development of distinctive human communities (Drielsma, 1985). Industrial change will inevitably change communities and it is reasonable to assume that these human communities will resist such changes, particularly as they begin to influence the social order, through changing norms and social hierarchy.

Management Responses

There is a range of possible responses to these new issues, and a number are being developed in Tasmania.

Local Government

With completion of Regional Forest Agreements, the focus of political action has shifted markedly from Commonwealth and State government to local government. More attention is required at this level to address these issues. In Tasmania, a focussed program of briefings and field days has been targeted at this area through the Forests and Forest Industry Council - a multi-stakeholder council which includes farm sector representation. This program has been positively received and strengthened personal contacts and led to productive dialogue, including the development of an ongoing forum convened through the Local Government Association of Tasmania.

Neighbour Relations

Specific focus has also been given to managing and enhancing neighbour relations. Forestry Tasmania, a Government Business Enterprise, recognised early that it had particular issues surrounding the payment of rates and boundary fencing. It determined in 1999 to voluntarily adopt a position of “level playing field” in respect of its farm land plantation activities, and actively seek agreement with the Tasmanian Farmers and Graziers Association (TFGA) on a range of issues bearing on its conduct as a good neighbour in the rural community. Such an agreement was subsequently reached and formally signed between the two organisations. It provides a high level agreement of good intent, a process for resolution of issues, and for annual review and updating. Communication of this agreement through the rural community has done much to dispel misperceptions, while at the same time re-enforcing to Forestry Tasmania staff the importance of “Relationship Forestry” as a concept and expectation, in managing local neighbour concerns.

Following from Forestry Tasmania’s experience, the Tasmanian plantation sector, made up of seven major forestry companies, in consultation with Private Forests Tasmania, TFGA Forestry and other stakeholders, developed and promulgated a voluntary Good Neighbour Charter. This document signed by the most senior Executive for each company, commits the company to consultation with neighbours and local government, and to best practice recognising the range of issues outlined above. It is proposed that the document will underpin an active communication strategy to reach out to the rural community.

State Policy

Tasmania has a State policy which seeks to protect agricultural land from other uses. The definition of agricultural use currently includes tree cropping. A review of the policy is currently under way, and the issue of whether tree cropping should or should not be recognised as simply another form of agriculture has become a significant focus. For commercial scale farm forestry, it is clearly desirable that there should be consistency, at least at the State level, in broad land use policy, to guide more detailed local government land use planning.

The Forces of Social and Economic Change

The changes in forestry must be placed in the context of broader social change impacting on rural communities. Such changes include shifts in internal migration, decline in traditional rural industry and industrial and commercial technologies.

On the other hand, Figure 5 illustrates the significance of internal migration for some rural communities. While now somewhat dated, it is illustrative and relevant for current purposes. Traditional migration out of rural areas, with agricultural decline, has been overtaken in certain areas by a retirement/lifestyle led turnaround. Such turnaround migration has been focussed on moist areas of equable climate - including some of our most productive natural and plantation forest lands. This has led to changing rural communities, with an influx of “urban” values and interests into more traditional rural economies, and consequent impacts on perceptions of both farming and forestry activities.

Tasmania, in particular, exhibits social trends within which context any evaluation of plantation issues must be placed. Declining population (Figure 6) and high unemployment (Figure 7) have been a feature of the landscape for at least the last decade, and certainly precede the rise of plantation activity in the last 2-3 years. While somewhat unique to Tasmania as a state, they are probably characteristic of many more isolated rural areas. They suggest that the traditional rural economic base is not sustainable, and that rural change is inevitable - plantations or not.

Migration turnaround

P.199 Prospects for Australian Hardwood Forests

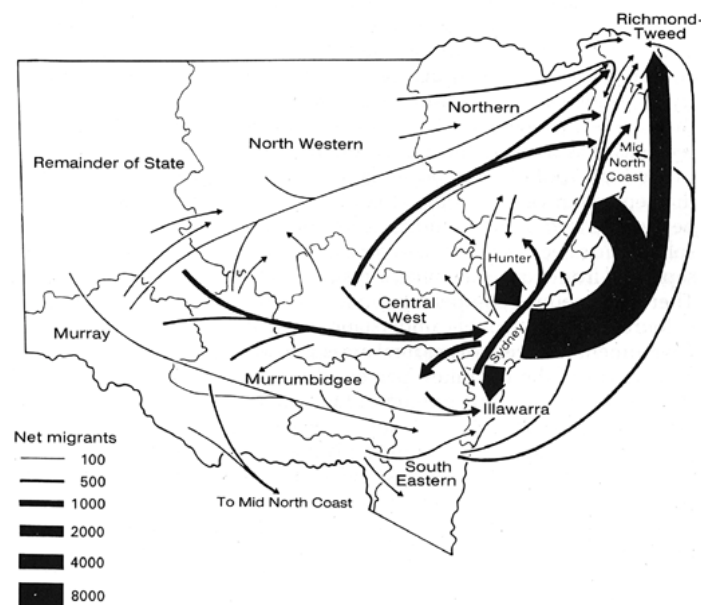


Figure 5:
Migration Turnaround 1976 - 1981

Globalisation of industry and technological changes continue to impact on rural areas leading to losses in regional services (financial, health and education, government) and infrastructure. A range of changes in the rural economy reflect the ebb and flow of particular industries and technological changes (eg. deregulation of the dairy industry), and have lead to declining employment in agriculture (Figure 8). During the 1990's the number of dairy farmers in Tasmania reduced from 900 to 750, while milk production increased by 63%.

In summary, plantation forestry is currently accused of causing, or potentially causing, high rural social change. In reality it is simply a small and more recent part of a much larger set of forces which have been impacting on rural communities for decades, and will continue to impact on them.

Tasmania's social & economic conditions

Tasmania's population growth

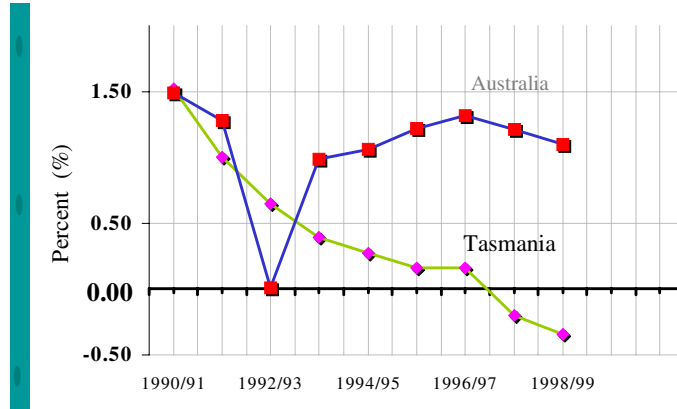


Figure 6
Tasmania's social and economic conditions - population growth

Tasmania's social & economic conditions

Labour force status of the civilian population aged 15 and over

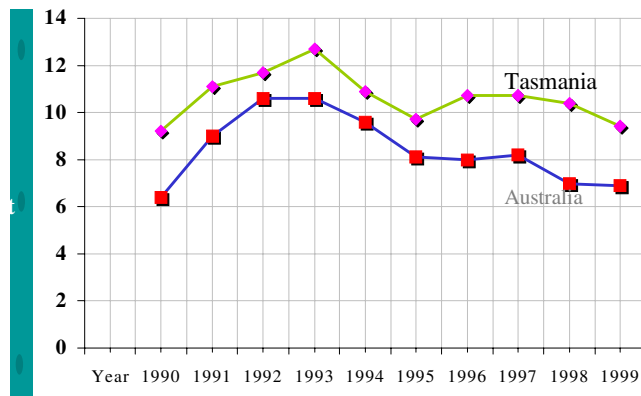


Figure 7
Tasmania's social and economic conditions - unemployment rate

Whether plantation forestry is contributing to these impacts, is responding to them, or may even be ameliorating some of them remains to be established by a somewhat more thoughtful and detailed analyses. There is a need for greater research into these matters, but it must be research that is grounded in an understanding of the broader dynamics and contexts of rural social change.

Effects from economic change on the rural landscape

(Source : ABS Labour Force Statistics, Microfiche GRP450, Table E25)

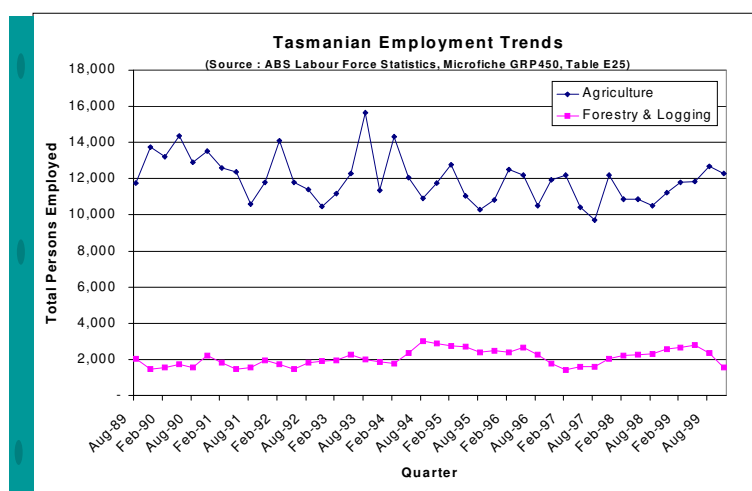


Figure 8
Effects from economic change on the rural landscape

Social Science Research

The social sciences have much to offer in assisting us to understand the dynamics of rural social change - both in informing policy and in enterprise level initiatives to more successfully integrate forestry into the farming community and landscape.

There is a wealth of relevant rural social science which has not yet been harnessed in pursuit of these issues in Australia. Machlis *et al.* (1997) (Figure 9) provide a broad human ecological framework for understanding and research. There is a need and opportunity for much fertile research in this area. It is to be hoped that this colloquium provides a useful beginning for a greater focus in this area.

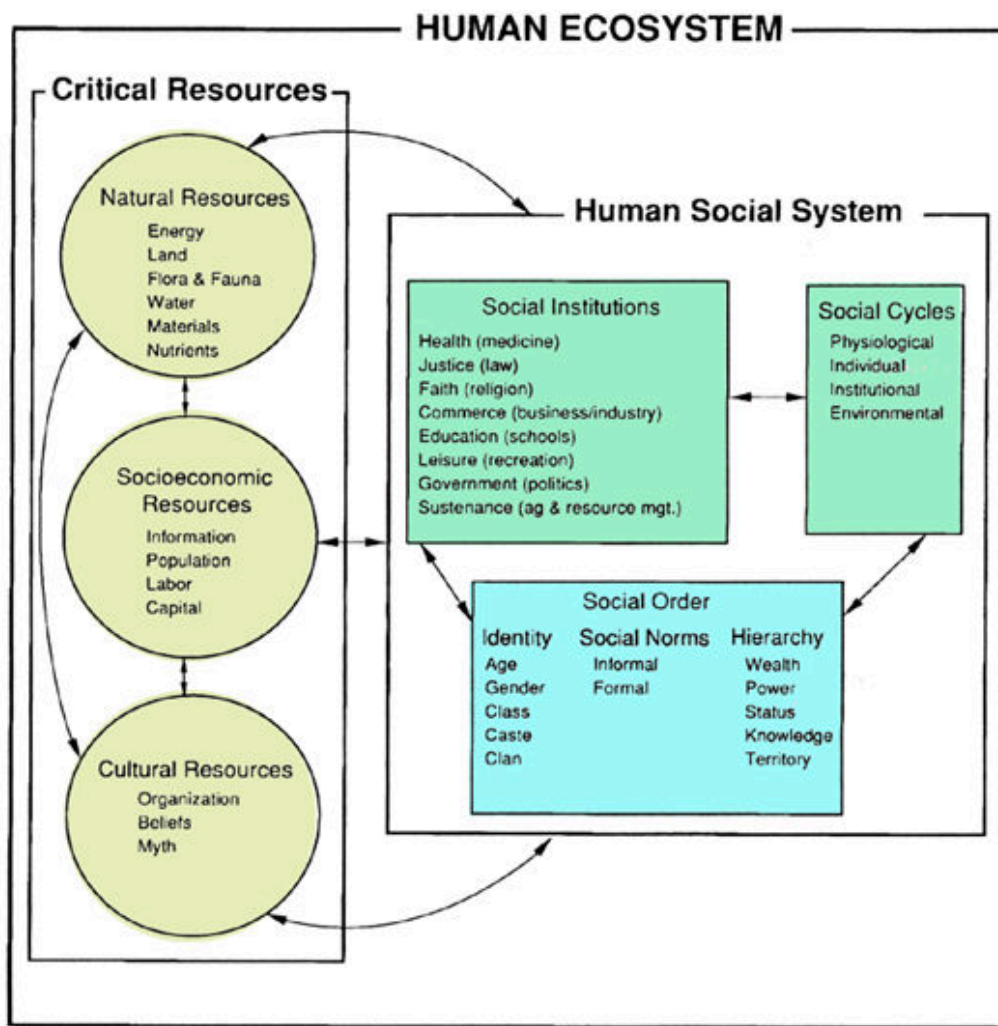


Figure 9

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Social Research to Support Successful Farm Forestry

Professor Craig Pearson, Dr Sheridan Coakes & Heather Aslin

Agriculture, Food & Social Sciences Division - Bureau of Rural Sciences,
Canberra, ACT.

Abstract

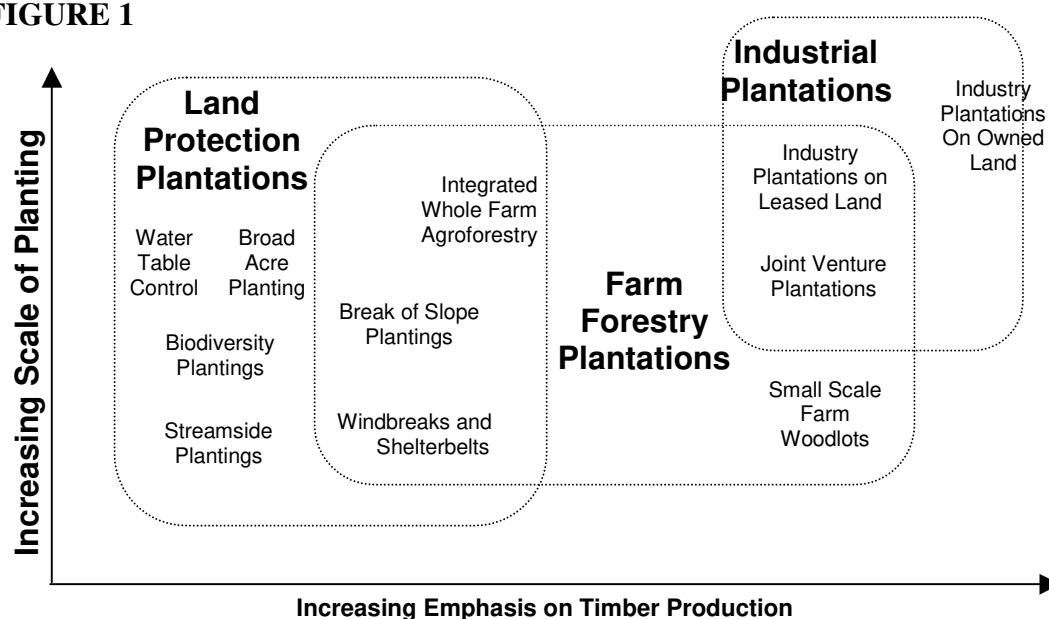
There is a clear role for social sciences research in maximising the benefits to individuals, communities and the economy from farm forestry, while at the same time developing creative solutions to associated structural adjustment for individuals and rural communities. This paper takes account of discussion earlier in the colloquium by examining the social research literature, relevant to the rapidly changing Australian farm forestry context, and suggesting potential social issues and research gaps. A greater consideration of the social environment will ultimately ensure the continued development of an economically and social sustainable farm forestry sector.

To structure this overview, we will frame colloquium outcomes, literature and speculations within a matrix. On the one axis, our understandings may helpfully be categorised by: existing social knowledge and research activity; and priority areas for social research. On the other axis, we place the issues of adoption, such as individual commitment (to change land-use into farm forestry); and impact, on individuals, farm families and communities. These considerations lead us to conclude that a way forward involves recognising four needs, namely that (1) adoption of farm forestry is a social activity, (2) it should be distinguished from industrial plantations and land protection forestry, (3) it will be accelerated by social research and unbiased socioeconomic case studies and (4) it is more likely to occur, and to be creative and long-lasting if farm forestry is adopted as part of cooperative "landscape design".

Introduction

Farm forestry, often referred to as 'agroforestry', can be defined as the incorporation of productive tree growing into farming systems. Such an approach can take many forms including development of woodlots, shelterbelts, alleys and widely-spaced tree plantings. In general, farm forestry tends to involve small to medium scale production, while industrial forestry involves large planting of trees often undertaken by government and industry. Donaldson and Gorrie (1996), in defining "farm forestry" do not include larger-scale industrial or plantation forestry. They propose 3 overlapping forestry systems with terms to describe them (Figure 1):

FIGURE 1



In an ABARE summary report assessing the state of plantation forestry in Australia, Burns *et al.* (1999) estimate that plantations represent less than 1% of Australia's forests, however they supply more than half the wood used by domestic wood producers. Seventy-five percent of the plantation area is softwood, however hardwood plantations are expanding rapidly, increasing by 18% between 1990 and 1998. The majority of Australia's plantations are publicly owned, reflecting the degree of government involvement in, and subsidisation of, the industry. This will no doubt change quickly, as private industrial forestry expands and governments vacate ownership of industrial plantations.

From an economic point of view, of the \$6 billion worth of forest products produced by the Australian forest industry in 1996-97, 65% were derived from plantation wood. Plantations are also significant employers, with an estimated 16,000 people employed in the industry in management and wood processing in 1996-1997.

At a more local level, there are approximately 19 million hectares of cleared agricultural land considered suitable for plantations, but despite this area less than 1% of farmers plant trees for commercial reasons (Barr and Cary, 2000).

Research in Farm Forestry

Very limited social and economic research on farm forestry has been undertaken within the Australian context. Much of the Australian literature consists of review articles, 'think pieces' and policy documents, rather than empirical research. This could be attributed to the fact that forest industries and agencies have been slow to fully acknowledge that farm forestry activities occur within a broader rural and regional context, and that often the issues associated with farm forestry production are social rather than technical. While social assessment work has been undertaken by government, since early 1996, as part of the Australian Regional Forest Agreement process, research has largely been focussed around state-owned native forests. It is only recently that government has turned their attention to social issues in relation to the plantation and farm forestry sector.

There have been numerous solutions put forward, within a policy environment, to identify and suggest possible policy actions for creating viable, self-supporting, plantations-based farm forestry. Such strategies have included attempts to develop confidence amongst growers and investors in regulatory planning arrangements, ongoing support and investment in innovation processes, implementation of cost-sharing arrangements and adherence to competition principles, to name only a few (Alexandra and Hall, 1998).

More recently, State and Federal Governments and the Plantation Industry have developed *Plantations for Australia: the 2020 vision*. The vision includes four strategic imperatives:

1. Boost the availability of suitable land for plantations;
2. Get the commercial incentives right;
3. Establish a commercial plantations culture; and
4. Improve information flows.

Socio-economic elements of the vision include improved consultation through the development of communication strategies, and skill development through extension and education.

However, as highlighted, much of this policy direction has been generated from limited empirical or substantive research. In other words, there is little guiding theory and data on which to base policy strategies and actions. Furthermore, it is evident that the needs and aspirations of different stakeholder groups, namely industry, government and farm producers, are quite disparate, again indicating a need to and appreciate the context in which these groups operate and their differing agendas and motivation for action.

Appreciating the Social Context

Although the literature in the area is far from extensive, a number of studies have been undertaken in the area of farm forestry and sustainable resource management. These studies have highlighted potential impediments to the adoption of farm and plantation forestry, and have highlighted areas of future social research potential. These issue themes are highlighted in the following sections and social research strategies to address these themes are identified.

Uncertain Viability

One of the most significant issues identified by farmers relates to uncertainty, in both an economic and social sense. Growers appear concerned about the social and economic benefits that may ensue from adopting a farm forestry approach, and there appears to be a plethora of contradictory information available in the area. For example Kirby *et al.* (1993), in undertaking an appraisal of agroforestry investment in South Australia, concluded that while agroforestry had a higher net present value than agriculture, the introduction of varying commodity prices, and the range of values associated with agroforestry, indicated that it may be a riskier land use.

Furthermore, an Industry Commission report completed in 1997, revealed a number of major factors that were seen to reduce commercial incentives for wood production on private land (Industry Commission, 1997). These included:

- Difficulties in separating ownership of land and trees – this may impede the land owners ability to sell rights to develop, manage and harvest trees on their land;
- Potential for double taxation of forestry income;
- Non-commercial operations of government forestry agencies – there have been numerous inquiries and controversies about the operation of State Government forestry agencies and questions about whether their pricing policies are fully commercial; and
- Uncertainty about harvesting rights – it is claimed that in most jurisdictions, landowners do not have the automatic right to harvest trees they have planted specifically for sale.

This being the case, there is a need to identify the key issues that farmers may have in relation to farm forestry. As private, rather than institutional, investors, farmers need a greater degree of certainty before embarking upon such an approach. Therefore it is necessary to determine what are the uncertainties or concerns of farmers, what information is available to address these concerns and how can this information be communicated in an appropriate manner.

In the social sciences, considerable research has been undertaken in the risk communication area that addresses how best to communicate information on risk issues. Risk communication must consist of dialogue between government/industry and community rather than just monologues by industry or government alone. It is evident from other risk communication efforts that tinkering with words is not sufficient to send a risk message, knowledge does not necessarily change beliefs and information alone may not be sufficient to bring about effective action. What is needed is a process by which salient issues can be identified, evaluated and mitigated through industry-government-community partnerships. In addition, research and communication activities should utilise existing stakeholder networks, at all levels – local, regional, state and national - to facilitate information provision and knowledge generation.

Role Definition and Coordination

Within the farm and plantation forestry sectors, it appears that the role of stakeholder groups is not clearly defined. In this regard further work is required that identifies the full range of stakeholder groups and issues. It is likely that groups may have quite different issues, and certain issues may be quite context-specific. Furthermore, research needs to be driven from the substantive domain, which is ‘bottom-up’, and should make use of stakeholder knowledge and conceptual frameworks. This will require a greater appreciation of differing perspectives, knowledge bases and learning styles, and greater use of existing social networks.

In addition, it is desirable for agencies and industry to coordinate research efforts to prevent duplication and improve the knowledge base in a consistent manner. An improved understanding of the institutional (agency structure and responsibilities, industry and government jurisdictional and administrative boundaries) and structural impediments (economics/trade, global issues, population growth, urban expansion) to farm and plantation forestry would also be beneficial.

The broader community and institutional change agents may also be key players in the adoption of more sustainable land management practices, such as farm forestry. For example, agencies may need to adopt a participatory and facilitatory approach, evident in previous processes such as the National Landcare Program. In other words, what may be important is the presence of change agents in the farming community such as farm extension and advisory

personnel, agencies and groups, farm planning and training groups and organisations and broader environmental and planning programs. Communities in which change agents are more active, may be more likely to implement or adopt sustainable land management practices when compared to those communities with less active change agents (Fenton *et al.*, 2000).

Time series research designs, action research and other participatory approaches, such as 'Cooperative Inquiry', may be useful methodological tools to assess organisational effectiveness. Cooperative Inquiry and action research models involve extensive interaction with participants in the process of formulating research questions and conclusions.

Socio-Economic Impacts

Despite promotional claims, there is little detailed analysis of the extent of the socio-economic benefits that will flow to regional communities from farm and plantation forestry initiatives, and the costs and benefits of such a regime to differing stakeholder groups. While there have been successful applications of farm forestry across Australia, it is very desirable that further case studies are commissioned to illustrate both the positive and negative social and economic consequences. What are the key socio-economic issues associated with a change in production regime? What are the direct and indirect flow-on-effects to rural communities? What strategies or policies can be developed to mitigate these issues and build more constructive partnerships between government/industry and stakeholder groups?

Social impact assessment is a useful tool in this regard. Involving key phases such as assessment, prediction, mitigation and monitoring the likely impacts of particular scenarios can be assessed and then monitored over time. Recent methodological developments in applying social assessment in a natural resource management context have included developing community sensitivity and resource dependency indices, mapping of social values, and applying a technique called 'Township Resource Cluster Analysis' to identify socio-demographic units dependent upon particular resource uses, and to assist in the integration of social data with environmental, biophysical and economic inputs.

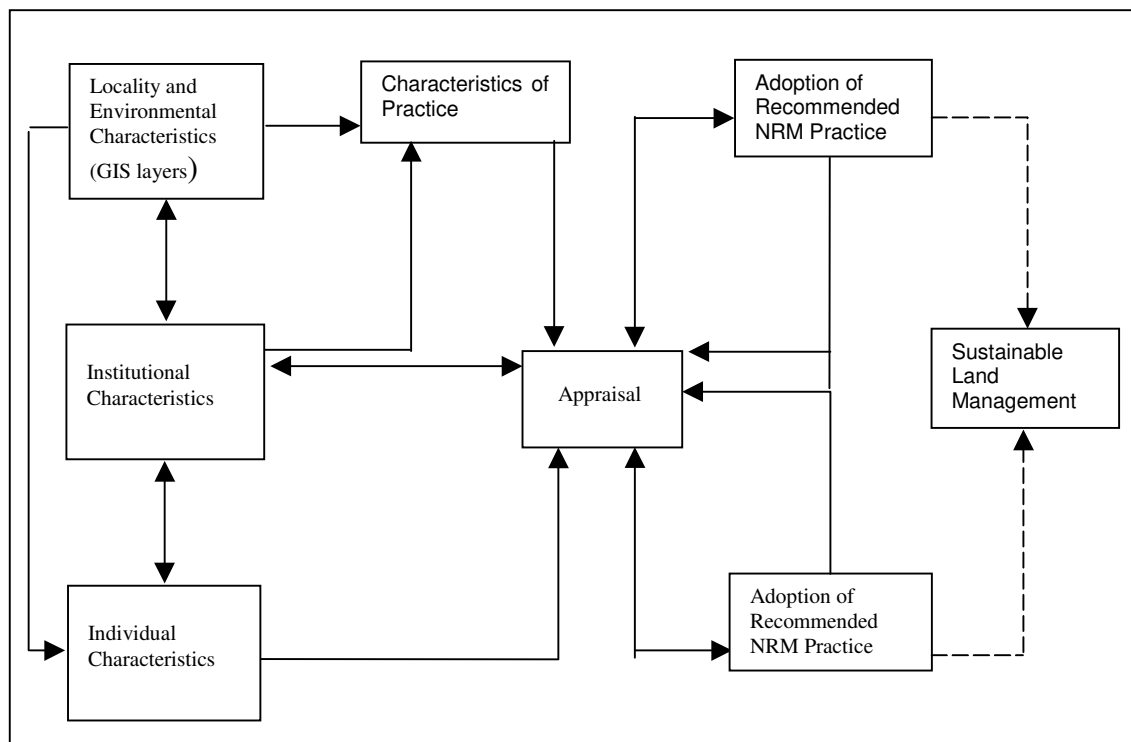
Social impact assessment is also useful in working with stakeholder groups who may be adversely effected by a proposal, to identify potential solutions to ameliorate or mitigate the negative impacts that may result. Such information is critical in developing appropriate structural adjustment packages that not only address economic but also social issues. Further research applying social impact assessment methodology will be useful in building a more comprehensive picture of the likely impacts of farm and plantation forestry at a community and regional level.

Adoption

Within the farm forestry area, there is a range of factors that may influence adoption. It is conventional to list such factors as including education and training, farming or land management experience, farm financial characteristics, farm family characteristics, attitudes perceptions and expectancies of change, voluntary participation and social and institutional contact (eg. Fenton *et al.*, 2000). Fenton *et al.* (2000) have identified three significant components in relation to the adoption of more sustainable land management practices, and have incorporated these components into a workable model. These are:

- Individual factors– including motivational and capacity indicators at the farm and individual farmer level;
- Institutional factors– including the prevalence and level of activity of change agents in the farming community; and
- Appraisal factors– including the level of farmer and land management participation in farm and land management organisations and groups, and additional levels of farmer education and training.

Figure 2. An Example of a Predictive Model of Adoption of Sustainable Land Management Practices (Fenton *et al.*, 2000)



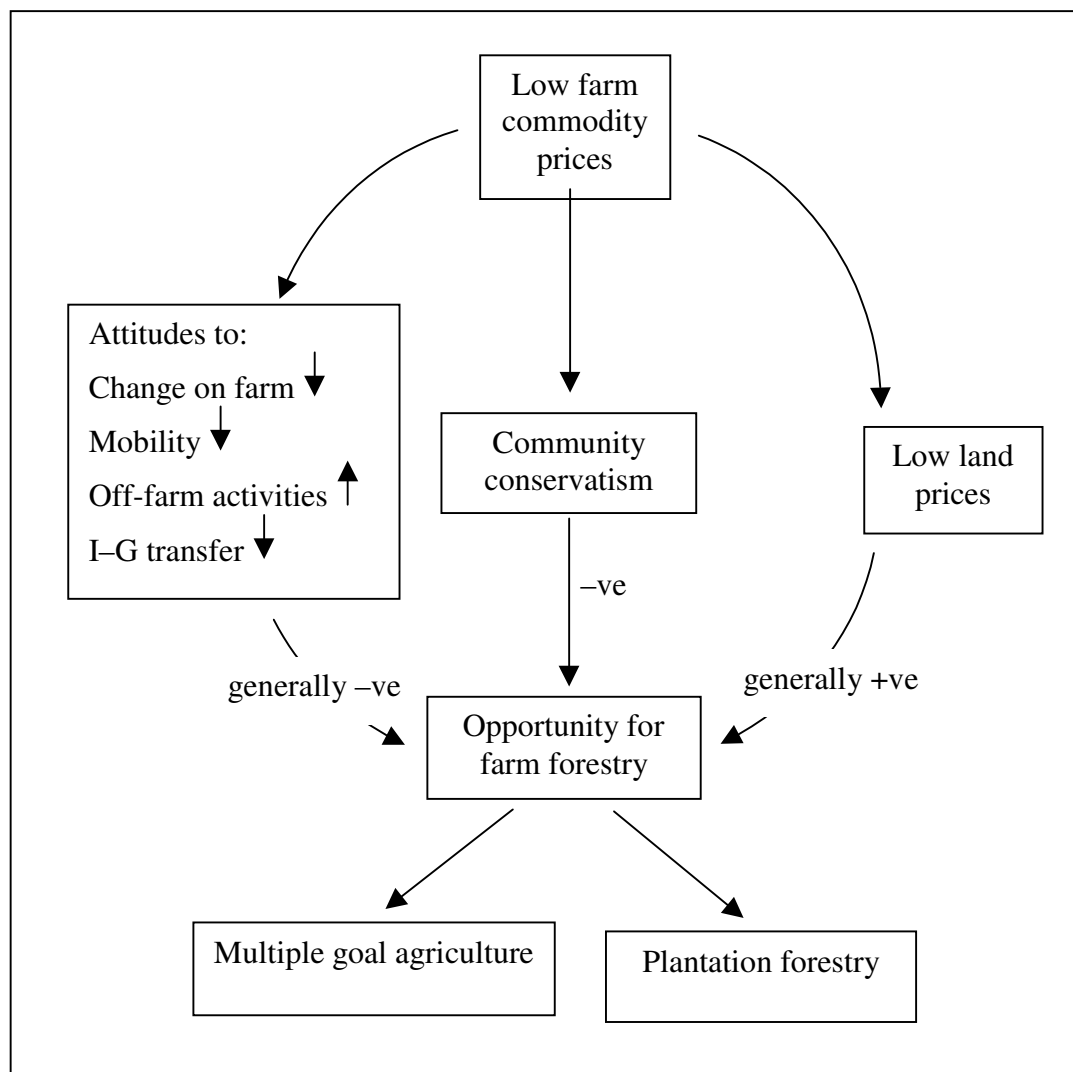
Fenton *et al.*'s (2000) model provides a descriptive base from which a better understanding of adoption may be obtained. The authors suggest that any attempt to derive a complete predictive model which encompasses all possible environmental, behavioural, social and economic indicators and which identifies the inter-relationships among these variables would be an impossible task given the current state of knowledge and research in the area.

Central to the model of Fenton *et al.* (2000) is the appraisal component that represents farmer and land manager beliefs and attitudes towards natural resource management, degradation and specific adoption practices. Appraisal also includes farmer and land manager attitudes towards those organisations and institutions that are promoting sustainable land management, and identification and recognition of land degradation. The feedback loops highlight how appraisal and other indicators determine the adoption of sustainable practices. They also indicate that adoption of practices in the past will change how farmers view or appraise the adoption of farm forestry in the future.

At this Colloquium, various authors have illustrated the complexity of issues, and their interplay, which in real life influences "appraisal". For example farm commodity prices will change farmers' attitudes towards the adoptions of farm forestry.

These changes are illustrated in Figure 3, which is drawn from the Colloquium. We are of the view, for example, that low agricultural commodity prices are most likely to decrease the enthusiasm a farmer has to embrace change such as farm forestry.

FIGURE 3



As Fenton *et al.* (2000) outline differences in appraisal may also be determined by a range of individual, institutional and contextual variables and the complex interactions among these variables. To date there is a limited understanding of the appraisal component and its relationship to adoption. It may be likely that many existing individual indicators of adoption (eg. age of farmer) are themselves being used as surrogate indicators of appraisal. In other words, it may not be the chronological age of the farmer that is important in predicting adoption, but the beliefs and attitudes that accompany differences in farmer's age.

The social sciences do possess the necessary data collection and analytical tools e.g. survey research, social profiling techniques, structural equation modeling, that may be used to identify and explore the causal relationships and paths in predicting the adoption of farm forestry practices. To date, as far as we are aware, no work of this nature has been undertaken in Australia.

In a review paper on social research and development for sustainable natural resource management in rural Australia, Ross (1999) also identified appraisal issues as important outlining that a better understanding is required of existing farm cultures and potential growers. In addition further research is required in relation to inter-generational issues and the transfer of farm assets, and research on values that guide and influence resource management decisions and behaviours. For example, Franzel *et al.* (1996) found that farmers' ideas of adoption clearly differed from those of researchers and scientists. Similar observations have been made in relation to adoption of other agricultural practices (Abel, Ross, and Walker, 1998; Scoones and Thompson, 1994). These insights into the different perspectives, mental models and knowledge systems of different stakeholder groups in particular offer a fruitful area for further inquiry into farm forestry.

The preceding discussion has focussed on social issues associated with appraisal and adoption of farm forestry. It is now helpful to broaden our view from a farmer's appraisal, particularly in relation to adoption of farm forestry, to consider some community issues. At the Colloquium, we selected 6 or 7 particular issues or perceptions which recurred, as being of core importance to individual adoption and community impact (Table 1).

TABLE 1: Issues or perceptions which were identified during the Colloquium as being of core importance to individuals and communities, in the farm forestry context.

Commitment to adopt farm forestry

- enthusiasm for change
- ownership / share power
- Alexandra and Hall: "a residual culture of blame"
- risk
- intergenerational benefit
- peer acceptance / support
- locally – grounded information: adaptive management cf. prescription by third party

Community impact

- peer attitudes: Race's "3 images"
- visioning benefits, problems
- coping with speed of change
- create "grey areas": creative space for designing new "landscapes"
- achieve "a new workability"
- transfer and capture of benefits

The "community impact" is especially important because community attitudes influence the farmers' attitudes to adoption, and sustainable land use in general. Further, this is an area where our existing knowledge in the social sciences is low, and where the social sciences offer opportunities for greater understanding and outcomes which are accepted by, and beneficial to, communities (Table 2).

TABLE 2

		Existing Knowledge	Priority Areas for Research and Development
Adoption	Individual	High – NRM and adoption generally Low – Farm Forestry context	• Development of a predictive model that highlights factors influencing adoption, and their inter-relationships eg. Regression models, path analysis, structural equation modeling, based on survey research • Context specific cost-benefit analyses of farm forestry initiatives, particularly in comparison to agricultural alternatives • Assessment of 'mental models' of individual farmers and decision network analysis
	Institutional	Medium – Farm Forestry context	• Institutional analysis of the full range of government structures and the regulatory environment, by farm forest region, and their influence on farm level decision making
	Appraisal	Low – Farm Forestry context	• Assessment of the broader community, peer group and industry processes influencing farm level adoption decisions eg. Participation in farm management organisations and groups, training, skills development
Impact	Individual/family	Low on social impacts Medium for economic	• Detailed Social assessments of impacts on the farm family (values, identity, option consideration). For example, investing in farm forestry may reduce the ability of a farm enterprise to support more than one family or generation due to comparatively long periods before returns from the investment are obtained, particularly when compared with traditional agriculture.
	Social fabric, institutional arrangements and infrastructure	Low	• Analysis of community perceptions of potential social changes arising from significant farm forestry plantings, for example, visual impacts, changes to community identity and attachment to place • Assessments of potential impacts on infrastructure (physical and social); social capital and institutional structures and functioning • Development of consultation and mitigation strategies to reduce these impacts – or levels of community concerns regarding potential changes
	Population	Low	• Analysis of impacts on population profile, employment levels and mix, regional income and expenditure levels and flows

In conclusion, and arising from Tables 1 and 2, we suggest that a 'way forward' for farm forestry is four-fold.

1. Recognise the adoption of farm forestry is a social activity, based as much or more on social issues eg. appraisal, as on biophysical information or likely economic gain;
2. Distinguish "farm forestry" from industrial plantation and land protection forestry because language is important and acceptance of farm forestry is made more difficult when it is confused with social, stakeholder and environmental issues which relate to plantation or industrial forestry;
3. Acknowledge not only the need for social research into appraisal and adoption of farm forestry, but also the need and likely gains from, social research into, and socioeconomic case studies of, community attitudes and impacts; and
4. Approach change to farm forestry as the people will: it occurs only when there is enthusiasm for change. In the case of communities, this enthusiasm is more likely to be generated, and the outcomes are more likely to be creative and long-lasting, if we adopt the paradigm of co-operative "landscape design" which will incorporate forestry.

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It's Not Easy Being Green: Perceptions of the 2020 Vision for Plantation Forestry in Australia

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Introduction

Policies introduced by the Federal government under the *National Forest Policy Statement*, the *Wood and Paper Industry Strategy*, and most recently the *2020 Vision*, call for a rapid increase in the rate of establishment of forest plantations in Australia (Commonwealth of Australia 1992, 1995; Plantation 2020 Vision Implementation Committee 1997). The *2020 Vision's* aim of trebling Australia's forest plantation estate by the year 2020 requires a significant land use change for many rural areas with land suitable for forest plantation establishment.

Rapid change commonly leads to conflict (Arcury and Christianson 1990). Previous work relating to plantation establishment in rural areas has found that the introduction of plantation forestry to an agricultural region often results in conflict (SPIS 1990). An increasing number of reports of opposition to forest plantation establishment in rural newspapers has occurred over the past three years, and led to development of a short term study into conflict over forest plantation establishment in rural communities in Australia. The aims of the three month study, conducted from December 1999 to February 2000, were to:

- identify concerns held by different groups over the expansion of Australia's forest plantation estate;
- identify perceptions of different types of forestry, particularly of different types of forest plantations; and
- identify mechanisms for expression and resolution of concerns.

This paper presents an overview of the issues raised during the study. It aims to provide a starting point for discussion of the social issues raised by the establishment of plantation forests in some communities. As the results being reported are preliminary, they are descriptive rather than explanatory at this stage – in other words, this paper does not aim to provide a thorough analysis of the sources of conflict or to develop theories to explain the ways in which conflict over plantation forestry has developed.

Throughout the paper the terms 'dispute' and 'conflict' are used interchangeably. This is because there is little distinction made here between the sources of conflict and the expression of conflict. Other authors argue that the expression of conflict should be referred to as the 'dispute' that indicates the presence of some source of 'conflict' (see for example Ingalsbee, 1996; Ozawa, 1996).

Methods

The study aimed to discover the reasons disputes had occurred and to explore in-depth the motives of individuals involved and the processes used to express and attempt to resolve conflict. Qualitative sociological research methods were the most effective means of achieving this.

The study was based on a series of case studies of disputes over forest plantations. Using case studies of disputes provided a useful means of understanding the motivations of individuals opposing forest plantation development. By focussing on areas where the highest levels of opposition to plantation development were found, it seemed likely that a good understanding of adverse perceptions of plantations could be developed.

The disputes to be studied were identified by three means:

- discussions with forest professionals who might have knowledge of disputes;
- review of media articles from local newspapers in rural areas of Victoria and Tasmania that have been targeted for forest plantation development; and
- contact with environmental groups who have released policies on forest plantation development.

Once the five disputes to be studied had been identified, an interview schedule was designed. Interviews were semi-structured in nature, allowing exploration of individual circumstances that related to the general topics being examined. A literature review on forest conflicts, and on land-use conflict in general, was used to design the interview guide. The guide is given in Table 1.

Interviews were then carried out with 45 individuals involved in the five disputes over forest plantations. Fourteen of the 45 were interviewed in relation to more than one of the disputes. One court hearing was also observed. Interview data was analysed using the analytic induction methods outlined by Minichiello *et al.* (1995).

Details of each dispute are outlined below.

TABLE 1: Interview Guide

Primary topic	Related sub-topics used to explore responses in-depth
Background information on the individual/s being interviewed	• Length of residence in area • Employment in local area/involvement with local community • Capacity in which they have come into contact with plantation dispute
What are the impacts of plantation development?	• Positive impacts • Negative impacts • Impacts on the individual/neighbouring properties • Impacts on the wider community
What sort of concerns have been raised over plantation development?	• When were concerns first expressed? • How have concerns been communicated? • How have concerns developed?

Primary topic	Related sub-topics used to explore responses in-depth
How have the forest companies involved responded to the concerns raised?	• What methods did they used to respond? • What did they say in response? • Were their responses appropriate?
What needs to change so that plantation establishment becomes an acceptable land use?	• What changes to the ways plantation establishment occurs can be made? • What type of plantation establishment is acceptable? • What species of trees are acceptable for plantation development?
What are the most appropriate methods of trying to resolve the dispute?	• Is the method currently being used the most appropriate? • What alternative methods might work? • What methods work for which party?

Case study 1: Softwood forest plantation proposal in small rural community in north-east Victoria

This study involved the purchase of a large farming property (approx. 411 ha) by a prospectus-based investment company. The property bordered a public road forming the main entrance to a small town and farming community. Several local residents objected to establishment of the plantation, and the local Shire refused a permit for plantation establishment. The forest company appealed the decision, and won.

Interviews were conducted with two local council planning officers, one forest company representative, one independent forester promoting plantation development in the region, four farmers supporting the plantation and 10 hobby farmers and farmers opposing the plantation. One environmental activist who provided information to local residents objecting to the proposal was also interviewed.

Case study 2: Hardwood forest plantation proposal in the rural community discussed in Case Study 1

A forest company involved in downstream processing of wood products applied for a permit to establish a hardwood plantation on a 125 ha farming property. They had not yet purchased the property, with the sale pursuant to obtaining a permit to establish trees. Neighbouring landholders objected to the plantation. The local Shire granted a permit to establish the plantation. The landholders appealed the decision, and lost.

Interviews were conducted with the two local council planning officers listed in Case Study 1, with two of the primary objectors (hobby farmers), and with four other farmers and hobby farmers in the district who had participated in both Case Study 1 and 2 as objectors.

Case Study 3: Dairy farming and cropping communities in north-west Tasmania attempting to stop forest plantation development

This study examined the protests of a set of closely linked communities in north-west Tasmania over the spread of forest plantations in their districts. The communities were studied as a unit, as their protests have overlapped and been worked on jointly by the different groups involved. One formal protest group, Citizens Opposed to Plantations (COPS), has been formed, along with several informal groups. The communities have all had significant

numbers of industrial forest plantations established in their localities over the past 10 to 20 years. One town has only one farmer left, with all other properties converted from traditional agriculture to forest plantations. Another district has nine properties remaining in traditional agriculture, with four of the nine landholders considering selling to plantation companies. Many of these farmers did not wish to sell to forest plantation companies, but felt they had no other options.

A farm forestry advocate supporting plantation development, two foresters employed by a prospectus-based company, a farm forestry extension agent, three objecting hobby farmers and six local farmers were interviewed. Two real estate agents operating in the area were also interviewed.

Case Study 4: Cropping and grazing community in north-east Tasmania attempting to stop forest plantation development

This case study examined the reaction of farmers in a small rural community that has recently had a highly visible property (of approximately 300 ha) sold and established to pine plantation. Three local farmers have formed an informal protest group and begun holding meetings opposing forest plantation development in the local community. Two of these farmers were interviewed, and informal discussion occurred with the farmer who had sold his property.

Case Study 5: Local Shire appealing the Private Timber Reserve system in north-east Tasmania

One local Shire in Tasmania has been objecting to applications for Private Timber Reserves and attempting to influence the areas in which forest plantation development takes place within its boundaries. The Shire is concerned that forest plantations are being located in highly scenic areas and detracting from tourism values in the local area, as well as devaluing hobby farm prices and lowering revenue from tourism and from rates. Several local residents are supporting the Shire.

A court hearing, relating to proposed amendments of the Shire's planning scheme to include provisions for areas with high scenic amenity, was attended. Two town planners, one local councillor, an environmental activist and two hobby farmers were interviewed. Three of the forest professionals interviewed in Case Study 3 also discussed Case Study 5, having been involved in plantation development in the Shire involved.

Results

The results are not presented on a case-study-by-case-study basis, as this paper aims to report on the common themes and perceptions that arose in all case studies of disputes over forest plantation development. The results reported below apply to all case studies unless otherwise stated.

Results are presented in three sections:

- Perceptions of different forestry activities;

- Concerns held about plantation forestry; and
- Mechanisms for expression and resolution of concern.

Perceptions of Forestry Activities

'No-one's got a problem with using poor agricultural land for plantations ... the problem comes when you're using unsuitable sites.' – Local Council Planner # 3

Because this study examined perceptions of forestry, it was important to first understand the perceptions held by rural communities of different types of forestry. During interviews, respondents were asked to discuss many aspects of forest activities. While forestry professionals did not describe one form of forestry as being more or less favourable than others in most cases, all other respondents reported having very different perceptions of different forms of forestry, with some preferred over others. It is these responses that are discussed in this section, ie those of respondents not directly employed or involved in the forest industry. For simplicity, this group of respondents is referred to as 'objectors' and includes farmers, hobby farmers, other rural residents and environmentalists. Forestry professionals and other promoters of plantation forestry are referred to as 'supporters'.

Three primary types of forestry were commonly identified by objectors in interviews, each with sub-types. Definitions of these activities are given below. The definitions have been entirely drawn from descriptions given by objectors.

1) Native forestry: the logging of native forest for timber and other wood products.
Two primary forms may be used: *clearfelling* and *selective logging*.

Selective logging was viewed as a favourable use of native forests, but with caveats – many objectors were concerned that practices needed to be improved before selective logging could be called sustainable. Clearfelling was unanimously rejected by the objectors as an acceptable use of native forests.

2) Industrial Plantation Forestry: forest plantations established on public land, or on private land purchased by companies.

The case studies all involved private land purchased by companies. The companies were either *prospectus-based investment companies* who do not undertake any processing of the wood products they are growing in plantations, or *forest-industry based companies* who own woodchip mills or sawmills, and are aiming to invest in plantation growing to supply their processing business. Objectors had a negative view of industrial plantation forestry overall, but preferred forest-industry based companies to prospectus based companies.

'It's two different industries. One's numbers on the books. One's trees.' – **Hobby farmer # 3.**

However, most objectors added that they disapproved of industrial plantation forestry primarily because of the type of land being purchased for plantation establishment. This land is commonly what farmers refer to as 'good agricultural land', which many objectors believed should be left in traditional agricultural production, while more marginal land should be

established to plantation. The definition of good agricultural land changed depending on the type of farming undertaken by the objector, and the nature of the agricultural industries in the local region.

3) Farm forestry: development of plantations on agricultural land owned by farmers.

Farm forestry may be undertaken in many forms. Objectors made only one major distinction between types of farm forestry. This distinction was the type of land on which trees were established, with two classes of land commonly referred to: marginal land, ie land not suitable for the landholder's primary agricultural enterprise/s, and good agricultural land – land suitable for the landholder's primary agricultural enterprise/s. In most cases objectors approved of farm forestry on marginal land, and disapproved of it on good agricultural land.

The perceptions objectors had of different types of forestry are summarised in Table 2. From this table, it is clear that the most negative perceptions of plantation forestry were of industrial plantation development. There were some negative perceptions of farm forestry on good agricultural land and none of farm forestry on marginal land. Industrial plantation forestry was perceived most negatively when plantations were being established on good agricultural land.

The concerns reported below relate primarily to industrial plantations established on 'good agricultural land' which was previously owned and operated for traditional agricultural purposes, and has since been purchased by a forest company for tree establishment. The concerns do not relate to other forms of forestry, except occasionally to farm forestry on good agricultural land.

TABLE 2: Perceptions of Forestry Activities by Objectors

TYPE OF FORESTRY	PERCEPTION
Selectively logging native forest	Acceptable with caveats – must be sustainable
Clearfelling native forest	Negative
Farm forestry on marginal land	Positive
Farm forestry on good farm land	Usually negative
Industrial plantations on good cleared land and/or ex-forest sites by forestry companies involved in wood processing	Negative
Prospectus –based industrial plantations established by companies not directly involved in timber/wood processing	Very negative

Concerns over Industrial Plantations

Objectors reported many concerns over the development of industrial plantations. This section presents these concerns, and some of the counter-responses from supporters of forest plantation development. The concerns can be broadly categorised as social, landscape, economic and environmental concerns. No attempt is made to objectively evaluate the validity or invalidity of any of the issues raised.

Social issues

‘... while you might be able to add up the number of jobs that might be created with a plantation versus a farm, it’s not just about jobs, it’s about community ... the cohesiveness and workability of a community.’ – Local Council Planner # 1

The majority of objectors linked plantation development to social decline in rural areas. By social decline, they usually meant the loss of people from the community and the following ‘domino effect’ of loss of services such as doctors, schools, school buses, churches and others. However, one third of the objectors believed social decline was already happening before forestry plantations began to be established in their region.

A primary concern was that, while plantations may not have caused the social decline occurring in the regions studied, they may prevent a recovery from social decline. This concern over the perceived permanence of plantation forestry was expressed by all except two objectors.

Plantations were believed to be a permanent change to the landscape for various reasons. These included:

- a belief that it would be difficult to physically convert soil back to being ‘good agricultural soil’ after it had grown trees;
- the physical difficulty of removing stumps; and
- concern that converting a plantation forest back to traditional agricultural use would be prohibitively costly as most of the farm infrastructure (eg internal fences, sheds, houses) is usually removed when the land is established to plantation.

Evidence gathered through the study indicated that a considerable amount of farm infrastructure is usually removed when a property is converted to plantation forestry. In Victoria, the original farm house was often left on the site, but sheds and internal fences were removed. Dams were kept as a water source in case of fire.

In Tasmania, all infrastructure required to run a farm as a traditional agricultural enterprise was usually removed, including fences, houses, sheds and irrigation mains. Figure 1 shows the foundation of a house that was removed prior to conversion of a property to plantation forestry. This practice reflects the rate charging system in Tasmania, in which higher rates must be paid if land has been improved. This rate system means that by removing infrastructure, forest companies incur less rates on their plantation properties.

Supporters usually responded to concerns over the permanence of plantations by stating that it would be ‘simple enough’ (Forestry professional # 4) to remove stumps and cultivate the soil for agriculture again. However, this response did not take into account the cost of replacing infrastructure such as fencing, housing, sheds, irrigation and connection to phone lines and electricity, if a tree plantation were to be converted back to agriculture.



Figure 1: Foundation of demolished house on farming property sold to plantation company.

More research is needed to quantify the costs involved in converting land back to agriculture, so that a better evaluation of the permanence of the land use change to plantation forestry can be made.

Landscape issues

'The landscape is not being altered over the time between childhood and adulthood. It is being altered over a period of months or weeks.' – Hobby farmer # 6, male.

'I'm shifting to the coast ... they can't log the bloody ocean, can they. I'll have a good view from there.' – Hobby farmer # 5, male.

Landscape issues can be categorised as two separate concerns. The first is aesthetic concern over the appearance of the landscape. The second is the potential economic impact of changes to the landscape.

Plantation forestry is in some regions creating a very rapid, visible change to the landscape. For example, in the Western Tiers of northern Tasmania, the rapid establishment of several young plantations in various locations on the slopes of the tiers has created a 'patchwork' of different ages and types of forest, with sharp visible breaks between forest areas of different composition, age and structure. This appearance led one objector, when asked to describe the potential benefits of plantation forestry, to state:

'...well, if you wanted to play chess from space, you could.' Hobby farmer # 6, male.

This impact on the landscape is seen by many objectors as detracting from the landscape and degrading the natural beauty of rural areas.

‘... it looks so horrible, they look so daggy.’ Hobby farmer # 4, female.

The tourism industry in Australia is often based around landscape values of the regions in which tourism is being promoted. The landscape of the region studied in Case Study 5 was well known for its tourism value, with unique landscape formations and large amounts of native forest. In the court case attended for this case study, two tourist operators gave evidence that the development of highly visible forest plantations in the region was adversely affecting their business.

Evidence was also heard in the court case about the impact of plantations on neighbouring hobby farmers. Evidence was given from a hobby farmer that his property had been valued at between \$115,000 and \$140,000 prior to establishment of a forest plantation on a hill overlooking his property. After the hill was converted to plantation, a second valuation by the same real estate agent placed the value of the property at \$85,000 at best. The reason for the devaluation was that hobby properties are sold primarily for their aesthetic landscape value. The real estate agents interviewed for case studies 3, 4 and 5 agreed that the value of a hobby property decreases as soon as a forest plantation is established nearby, as the plantation is seen as detracting from the aesthetic qualities of the landscape.

More research is needed to quantify the impacts of plantation forestry on the value of neighbouring land, and on tourism in regions where plantation forestry is occurring on a large scale.

Economic issues

Objectors raised a series of potential economic impacts plantations are believed to have on neighbouring properties, on councils and on regions. The main concerns raised were:

- reduction of agricultural productivity due to shading by the plantation and increased browsing by fauna harbouring in the plantation;
- increased fencing costs in some instances;
- reduction in land value;
- reduced rates base for local Shires;
- damage to local roads from logging trucks;
- loss of good agricultural land having the potential to cause withdrawal of major agribusiness from regions; and
- the perceived ‘unfair advantage’ held by plantation forestry companies over farmers.

Potential impacts of forest plantations on neighbouring hobby farms and tourist operators have been discussed above in terms of their landscape impacts. The potential negative impacts of forest plantations on neighbouring farm properties is a more complicated issue. Negative impacts were reported by neighbours in terms of agricultural productiveness, and in terms of property values.

Shading by plantation trees was believed to cause loss of productivity in neighbouring paddocks. This was a particular concern where plantations were to be established to the north of a farmer’s paddock.

Farmers who had plantations on their border reported that after some years they lost significant amounts of pasture due to increased browsing by fauna living in the plantation forest. The increased browsing was believed to result from two factors: provision of habitat in the plantation bringing fauna closer to the farmer's paddocks, and a reduction in pasture causing fauna to concentrate browsing on the remaining cleared areas – usually any cleared areas bordering the plantation. Browsing problems following establishment of a forest plantation on neighbouring land had led three objectors interviewed to erect wallaby-proof fences around their land.

Fencing costs are a significant issue for farmers bordering a plantation. Public forestry companies have not historically been required to contribute to fencing costs on common boundaries. Private landowners, however, have usually been required to contribute 50% of the costs of a common boundary fence. Several farmers interviewed had been forced to incur 100% of the cost of fixing fences on the boundary between their property and neighbouring forest plantations. Three reported being threatened with legal action and shooting of stock by forestry companies when fences broke and stock crossed into forest plantations. The forest companies involved did not offer in any of these cases to contribute to the cost of maintenance of boundary fences. In two of the three cases, a private plantation company had established the neighbouring plantation.

In Tasmania a recent 'good neighbour agreement' between the Tasmanian Farmers and Graziers Association (TFGA), which represents over 95% of all farmers in Tasmania, and Forestry Tasmania, the State forest enterprise, is attempting to address this issue.

The second issue raised by objectors bordering plantations was a perception that their land lost value when a forest plantation was established on the border of their property. Supporters responded by stating that the presence of plantation forestry companies in the market had acted to raise the sale price of agricultural land. Interviews with real estate agents in northern Tasmania failed to clarify this issue. Further research is needed to understand the implications of plantation development for the sale price of neighbouring agricultural land.

Shire planning officers were commonly concerned that increasing numbers of plantations would lead to a lower rate base for the Shire, and that they would be unable to maintain roads adequately with this lower rate base. Concerns were also raised that logging trucks would cause significant damage to roads.

Some concern was raised that, on a regional level, the 'encroachment' of plantations onto good agricultural land might lead to a situation in which there is not adequate remaining land for other agricultural industries to stay in the region. For example, in northern Tasmania contract farming of poppies, potatoes and various other vegetable crops is common. The companies that contract the farming require a minimum level of production to continue using the region as a base for their product. If they cannot achieve this minimum, for example because forest plantations have been established on a significant amount of the available suitable land, it was suggested they might shift to other areas which can provide them with enough land.

The final economic issue raised was a perception by objectors that forest plantation companies had an unfair advantage over farmers when it came to obtaining land. Because

plantation companies were believed to have ready access to capital, and to have favourable tax provisions, many objectors believed that they could not compete on a level playing ground with the plantation forestry companies.

Environmental issues

The most commonly stated environmental concerns about plantation forestry related to:

- the use of chemicals on forest plantations, and potential off-site impacts of these chemicals;
- water table levels;
- clearing of native vegetation; and
- the spread of wildings from pine plantations.

The use of chemicals on forest plantation sites was perceived as an environmental threat by most objectors. Common statements were that:

'They just put uteloads and uteloads of chemicals (on the paddocks) and they don't sort of consider what it's doing to the soil. ... well, it's going to leach out and go into the river...' – Sheep grazier # 5, female

Herbicide use in forestry plantations was perceived by objectors to be very different to herbicide use in traditional agriculture. Three main differences were noted:

- chemicals which many objectors believed were dangerous to the environment, such as atrazine and simazine, were often used in plantation forestry;
- aerial spraying, rather than ground spraying, was commonly used; and
- large quantities of herbicides were used to achieve removal of all competing vegetation before establishment of forest plantations, a practice viewed negatively by objectors. Objectors rarely referred to the fact that little to no herbicides are used in most forest plantations after the first one to two years of tree growth.

These differences in the methods and types of spraying result in herbicide use in forest plantations being viewed by objectors as quite different to herbicide use in agriculture. This perceived difference may contribute to the perception that chemical use in forest plantations presents more significant threats than chemical use in traditional agriculture.

Several objectors were concerned that increasing numbers of forest plantations would lead to a lowering of the water table, and hence a lowering of flow in local rivers and streams and decreased water supply for farmers in the region.

Loss of biodiversity and aesthetic landscape values through clearing of native vegetation for forest plantation establishment was a concern for a majority of the objectors. The plantations proposed and/or established in Case Studies 1, 2 and 3 all involved clearance of some native vegetation from properties purchased by forest companies. Local council planners interviewed stated that many applications for permits to establish forest plantations involve clearing native vegetation off some parts of the land being converted to plantation. Current government policies encourage the establishment of forest plantations on cleared land. However most

agricultural properties, while having significant areas of cleared land, also contain areas of remnant vegetation. It appears common for forest companies to apply to clear some of these areas for conversion to plantation once they have purchased an agricultural property.

One respondent was concerned about the number of wildings from pine plantations in his region (north-east Victoria) that he had observed in surrounding native forest. He believed this could lead to loss of biodiversity in the native forest.

Development of Conflict: Mechanisms for Expression and Resolution

In all five case studies, the process of conflict over plantation development followed four clearly identifiable stages:

- a high profile forest plantation, or series of plantations, were established or proposed to be established;
- concerned parties formed protest groups, usually of an informal nature;
- the groups protested to media, politicians and councils; and
- the groups worked within available legislative processes to protest against plantations.

These stages are discussed below.

The first plantations: motivation for protest

The formation of a protest group was motivated by either:

- a proposal for a single forest plantation development in a high profile area; or
- establishment of a series of plantations in a local area, to the point where local residents became concerned plantations were ‘taking over’ the farming land in the area.

A high profile plantation means a plantation situated in a location which is highly visible to many people in the local community. Examples include the siting of a plantation along a main road leading into or out of a country town, on or near a local landmark, or on the slopes of a large hill or series of hills. The visibility of these sites catches the attention of local residents, and as a result is more likely to result in protest over the proposed plantation.

Case Study 1 provides an example of this. While previous forest plantation proposals in the region had drawn some objections from neighbouring landholders, they had not been objected to by the wider community as they were situated on side roads or in ‘back blocks’ in the region and were not highly visible. It took the proposal of a large, highly visible plantation to trigger the formation of a protest group drawn from the wider community.

Case Study 3 provides an example of the second type of motivation for protest. It was not until over half the agricultural properties in the district had been sold and converted to forest plantations that a significant number of local residents began lobbying the local and State media, Shire and politicians in an attempt to prevent further conversion of agricultural land to plantations.

Formation of protest groups

The protest groups studied were predominantly informal in nature. Only one group, the COPS groups in northern Tasmania (Case Study 3), had formally named itself as a protest group. The others were not registered groups and had no formal membership lists or funding.

In northern Tasmania, protest groups had begun developing a communication network between the regions studied in Case Studies 3 and 4, in order to develop more effective means of protesting forest plantation development. In the Victorian case studies, objectors did not communicate with protest groups in other districts. They did, however, seek and receive assistance from organised environmental groups, such as the Wilderness Society, and from the Environmental Defenders Office.

In case studies 1, 2 and 3, hobby farmers led and organised the protest groups studied. This was commented on negatively by forest professionals, who interpreted the protests as being spurious in nature because they were being communicated by hobby farmers. However, many traditional farmers interviewed supported the initiatives of the hobby farmers, and attended meetings of protest groups formed. Explanations given by hobby farmers as to why they had ended up leading protest groups were that:

- the hobby farmers commonly had more time to protest than traditional farmers, and so took on the role of writing letters, organising submissions and contacting local media;
- the hobby farmers generally had a higher level of education and a better understanding of the means by which they could protest than the traditional farmers; and
- a majority of the traditional farmers interviewed reported being afraid of protesting, having a perception of forest companies as large corporations who might sue them or otherwise harm them financially if they attempted to protest.

In one case, a traditional farmer who had left school at the age of fourteen had attempted to run a protest group, but had been unable to commit enough time to it, due to his full-time farming commitments, and to the difficulty he experienced in writing formal submissions and letters to politicians and councils. The same group was subsequently regathered by a hobby farmer with tertiary education and computing skills who has run a strong campaign lobbying media, councils and politicians about forest plantation issues.

In the fourth case study, traditional farmers organised and led meetings discussing opposition to forest plantations.

The fifth case study involved protests by a council and local environmental group against plantation development. The group had a very different structure to the traditional protest groups discussed above.

The protest process

In the first four case studies, the protest process involved groups gathering support by the following process:

- writing letters to local newspapers protesting forest plantation development;
- calling meetings of people interested in opposing plantation development;
- searching for means of protesting the plantation. This stage included lobbying of local councils and politicians as the group attempted to discover what avenues they had for protest. It also included raising awareness of issues by contacting local media and ensuring articles were written on the issues surrounding plantation forestry; and
- the use of available legislative mechanisms to object to proposed plantation development.

This protest process (and its outcome) always depended in the end on what legislative mechanisms were available for protest to the group. This is discussed below.

Legislative systems and protest

‘They (the plantation company) can buy a property ... and plant it ... and nobody can protest because there’s nowhere for ‘em to protest to.’ – Farmer # 4, female.

The case studies took place in two regions with different legislative mechanisms for objecting to plantation development.

In the Victorian Shire in which Case Studies 1 and 2 were conducted, a forest company must apply to the Shire for approval if they wish to establish a forest plantation that is either over 100 hectares in size, or will when joined to neighbouring plantations total more than 100 hectares. The Shire requires that all neighbouring landholders be notified of the proposed development so that they can lodge objections if they wish to. Objections may be lodged both by neighbours and by other interested parties. Once objections have been received, the Shire makes a decision whether or not to approve the plantation development, and what conditions to attach if the proposal is approved. If either the forest company or the objectors wish to appeal the Shire’s decision, they can appeal to the Victorian Civil and Administrative Tribunal. Once the Tribunal has made its decision, the only avenue of appeal is to the Supreme Court on a point of law. Therefore, there is significant opportunity for interested parties to lodge objections and have their concerns included in the requirements of any planning permit that is subsequently granted.

In Tasmania (Case Studies 3, 4 and 5), a landholder wishing to establish a forest plantation can apply to the Forest Practices Board to have the area of land on which they wish to establish the plantation declared a Private Timber Reserve (PTR). The Board is made up five members, at least three of whom are employed in some part of the forestry industry. When an application for a PTR is made, the Forest Practices Board is required to publish the application in daily newspapers of the State, and to send a copy of the notice to relevant local authorities. They do not have to send notification to adjoining landholders. If a PTR is approved, then it overrides all other local planning laws unless the PTR was proposed on an area of land where the local Shire has declared forestry a prohibited land use. Until recently, only local government had a right to lodge an objection to a proposed PTR. This has now been amended so that adjoining neighbours may lodge an objection if they own land within 100 metres of the boundary of the proposed plantation. However, an objection may only be in relation to six aspects of the application, which are narrowly defined in the legislation. This means that landholders and local residents have less scope to object to the development of plantation forestry in Tasmania than they do in north-east Victoria.

Both objectors and supporters interviewed had mixed feelings on the ethics of attempting to block forest plantation development on private land, as attempting to block forest plantation development usually financially disadvantages the landholder/s attempting to sell land for industrial plantation forestry development. The legislative systems in the two study regions reflect different attempts by government to allow legitimate objections to developments on private land while protecting the rights of the private landholder.

The Role of Foresters: Responding to the Concerns

'Look, there's lots of plantations in and around that area, I don't recall seeing anything happening or the world ending ... I think a lot of the things they (protesting farmers and locals) say are just made up. They're really just a lot of crap, you know. ... It's not easy being green.' – Plantation Forester # 1, male.

The responses of supporters to the concerns raised by objectors were examined in the study. Typical responses by supporters included:

- dismissing concerns as being purely 'emotional' or based on 'perceptions, not reality';
- promotion of the benefits of forest plantation development for farmers and the local economy; and
- dissemination of information on plantation development.

Supporters describe plantations as providing a way for cash-strapped farmers to be able 'retire with dignity'. Other benefits commonly described by supporters are ecological benefits, eg amelioration of land degradation; and economic benefits, eg increased employment from milling wood products.

It was rare that supporters responded directly to the concerns being stated by objectors. Instead, supporters commonly changed the subject to a discussion of the benefits of plantations, or the rights of private landholders to choose for themselves what type of crop they put on their land, be it a tree plantation or a more traditional agricultural crop.

A significant difficulty for supporters in responding to concerns, raised by three supporters interviewed, was a lack of available information that could either validate or invalidate the concerns being raised by objectors. As indicated throughout this paper, research is needed to quantify many aspects of the potential impacts of forest plantations in different areas.

Conflict Resolution Techniques

Three primary conflict resolution techniques had been attempted in the case studies:

- information dissemination;
- participatory resolutions methods such as mediation and public meetings; and
- regulatory methods such as court decisions and planning regulations.

Only a brief discussion of each is given here, as a primary difficulty of this study was that by studying evidence from cases which had resulted in significant conflict, it was difficult to evaluate conflict resolution techniques due to the fact that in most cases studied they had failed and hence conflict was ongoing.

Information dissemination

A common response by foresters in most conflicts over forestry practices has been to attempt to disseminate more and better information about forestry practices in the hope that this will reassure objectors and lessen the conflict. This is an approach which assumes that current forest management practices are appropriate, and that conflict is resulting from a lack of adequate information about management practices (Routley and Routley 1975). It has not usually been found to be effective in lessening conflict, indicating that conflict is usually related more to concerns about forest management practices than to 'misunderstanding' of practices (Hellstrom and Reumala 1995).

Participatory approaches

Participatory conflict resolution approaches generally involve some form of mediation, in which the concerns of different sides are heard, and a middle ground or acceptable compromise is sought. Mediation was tried in Case Study 2. It was not effective, as the two parties were unable to find a 'middle ground' on which the plantation could proceed and the objectors believe they were not being adversely affected.

In the other case studies, most objectors rejected the possibility of using mediation as a conflict resolution technique, believing they were 'too opposed' to plantation forestry to ever accept it. However, further discussion revealed that many types of forestry were acceptable to objectors – including plantations on 'marginal agricultural land', small-scale plantings and mixed-species plantings. Supporters were willing to modify some planting practices to appease objectors, but often believed it would be impossible to achieve adequate growth rates on the types of land objectors found acceptable for plantation establishment.

These responses do indicate a potential for resolution of conflict if both objectors and supporters are willing to entertain a significant shift in planting practices and in beliefs relating to forest plantations. Further study of situations in which there is not such strident opposition to plantations would more usefully identify situations in which mediation may help prevent and resolve conflict over plantation establishment.

Regulatory methods

Regulatory methods were used in all five case studies to make a final decision as to whether forest plantation establishment would go ahead. Methods included use of local government planning decisions, the Civil and Administrative Tribunal, and applications to the Forest Practices Board in Tasmania.

Some objectors suggested they would be willing to accept plantation forestry if local planning schemes clearly identified areas targeted for plantation development and they could have input into development of these planning schemes. Supporters of plantations, and some

objectors, believed this was an inadequate approach which would only result in further conflict.

While there is certainly a place for regulatory resolution of conflict, at present the use of regulatory resolution on a case-by-case basis is considerably costly in the regions studied. It may also be ineffective in the long-term, with several objectors interviewed prepared to object to any further forest plantations proposed in their region until they obtained a favourable outcome from the relevant regulatory body.

Conclusion

The discussion in this paper has shown that there are a wide range of concerns held over current policies to increase the area of forest plantations established on cleared agricultural land. These concerns relate primarily to industrial forest plantations, and are social, economic and environmental in nature.

A major problem in attempting to resolve the conflict that arises due to these concerns is a lack of adequate information on the validity or invalidity of the various concerns held. Without this information, local government and regulatory authorities will be forced to make decisions based on 'perceptions' rather than on evidence of the potential positive and negative impacts of plantation forests.

Given the current policy aiming to treble the area of Australia's plantation base by the year 2020, it seems desirable that research efforts in these areas be increased, in order to help reduce the social and economic costs of future conflict over plantation establishment in Australia.

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Strategies for Improving Landholders' Response to Farm Forestry Development

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Abstract

Small-scale forestry, largely represented as farm forestry, is a growing and important component of Australia's forest industries. Farm forestry is largely promoted by government and industry as a land-use likely to deliver important benefits in terms of increasing future timber supplies, arresting natural resource degradation, enhancing regional development (mainly associated with processing), and improving farm viability. In short, farm forestry appears to have considerable potential to provide socio-economic and environmental benefits to regional Australia. If viable, self-sustaining farm forestry industries are to develop, thousands of landholders will need to be involved in the growing of forest products, and an integrated network of service providers and processors will need to be formed. In several regions there are promising signs that such farm forestry industries are emerging. Equally however, there are signs that current approaches to farm forestry development may not be reaching their full potential, particularly if communication efforts are inadequate or misdirected. Understanding the socio-economic factors affecting landholders can assist industry and government to identify those landholders most likely to adopt farm forestry. This in turn can make communication or extension efforts more effective and efficient, and so improve the investment made by industry and government by getting the landholders involved who are most suited to particular farm forestry industries. This paper outlines the major issues affecting landholder decision-making, and suggests how those landholders most likely to adopt farm forestry can be better identified and involved.

Introduction

Farm forestry is defined here as the management of commercial tree crops on farmland (including native forest management). In Australia, farm forestry is promoted by government and industry as a land-use likely to deliver important benefits in terms of increasing future timber supplies, arresting natural resource degradation, enhancing regional development (mainly associated with processing) and improving farm viability. In short, farm forestry appears to have considerable potential to provide socio-economic and environmental benefits to regional Australia.

If viable, self-sustaining farm forestry industries are to develop around Australia, thousands of landholders will need to be involved in the growing of forest products, and an integrated network of service providers and processors will need to be formed. In several regions there are promising signs that such farm forestry industries are emerging. Equally however, there are signs that current approaches to farm forestry development may not be reaching their full potential, particularly if communication efforts are inadequate or misdirected. Understanding the socio-economic factors affecting landholders can assist industry and government to identify those landholders most likely to adopt farm forestry. This in turn can make communication or extension efforts more effective and efficient, and so improve the investment made by industry and government in attracting landholders most suited to particular farm forestry industries.

This paper outlines the major issues affecting landholder decision-making, and suggests how those landholders most likely to adopt farm forestry can be better identified and involved. As there is only a small body of literature on the adoption of farm forestry in Australia, much of the discussion in this paper draws upon research and experiences relating to the agricultural and forest industries, and socio-economic factors operating at the farm level. After considering the context of landholders' decision to adopt, the decision making process is described and applied to the farm forestry situation.

Context of Landholders' Decision to Adopt

In the case of farm forestry, clearly the nature of integrating forestry with agriculture will require people to alter their farming practices (Cernea 1991). Encouraging behavioural change by landholders is often a complex and long term task, particularly if relying upon voluntary adoption, as in Australia. If new enterprises, such as farm forestry, are expensive, unproven, complicated or contrary to accepted farming ways, adoption of new technologies can be lower than anticipated (Vanclay and Lawrence 1995). In these circumstances, efforts to encourage behavioural change will need to address the underlying reasons of non-adoption. While farming communities are typically familiar with timber management for on-farm use, it is unlikely there are many farming communities in Australia with a strong cultural history of commercial timber production. Hence, developing farm forestry industries will require industry and government to develop effective communication approaches, as well as addressing education and skills training, financial support, development of marketing arrangements, and provision of infrastructure (IC 1993).

The adoption of new farming practices, such as farm forestry, requires an understanding of the four broad groups of socio-economic factors that strongly influence landholder decision-making. These include:

1. Social units of resource management - such as target audience segments or farming types and the corresponding willingness and capacity to invest in new enterprises (eg. the household income or viability of the farm business for full-time farmers, small-scale part-time farmers) and the relevant socio-economic characteristics of landholders (eg. expected long term ownership of property);
2. Internal social dynamics of management units - such as farm family structures and roles (eg. likelihood of inter-generational transfer of farm, number of dependants);
3. Complexity of decision making by landholders - such as how to manage the increased time and financial commitments required for a new enterprise, and uncertainty about market risks; and
4. Nature and extent of external links - such as long term contracts with industry (eg. joint ventures), and the outcomes of government legislation and programs.

Each of these is briefly discussed below.

Social units amongst landholders

Those developing farm forestry need to appreciate that there is a diverse range of landholders in Australia today. For example, when assessing farmers behaviour towards tree planting, two broad social categories of farmers can sometimes be found: problem driven farmers (financially marginal farms) and non-problem driven farmers (profitable farms) (Agrimark 1989). The former group typically acts in relation to a perceived problem and sees tree planting as too expensive to address land protection issues and long term farm viability. Profitable farmers were more likely to be planting trees as the ‘... cost and time component is not seen as prohibitive.’ (Agrimark 1989, p.46). Hence, the level of household income or farm business viability can be a useful guide to those likely to have the capacity to adopt farm forestry, despite its perceived inflexible, long-term and high risk nature.

It is likely that the different social units will respond differently to efforts to promote farm forestry. This reinforces the need to better target the communication or extension efforts required to meet the needs of landholders (Buttel 1991).

Internal social dynamics of management units

The type and extent of farming can be influenced by a mix of economic, social and political factors. Often there is a close relationship between farming and the farm family’s internal dynamics, with changes - such as to adopt farm forestry - affected by the way family members behave. Farm family dynamics which may affect the capacity of a farming business to change or diversify farm production, include: family size, the age and number of dependants in a family, the amount of off-farm employment, and inheritance arrangements.

For example, inheritance patterns have been a key element in the social organisation of farming communities. If a farmer can attain financial control of a prosperous farm before the age of 30, such as through inheritance, then long term farm investments such as farm forestry are more likely to be considered. Conversely, farmers that are struggling financially and have

several dependant family members are far less likely to adopt alternative, long term farming practices, especially if there are high establishment costs or unnecessary risks. The long-term nature of farm forestry clearly reduces the potential for changing land-uses, and so could be expected to be more difficult to promote to farmers with unfavourable family dynamics. While 'forestry rights' is a welcome legislative reform (available in Tasmania, New South Wales and Victoria), generally those adopting farm forestry do so with the expectation that the property is likely to remain within the family (eg. for the landholders' lifetime, through inter-generational transfer) or organisation at least until the time of harvest.

Complexity of decision making by landholders

The decision making process by which landholders appraise new technologies to determine what, if and when to adopt can be complex (Vanclay & Lawrence 1995). Yet for government or industry wishing to see commercial tree growing become a widespread agricultural activity it can be a seemingly unpredictable process. Rather than undertake in-depth social analyses to understand the intricacies of decision making processes, those promoting new technologies often resort to offering financial incentives, regardless of whether the financial cost of adoption has been established as a critical factor (Pretty 1995).

Because of high establishment costs, uncertain returns, a lack of unbiased locally-relevant information, limited technical and educational assistance, problems of managing livestock amongst trees, and the belief that the farm already has enough trees, many landholders believe farm forestry is a high risk enterprise (Prinsley 1991; Wilson *et al.* 1995). Although industry and governments provide financial incentives to encourage adoption of farm forestry, these seldom cover the full costs and risks borne by farmers. Even when landholders agree with the technical information given to them about the benefits of farm forestry, they may not be in a position to practice farm forestry. Consequently, incentives to encourage landholder adoption of farm forestry should consider a wide range of options (eg. clearly understood & reliable information), not just financial inducements.

Nature and extent of external links

The nature and extent of the links between landholders and industry or government play an important role in determining the attractiveness of farm forestry. Clearly, landholders prefer to negotiate joint venture arrangements so as to adapt to the individual needs of the farming business. However, a protracted negotiation process or unlimited joint venture options can make farm forestry an expensive investment for industry - particularly if dealing with hundreds of small-scale growers. Consequently, support may be better directed towards ensuring grower cooperatives and market brokers are also available within regions.

Timber grower cooperatives have been established since the late-1980s around Australia (eg. Victoria, Tasmania, Western Australia) to better coordinate dispersed, small timber supplies and increase regional competition (Henderson and Leech 1994; Speedy 1996). The long term measure of success for grower cooperatives will be the extent they can attract better prices for growers. Improved access to neighbouring regional and overseas markets are likely to improve the opportunities for grower cooperatives. Grower cooperatives could also assist industry by coordinating supplies to allow industry to negotiate with a 'single' grower, rather than with numerous disparate small-scale growers. Alternatively, small-scale growers and

industry in New Zealand and the United States often commission market brokers to coordinate sales, providing an example of what might be possible in Australia.

Decision Making for Farm Forestry

Organisations or individuals seeking to influence people's actions need to understand how those people operate so appropriate strategies can be developed. An understanding of decision making processes and the factors influencing decisions can assist in the development of information campaigns and change programs. A typical information campaign, for example, will have a specific objective which it aims to achieve by delivering specified messages to specified target audiences. In the case of farm forestry, an organisation's objective may be to contract 10,000ha of eucalypt plantation by the year 2000. The target audience selected for this would be broadacre commercial farmers. This audience could be broken down into different categories on the basis of factors affecting their decision making (such as property size, age, attitude to forestry etc). The specific message for the strategy could be "Enter a farm forestry joint venture". For maximum impact, the way in which these messages are delivered to the audience needs to be determined through consideration of the characteristics of the decision making related to the particular topic.

This section looks at decision making – what it is, how it proceeds, what factors influence it, and how it can be researched. In giving an overview of decision making, it also demonstrates what we already know about how landowners make decisions about entering into farm forestry. It highlights what we do not know, and also how we can use our existing knowledge to develop effective programs for supporting the adoption of farm forestry.

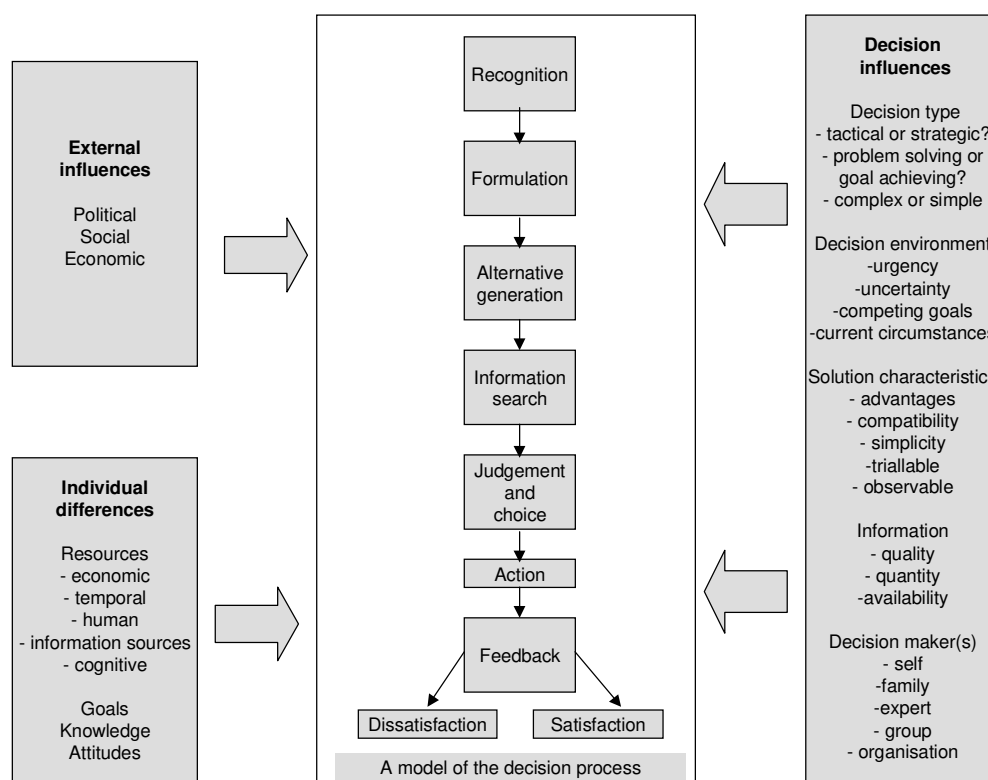
What is Decision Making?

Carrol and Johnson (1990) define decision making as a process by which a person, group or organisation identifies a choice or judgement to be made, gathers and evaluates information about alternatives, and selects from among the alternatives. This definition includes a particular set and sequence of steps in the decision making process. The seven steps shown (as shown in Figure 1), and some examples relevant to farm forestry decision making, are described below:

1. Recognition

Recognition is the realisation that there is a decision to make. In the case of farm forestry, this may be when a landowner recognises farm forestry as a viable option worthy of consideration for his/her property. While there is little evidence about how this occurs in the case of farm forestry, it may come about because of advertising, a personal approach from a company, a comment from the accountant or by the landowner observing another landholder's entry into farm forestry. Further information on how this recognition occurs would allow strategies to be developed to further enhance recognition.

FIGURE 1. A model of decision making: The process and factors influencing it
(adapted from Carroll and Johnson 1990; Engel *et al.* 1995)



2. Formulation

Formulation involves exploring and classifying the decision, including some understanding of the relevant objectives and values. A landowner may, for example, consider what goals may be achieved by entering into farm forestry: long term security, aesthetics or productive use of otherwise marginal land. In the case of other agricultural enterprise selection, this step usually involves discussion with people close to the landowner, and trusted advisers. An understanding of what considerations a landowner makes, and who these are discussed with, would assist in the development of communication strategies.

3. Alternative generation

Generating alternative solutions to the problem usually starts by a search of the memory to determine whether enough is known about available options to allow a choice to be made without further information search. External search will be needed when this is not the case. A landowner considering farm forestry, for example, may try and find out what farm forestry options are available. There is little evidence about just what alternatives landowners do undertake as part of this process. Once known, this step could be supported through the provision of information about alternatives and their relative merits.

4. Information search

This involves seeking to identify the attributes of the alternatives under consideration. This involves trying to recall information from the memory, followed by an external search where internal knowledge is considered to be inadequate. The landowner may try and gather as much information about all aspects of each of the available farm forestry options as possible. External searching may include obtaining written and electronic information and seeking the input of known experts, such as accountants, consultants or experienced landowners. While a great deal is known about landowner's information sources, their specific sources for farm forestry require further investigation. Knowing these would allow for targeted information provision.

5. Judgement or choice

Judgement involves judging the attributes of the alternatives. Choice involves comparison among alternatives. In the case of new enterprise decisions, this process is usually undertaken by the landowner and family in consultation with trusted external sources (Phillips 1982). Sorting through and evaluating attributes and alternatives is done through 'decision rules'. The decision rules used by landowners in assessing farm forestry are known to some extent but have not been fully elucidated.

There is some debate on the relative priority of economic and social factors within landholder decision making. Several writers (Alexander 1995; Kent 1992) suggest economic considerations are paramount. Others (Rosenblatt & Anderson 1981; Vanclay 1992; Gasson *et al* 1988; Kirby *et al.* 1993; Errington & Gasson 1994) suggest social factors, such as notions of good farm management (Vanclay 1992) may dominate decision making. Incentives to encourage landholder adoption of farm forestry should thus consider a wide range of options, not just financial inducements.

6. Action

'Decision taking' incorporates making and then acting on a decision. This is where the landowner decides not to enter farm forestry, to enter farm forestry or to adopt a 'wait and see' approach.

7. Feedback

Information about the outcomes of the action permits learning which may lead to changes in knowledge and decision rules. In the case of farm forestry, little research has been done on the type of feedback farmers obtain over time. It would be expected that feedback could be enhanced through on-going communication and the provision of information about the experience of others in farm forestry.

These steps represent the ideal - the 'best' way of making decisions. In reality, decisions are not always made following this process. The steps may overlap, may not be independent and may not always occur in the same order. Sometimes people undertake a complex decision process requiring substantial amounts of time and energy. More commonly, they use simplistic processes in which relatively little time and effort are devoted to the decision.

An understanding of the process of decision making with respect to the decision to enter farm forestry can provide clear directions for those wishing to influence this process. It must be recognised, however, that the process will differ between individuals, and between regions. As such, an understanding of the specific determinants in a particular region are important. Communication strategies need to be selected to address regional and individual specific decision making.

Factors affecting decision making

The decision making process and its outcomes, are influenced by a large number of factors. These can be grouped as individual differences, decision influences and external influences. None of these factors act in isolation, and none can be considered solely responsible for determining the decision process and outcome. Rather it is way they combine to influence decision making which is of importance. There is a need to gain as full an understanding of landowner decision making as possible, and use this to develop communication strategies. Key themes raised in the literature highlight the need to:

- Identify farm forestry information sources, and information quality and quantity;
- Develop a range of farm forestry packages which address different audiences' needs and market these to the different audiences; and
- Further develop our understanding of landowner decision making with respect to farm forestry.

Identifying Likely Adopters: A Typology of Landholders and Industries

As identified in the preceding sections, understanding the socio-economic factors affecting landholders can assist industry and government to identify those landholders most likely to adopt farm forestry. This section considers the characteristics of alternative farm forestry opportunities and uses our existing information on farm forestry decision making to identify which landholders these would be most attractive to.

A review of joint ventures offered by the forest industries indicated that the type of landholder involved and the land they offered, varied considerably depending on the commercial prospects for farm forestry within a region and the nature of the joint venture arrangements (Curtis and Race 1998). The various forestry joint ventures around Australia include landholders who are:

- semi-retired and retired farmers;
- commercial farmers;
- small-area landholders with off-farm income;
- semi-commercial farmers with off-farm income;
- prospectus companies on behalf of urban investors;
- investor syndicates;
- corporations with under-utilised land;
- local government with under-utilised land; and

- State government with under-utilised land.

The important socio-economic characteristics that determine whether landholders have the capacity to invest in farm forestry, and if so what type of farm forestry enterprise, include:

- high level of household income or farm business viability;
- areas of under-utilised land (ie. > 5 ha); or
- expected long-term ownership of land.

Landholders must also have a willingness to develop a new enterprise. While the opportunities for farm forestry can vary considerably, farmers and small-scale landholders generally seek multiple benefits from farm forestry. As such, the design and analytical skills of these landholders will be important for developing integrated farm forestry operations that provide multiple benefits.

If a landholder does not satisfy any of the three characteristics listed above, then it will be unlikely that they will develop a commercial farm forestry enterprise. Even when these three characteristics are satisfied, there can be expected to be landholders who will develop quite different farm forestry operations. However, four examples of possible farm forestry enterprises and the likely landholders who will be attracted are provided below to illustrate this diversity. These are summarised in Table 1, below. It is not expected that this typology will reflect the local context in every region, but is presented as a guide only.

TABLE 1: Typology of farm forestry landholders and industries

Industry	Landholder	Marketing arrangement	Design
<i>Small-scale specialty timber sawmill</i>	• Commercial farmers with some silvicultural experience; • Small-scale landholders.	• Market brokers.	• Timberbelts; • Small woodlots (1-5 ha).
<i>Medium-scale hardwood sawmill</i>	• Commercial farmers with considerable forestry expertise; • Small-scale urban investors.	• Grower cooperative; • Forest management team; • 'Marketing' joint ventures.	• Timberbelts; • Woodlots (2-10 ha).
<i>Large-scale integrated softwood & MDF mill</i>	• Commercial farmers with under-utilised land; • Small-scale urban investors; • Corporations & government with under-utilised land.	• Joint ventures with industry sharing the establishment costs & undertaking much of the forest management; • Grower cooperatives; Forest management team.	• Woodlots & small plantations (10-40 ha).
<i>Large-scale pulpwood mill</i>	• Commercial farmers with under-utilised land; • Retiring farmers; • Corporations & government with under-utilised land; • Urban investors.	• 'Lease' joint ventures; • Grower cooperatives; • Forest management team; • Market broker.	• Wide timberbelts, woodlots & plantations (10-100 ha).

Strategies for a Way Forward

Understanding the socio-economic factors affecting landholders can assist industry and government to identify those landholders most likely to adopt farm forestry. This in turn can make communication or extension efforts more effective and efficient, and so improve the investment made by industry and government by getting the landholders involved who are most suited to particular farm forestry industries. Based on farm forestry experience in Australia and overseas, and other farming industries, it has been possible to identify four strategies for improving how industry and government can work with landholders to develop farm forestry.

1: Identifying a typology of broad landholder groups

A typology of the broad landholder groups can be a useful way of better defining the target audience most suited to particular farm forestry operations. A clear focus on the target audience will allow industry and government to conduct a more efficient farm forestry program, without resources (eg. staff time) being wasted on communicating to landholders unlikely to develop the preferred options. It should be remembered that a typology is only a guide to broad groups of likely adopters and is expected to be a definitive analysis of all farm forestry participants. While this discussion paper provides an example of how a landholder-industry typology may be constructed for farm forestry, each region should develop a typology to ensure it reflects the local context.

2: Training field staff and project officers in communication approaches

Building a productive and mutually beneficial relationship between landholders and industry or government requires developing an effective communication approach. Effective communication for farm forestry will require staff to develop:

- an understanding of the socio-economic context of the target audience and how farm forestry is likely to be developed (eg. identifying the primary benefits sought from farm forestry);
- information that is easily understood (eg. brochures that provide comparisons with existing enterprises, conducting ‘whole farm planning’ or Master Tree Grower courses) and supported by credible members of the target audience;
- information on local case studies or examples that clearly illustrate the nature of the proposed farm forestry operations;
- opportunities for the target audience to discuss the proposed farm forestry operations with others with similar experiences (eg. field days, discussion groups or networks);
- a long-term relationship that is trusted by both partners (eg. annual newsletter, annual site visit); and
- the involvement of local farm forestry ‘champions’ or ‘role models’.

3: Developing flexible options in advance

Even when a target audience can be identified, it is likely that these landholders will still prefer some flexibility in how farm forestry is developed. Lack of flexibility or poorly informed alternate options can risk lack of adoption or adoption on a lesser scale. It may be necessary to compromise the original objectives of both the industry and landholder before a farm forestry enterprise can be agreed to. Field staff and project officers should be prepared to offer a flexible package to the target audience, so both industry and landholder objectives can be satisfied. Staff should understand the extent farm forestry operations can be modified with an analysis of the implications (or trade-offs) available for the landholder. Modifications may include physical changes (eg. adding a row of sheltering shrubs) or financial (eg. allowing lease payments to be accrued and paid in low income years).

4: On-going monitoring and evaluation

Field staff and project officers should be trained in methods for undertaking on-going monitoring and evaluation of their communication approach. A combination of good quality and high frequency information products, and widespread contact with the target audience is required for effective communication. If not all three, then a project risks being a wasted investment, bad publicity for the project and organisation, and undermines the collective efforts of many people seeking to develop farm forestry. An understanding of appropriate methods to undertake in-depth analysis will assist to make communication approaches effective, of a high standard and encourage continuous improvement.

This research aims to work with industry and government partners to explore the relevance of the above strategies as a guide for improving the effectiveness of farm forestry development.

Conclusion

The adoption of new farming practices, such as farm forestry, requires an understanding of the broad socio-economic factors that strongly influence landholder decision-making. This paper outlines the major issues affecting landholder decision-making, and suggests how industry and government can develop an effective communication approach to better work with those landholders most likely to adopt farm forestry.

Evidence presented on decision making for entry into farm forestry demonstrated the need to:

- identify farm forestry information sources, and information quality and quantity;
- develop a range of farm forestry packages which address different audiences' needs and market these to the different audiences; and
- further develop our understanding of landowner decision making with respect to farm forestry.

The evidence also demonstrated that the important socio-economic characteristics that determine whether landholders have the capacity to invest in farm forestry, and if so what type of farm forestry enterprise, include:

- high level of household income or farm business viability;

- areas of under-utilised land (ie. > 5 ha); or
- expected long-term ownership of land.

If a landholder does not satisfy any of the three characteristics listed above, then it will be unlikely that they will develop a commercial farm forestry enterprise. Even when these three characteristics are satisfied, there can be expected to be landholders who will develop quite different farm forestry operations. Four categories within a typology of likely adopters were developed to illustrate this diversity.

The paper argues that efforts to encourage landholders to adopt farm forestry must be supported by an effective communication approach. Four strategies for improving how industry and government can work with landholders to develop farm forestry include:

1. Identifying a typology of broad landholder groups;
2. Training field staff and project officers in communication approaches;
3. Developing flexible options in advance; and
4. On-going monitoring and evaluation.

Research supported by the CRC for Sustainable Production Forestry is continuing with industry and government partners to explore the relevance of the above strategies as a guide for improving the effectiveness of farm forestry development.

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Farm Forestry and Regional Development: Communities making collaborative decisions.

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Abstract

In order to maximise the potential benefits of farm forestry development there is a clear need to find effective ways to bring together the diverse array of stakeholders involved in and affected by it. One potential mechanism whereby this may come about is in collaborative regional development initiatives, in which local and/or regional communities engage in a process to plan future development in a way that seeks to encourage broad community participation. This paper presents the results of an analysis of a number of written case studies of collaborative regional development initiatives, as well as a process currently underway in the Derwent Valley region of Tasmania which is the subject of an ongoing research project by the authors. The essential components and the impacts of these processes are examined, and the implications of such processes for farm forestry development are discussed. While the unpredictability of such processes means that attempting to initiate such processes may not be cost effective for proponents of farm forestry, involving themselves in existing initiatives may well be productive. The broad social benefits of the participative decision making processes observed in these case studies, where the community has substantial control over both the process and outcomes, strengthens the case for adopting participative approaches to developing farm forestry within Australia.

Introduction

Farm forestry, taken in its broadest sense to include all industrial and non-industrial forestry activity on farmland, offers many potential economic, environmental and social benefits to individual farmers and regional areas in Australia (Forests Taskforce 1995; Curtis and Race 1996; DPIE 1997). However there are complex social and economic issues that need to be addressed by the many stakeholder groups engaged in or affected by farm forestry if this potential is to be realised. These groups include farmers and farmer organisations; wood and paper industry players; local, state and federal government; environmental groups; researchers; financial institutions; and rural communities.

Farm forestry activity is occurring against a background of many years of hotly contested political debate over forestry, plus widespread concern over the decline being experienced by many regional areas in Australia, particularly those heavily dependent on agriculture. Given this combination, there is ample fuel to drive both serious consideration of farm forestry as an opportunity, as well as the potential to produce conflict. As Race and Buchy (1999: 416) concluded in a discussion of Australian forest management in general...

The challenge remains for all stakeholder groups, that if we are to construct a shared vision of forestry principles and practices to meet our multiple goals then developing an effective participatory process for policy development and implementation appears as an important first step.

This challenge is equally pertinent to farm forestry. One mechanism with the potential to provide such a process is collaborative regional development initiatives. In such initiatives local and/or regional communities come together to collectively plan future development in a way that seeks to encourage broad community participation and balance economic, social and environmental considerations. These are becoming increasingly common in Australia and overseas. Such participative processes are being actively encouraged by governments - for example, the Australian Federal Government's Rural Plan initiative (Department of Transport and Regional Services 1999) - and reflect a growing trend toward more participatory modes of planning and management within government (Marsden and Murdoch 1998), business (Senge 1993), in research and development (Pretty 1997; Thompson 1995), and in whole communities (Schindler-Rainman and Lippett 1992).

This trend toward participation is underpinned by a recognition that top-down decision making, where decisions are made by elites of experts, bureaucrats and/or politicians, often in conjunction with business and financial institutions, and "imposed" on the community can be alienating and disempowering for the general population. Pretty (1997: 16), when discussing participation in agricultural development, sums up benefits that have been associated with participation:

... an increasing number of comparative studies of [agricultural] development projects [have shown] that participation is one of the critical components of success. It has been associated with increased mobilisation of stakeholder ownership of policies and projects; greater efficiency, understanding and social cohesion; more cost-effective services; greater transparency and accountability; increased empowering of the poor and disadvantaged; and strengthened capacity of people to learn and act.

Similar benefits of participation in other contexts have been cited elsewhere (Berry *et al.* 1993; Kinsley 1997; Schindler-Rainman and Lippett 1992). However it should be understood that there are different forms of participation ranging from tokenistic participation where outsiders retain all the control over decisions, to self-mobilisation, where local people act on their own initiative independent of external institutions (Pretty 1995). It is argued that it is only at the latter end of this scale that the potential benefits listed above are realised (Cornwall 1999, cited in Race and Buchy 1999; Pretty 1995).

This paper presents the results of an analysis of a number of written case studies of collaborative regional development initiatives, as well as a process currently underway in the Derwent Valley region of Tasmania which is the subject of an ongoing research project by the authors. The essential components and the impacts of these processes are examined, and the implications of such processes for farm forestry development are discussed.

Methodology

After a literature search of collaborative regional development processes, written reports on eight case studies from around the world were selected for detailed analysis. They were chosen so that a diverse spectrum of context, scale and setting could be compared and contrasted. As Table 1 shows the case studies were from Australia, Canada, Ireland, India and the United States. They included rural and urban settings, single towns and large regions, dependent initiatives and sponsored programs. Involvement of forestry was not a criterion used to select case studies as the aim was to examine regional development initiatives *per se*, rather than looking at how forestry has been dealt with in such processes.

A qualitative analysis of each of the case studies was done, examining elements of the processes undertaken and the outcomes arising from them. The Derwent Valley process as it has unfolded to date was examined in the same way. The analysis examined how the processes were initiated, their aims, the level of resources available, the steps followed including how community participation was achieved, their timeframe and outcomes. Common features and differences between cases were then drawn out.

There were some limitations to the data that had a bearing on what conclusions could be made. The case studies varied in their level of detail and the factors examined by them. For example, data on the historical background including the previous decision making culture was available for some and not others. In general, there was limited detail on how the steps in each process were carried out making it difficult to draw any conclusions about the significance of any process factors in affecting the outcomes. Also as all the studies were based in the 1990's the longer term effects could not be judged. The reports on Kerala on which this review was based were written before the process was fully completed so that its final outcomes could not be assessed (as is the case with the Derwent Valley process).

Results: Features of Collaborative Regional Development Initiatives

Table 1 summarises a number of features of each of the case studies. The table reflects the degree of variation between the case studies, but also illustrates the fact that there were also many similarities between them, particularly in the broad steps of the process followed. The following analysis will report generally on the range of approaches to regional development presented by these case studies, at times illustrating points with specific examples.

Initiation

Each of the initiatives studied stemmed from an active choice by motivated individuals to tackle local issues - be this in a town, a city, a region or an entire state - in a collaborative way. However, in many cases the initiative was triggered by an outside catalyst in the form of some type of program sponsoring collaborative regional development. In the case of Ballyhoura in Ireland, an existing self-initiated process received a very effective boost when the region became involved in the European Union's LEADER program, a rural development initiative operating throughout Europe (Walsh 1999). These programs were either designed to promote general development activity across an entire region or state (termed "regional" in Table 1), or aimed to facilitate local activity within individual sites (termed "multi-site" in

Table 1). The programs were sponsored by either government, non-government organisations including universities and philanthropic foundations, or a combination of these.

Level of resources

In the different case studies there was considerable variation in the level of resources available for running the participative process as well as for implementing projects or programs. In this regard they fell into three broad categories. Firstly, there were those where significant levels of funding, and sometimes planning and administrative support, were made available to a region or community to facilitate both the planning process as well as implementation of local development projects. In the second category finance and/or support was provided for managing the process but funding for project implementation was either not available or very limited. In the third category, there was no outside support for either managing the process or project implementation. In the last two categories project implementation relied on a combination of the following - voluntary donation of materials, labour and finance; attracting grants from various funding bodies; and/or the formation of partnerships with government, industry, community groups or combinations of the three.

From Table 1 it can be seen that most of the case studies involved some kind of leadership training for the coordinating groups. While the degree of training varied, the topics covered were very similar. They included education about conducting a regional development process and skill development such as team building, running effective meetings (both committee meetings and public meetings), facilitation, community self-study, strategic planning and cost-benefit analysis.

Where this training was provided as an integral part of a sponsored development program, the intention was to provide skills and understanding of regional development to local organisers in order to empower them to put this knowledge into practice, adapting it to suit local conditions. The program organisers had to tread a fine line between providing enough guidance to enhance the success of the development initiative, yet ensuring that locals had sufficient control over the process to avoid them becoming dependent on outside support, so that they could eventually sustain ongoing activity independently. From the available evidence it appears that this was generally done successfully, as community development efforts continued after the withdrawal of program support in the majority of sites where efforts were initiated within each multi-site program examined. (Note: There was insufficient data to assess Community Builders WA).

TABLE 1: Features of regional development initiatives

	Ballyhoura 1	Kerala 2	L.I.S.C. 3	C.R.R.P. 4	Kane 5	Tumby Bay6	London 7	Community Builders WA8	Derwent Valley
Country	Ireland	India	US	US	US	Australia	Canada	Australia	Australia
Population	55 000	30 000 000	1400-11000	<5000	<5000	2700	326 000	?	12 500
Urban/Rural	rural	rural & urban	urban	rural	rural	rural	urban&fringe	rural	rural
Initiation	ind't+program	independent	program	program	program	independent	independent	program	independent
- program type a	multi-site	regional b	multi-site	multi-site	multi-site	none	regional b	multi-site	none
Level of Resources									
- process	high	high	high	medium	medium	low	high	high	low
- projects	high	high	high	low	low	low	not applic.c	low	low
Timeframe	~3 years	>1 year	2-3 years	1 year	<1 year	<1 year	3 years	6 months	>1 year
Process									
New group formed	3	8	3	3	3	3	1 group/planc	3	3
Leadership training	some	3	3	3	3	some	8	3	some planned
Vision creation	not explicit d	8	?	3	3	3	3	3	3
Audit/Profile	3	3	?	3	3	3	3	3	3
Opportunity ID	3	3	3	3	3	3	3	3	3
Action Planning	3	3	3	3	3	3	8	3	not yet
Outcomes									
Infrastructure	3	3	3	3	3	3	8	3	not to date
Educ. & Training	3	3	8	3	3	3	8	?	not to date
Industry	3	3	8	3	3	3	8	?	not to date
Develop't									
Special Events	3	3	8	3	8	3	8	3	not to date

Notes:

- a. Regional = designed to promote general development activity across an entire region or state. Multi-site = aimed to facilitate local activity within individual sites.
- b. Kerala and London initiated regional programs but did so independently
- c. London set out to produce a series of strategic plans, rather than implementing on-ground projects like the other initiatives
- d. Walsh 1999 states there was a clear vision created but it is not clear whether this was a specific objective or an unintended outcome

(Specific references for Table 1: 1-Walsh 1999. 2-Chasin 1998; Franke and Chasin 1997. 3 (Local Initiatives Support Corporation) - Gittell and Vidal 1998. 4 (Colorado Rural Revitalisation Project) -Colorado State University Cooperative Extension 1992; Kincaid and Knop 1992; Murray and Dunn 1995. 6-Kinsley *et al* 1999; Reed 1998. 7-Jeffreys and Munn 1996. 8-Agriculture WA 1998; Middleton 1999).

Aims

The broad aims of all the initiatives were very similar. They all sought to stimulate economic development but in a way that balanced social considerations. From the material available it appears environmental considerations were only given a strong emphasis in three of the nine cases - Kane, London and the Derwent Valley. Alongside balanced economic development there was also an explicit aim of capacity building - improving the physical infrastructure and the skills of the people - as well as increasing trust, cooperation, commitment and confidence within the community. Several initiatives also aimed to develop links and partnerships with external organisations and enhance their capacity to contribute to regional development. Thus there was an equal emphasis between seeing on-the-ground improvements and developing the capability of communities to successfully work together to control their destiny and achieve their desired goals. This community commitment, capacity and control is often referred to as 'social capital' (Putnam 1993; Gittell and Vidal 1998).

With one exception, all of the initiatives were strongly action oriented, they had a "product" focus, aiming to select and implement tangible projects - the desire to avoid "yet another talkfest" commonly voiced by the committee coordinating the project in the Derwent Valley, appears to have been common in most of the cases studied. The exception was London, a Canadian city that developed a set of strategic plans reflecting its citizens views on all aspects of the cities future development. As will be discussed later, a changing external political environment has meant that all the talk involved in the London process appears to be in danger of resulting in little action to implement the plans produced (Agocs 1999). The London plans may become yet another set of documents gathering dust on a shelf.

Common Steps

Although the process varied in detail from place to place, some common basic steps were followed in most cases. These were leadership group formation, community mobilisation, creating a vision, creating a regional profile or audit, identifying opportunities, project selection and action planning. They are detailed below.

Leadership group formation

In most cases a new leadership group formed with the responsibility of planning and coordinating the process within their town or region. There was a deliberate effort to ensure these groups had broad representation from diverse groups within the community, including business people, farmers, members of community groups, local government and sometimes state agency representatives. These groups were independent of local government, although with various levels of connection and support from them.

Generally members served in an unpaid voluntary capacity, motivated by their passion for their community and its development. Peter Cooper, a committee member in the Derwent

Valley initiative, summed up the reasons for his involvement by saying, “I have enjoyed the benefits of life in the Valley, but the good times that we knew with respect to major industry and government employment are gone. If we don’t go through this process of determining our own future no one else will. If you care at all about this place you have no choice other than to be involved” (Derwent Valley Gazette 1999).

Community mobilisation

The participation of the community in the process was seen as vital to success. A primary task in every initiative was to mobilise the community to raise their awareness of the development effort and gain their support and involvement. The coordinating groups tended to see themselves not as the creators of solutions to community problems but rather as providing a conduit through which the community’s ideas, values and energy could be channelled, and that this collective effort was what was needed to progress the region.

The community was engaged through a variety of methods including surveys, consultations, discussion groups and public meetings. In addition, many of the initiatives had active media campaigns that generated wide publicity through posters, banners, newsletters, newspaper articles and radio interviews. The evidence available suggests that most of the initiatives created a high level of public awareness and support, although actual participation through attending meetings, answering surveys and so on was much lower.

Vision

Another step common in many of the case studies was the attempt to engage the community to agree on a common, shared vision of the preferred future for the community. Often this vision was encapsulated in a short vision statement that was given wide publicity. The following two examples capture the spirit of these visions. In some cases the reviews state that there was a clear, shared vision in a region, although it was not clear whether these were ever written down. A feature of these visions was that they identified values the community held to be important such as caring, sharing and tolerance.

Florence Colorado (pop. 2,990): “A healthy, progressive and caring town that celebrates the past, with adequate facilities and services to support well-planned growth, while maintaining rural life quality. A community where our people have a voice in leadership and are ready to meet the challenges of the future.” (Colorado Rural Extension 1992)

London Canada (pop. 327,000): “London - The Forest City. We are a caring, responsive community committed to the health and well-being of all Londoners. The actions we take will be socially, environmentally and fiscally responsible so that our quality of life is enhanced and sustained for future generations. Our people, heritage, diverse economy, strategic location, land and resources are our strengths.” (City of London 1994).

Regional audit or profile

In order to provide an informed basis for selecting development projects, information was gathered in many cases to produce a regional audit or profile. These audits included some or all of the following facets - recent demographic trends in areas such as population, employment, income, education and business start-ups and closures; assessments of assets, problems and needs in the region’s natural and built environment, it’s business environment,

and social aspects such as leadership capacity, community spirit and quality of life. Examples of approaches to regional profiles are reported by Kinsley 1997; Rasker *et al.* 1995; and Middleton 1999. In some cases benchmark studies were done to identify issues, and against which to measure future change.

These studies were done using both quantitative data as well as qualitative data derived from asking community members for their opinions, values and ideas. A review of the Colorado Rural Revitalisation Program noted that “the assessments yielded objective and subjective insights and helped provide direction for community improvement activity. When the public was invited to participate in the assessments, other things were usually accomplished as well: local communications were strengthened and the [organising] teams won trust, local legitimacy and offers of assistance” (Colorado State University Cooperative Extension 1992).

By engaging in these assessments the people involved become more aware of their past, the forces shaping the present and those likely to shape the future. It also leads to an assessment of pressing needs and community priorities. This gives communities a sense of emerging opportunities and strategic directions in which to actively steer future development.

Opportunity identification and action planning

In every case study general areas of opportunity as well as specific projects were identified. From the many possible projects identified, in most cases between three to five were selected and had detailed action plans drawn up for their implementation - including budgets, sources of finance, human and physical resources and timeframe. Some of the criteria used to select projects were that they help achieve the community’s vision, they be achievable with the resources available, and often, there was a conscious effort to find at least one project that could be achieved quickly and was preferably highly visible in order to provide a success to celebrate and thus build confidence and maintain support and enthusiasm for the overall process.

Timeframe

The time from the initiation of community activity to the implementation of projects varied from about six months to over three years, although in most cases the timeframe was twelve months or less.

Outcomes

The outcomes of these initiatives fell into two broad categories - visible projects and community (or social capital) development. The scale and complexity of the visible projects undertaken was very variable and was affected by the level of resources available for project implementation - the areas with a high level of resources for projects - Ballyhoura, Kerala and the LISC demonstration - undertook or were planning more complex projects. The experience, skills and motivation of local communities also appeared to affect the outcomes, as the level of activity in similar towns within the same multi-site program was also very variable. The case study of Ballyhoura demonstrated that the scale, complexity and degree of integration of projects increased over time. In Ballyhoura a development group began on a small scale in 1964 and over time the geographic area covered by the organisation expanded along with its skills, experience and impact. Ballyhoura’s experience bears out the approach taken in several of the multi-site programs that beginning with modest, simple projects

provides the skills, confidence and motivation to tackle more complex and larger projects at a later date. In other words, regional development must be seen as a long term process.

The visible projects undertaken could be grouped into four areas. The first was new or improved infrastructure. This included projects such as Tidy Town initiatives, revitalising the main street, upgrading or rejuvenating old buildings, provision of facilities for child care, youth and adult recreation centres and new processing facilities for value-adding to raw commodities produced in the region. Infrastructure improvement also included provision of services, and the formation of new or reinvigorated community groups. The second area was education and training programs such as small business skills, farm record keeping and home budgeting, vocational-technical classes targeted for youth, and training in scientific data collection to enable local people to monitor and address local environmental programs. The third area was economic diversification and industry development. This was often linked with education and training programs designed to develop an entrepreneurial culture and skills, but also included marketing and product development programs, tourism development initiatives and the formation of enterprise cooperatives. The last area of project implementation was the organisation of special events such as festivals, sporting events and social functions. Some of these were designed primarily for local people, while others were aimed at attracting visitors and income to the region.

Along with these visible projects there were also less tangible outcomes which arose largely as a result of the collaborative way these initiatives were conducted. Communities that engaged in these processes reported, where information was available, increased levels of optimism, trust and confidence, and the feeling that the community had some control over its destiny. There was also an increase in networking between individuals and organisations within communities, as well as the development of working relationships between local communities and outside organisations such as government agencies or business and financial institutions in cases where these groups became involved in the initiative.

Several case studies reported that the initiative led to an improvement in local government / community relations. In some cases the new leadership group became a conduit for channelling community opinion to local government and/or the participative way in which the development initiative was conducted became a catalyst leading local government to work in a more inclusive manner.

On a more general level it can be seen that the development initiatives acted as a catalyst for change. They mobilised both human and physical resources, created an atmosphere of open-mindedness and innovation that led toward increased economic activity compatible with community values, and became a touch-stone to channel community concern about social decline into active efforts to enhance community cohesion.

The process in London deserves special mention as it serves to provide a warning note. In 1993 the City of London set out on a three year process to mobilise its population of 326 000 to create a set of strategic plans reflecting their ideas and wishes. Over the next three years a thorough and extensive program was carried out and an overarching Strategic Plan and six inter-related subsidiary plans were drafted, reviewed and approved by Council. An external assessment of the process (Agocs 1999) concluded that "Vision 96 was successful in involving local community stakeholders in generating the plans [and] the content of the plans appeared to reflect a wider range of stakeholder values than plans generated in more conventional and managerial ways."

However, two factors in particular were identified which have limited the extent to which the plans have served to influence political and administrative decision making. Firstly, “the election in 1995 of a Conservative provincial government with a radical restructuring and cost-cutting agenda” has changed the political environment in which the London Council operates so that it became preoccupied with adjusting to this new situation. Secondly, there were no structures put in place to provide the community with a forum to monitor the implementation and results of the plans, despite calls from the community for such a mechanism during the planning process. Agocs (pers.comm. 2000) believes there is now “a lot of disillusionment” amongst the public at the lack of implementation after all the time and energy invested in the process. Although Agocs believes this disillusionment is directed largely at the provincial government rather than the City Council, a question mark must remain over the willingness of the populace to engage in such participatory processes again. Time will tell whether the London process was worthwhile despite the initial setback in its implementation.

Decision making

All of these initiatives involved a high degree of control by locals over both the process followed and projects selected. Although in the larger regional initiatives and multi-site programs the model promoted by the larger program influenced local level “process” activities, the planning and implementation of these activities were largely in the hands of locals. Project selection was entirely controlled by locals, although where applications were made to funding bodies to finance projects, outsiders exerted influence through their control of financial resources. It was notable however, that many communities successfully bid for grants, suggesting that projects that have arisen through such collaborative processes and can demonstrate wide community support may be more attractive to funding bodies.

Discussion

The question this research set out to address was how to maximise the potential economic, environmental and social benefits of farm forestry when there are so many players involved and so many complex issues to be addressed. This study suggests an additional question should also be asked:- How can the process of seeking to maximise these benefits help develop the self-confident, self-empowered and cooperative communities that so many people desire? This research adds weight to the conclusion that it cannot be done by individual players acting in isolation, rather, a broad cross-section of the community has to be involved in a genuinely participatory process, and although there is a role for national governments and policies, these questions must be addressed at a local and regional level.

While collaborative regional development initiatives are not the only participatory mechanism available to find mutually supported ways forward for farm forestry, they clearly have potential. However, one conclusion of this research is that progress is unlikely to come quickly or easily. Participatory processes are time-consuming and complex, and progress can be slow and awkward. The challenge for both individuals and organisations is firstly to learn to take a long-term view, which means both having the patience to persevere with the process as well as ensuring that short-term objectives are compatible with longer term goals. Secondly, they need to learn to look beyond themselves and realise that often individual self-

interest is best served by being receptive to others concerns and working together for the benefit of all.

What does the proliferation of collaborative regional development initiatives around Australia mean for farm forestry development? From a regional perspective forestry is only one industry and one issue among many and therefore there is no guarantee farm forestry would even be discussed in such initiatives. However, in regions where farm forestry is already established the sort of outcomes that may arise from such initiatives are likely to be development of down-stream processing and value-adding to wood products, collective marketing arrangements and/or tree-farming cooperatives, educational programs such as Master Tree Growers and efforts to better integrate forestry with other industries.

Where farm forestry has potential, a regional profile is quite likely to identify farm forestry as an opportunity to address the combination of lack of tree cover, land degradation and poor farm incomes that affects so much of rural Australia. In general collaborative regional development initiatives would provide a forum for balanced consideration of the pros and cons of farm forestry within particular regions, and allow the general community an avenue to raise their concerns, for farmers and industry to hear these concerns and give an opportunity for proactive planning to address them before they have a chance to escalate. The experience in some of the case studies was that there is a limit to the ability of these collaborative processes to resolve an issue once it had escalated to the point where there was heated debate between opposing interests.

As no region exists in isolation, successful and innovative developments in one region will often influence activities in other regions and may lead to larger scale initiatives at either a state or national level. In today's era of rapid communications this can occur much quicker than in the past. As an example, an audit of the strengths and weaknesses of the Riverina region in NSW led to a strategy to develop the local softwood industry. This process triggered a State-wide review of the industry which has been one catalyst in increasing the percentage of Australia's softwood consumption that is locally produced (McKinsey and Co. 1994). Similarly, one region that identifies farm forestry as an opportunity and develops a strategy to promote it may act as a catalyst for similar initiatives in other regions.

For proponents of farm forestry there are two issues that this study raises. Firstly, what are the costs and benefits of participation in regional development processes, and secondly, what lessons can be drawn from these processes about community participation in general.

Clearly there are different levels at which they could engage in regional development processes, ranging from actively forming partnerships to initiate such processes where they are not already in existence, to participating to varying degrees in existing processes. For an industry organisation or state forestry body the first option of setting out to initiate a process is clearly a risky use of limited resources, as for the organising group they are very time-consuming and there is no guarantee farm forestry would be discussed. However, involving themselves in existing processes where they consider farm forestry a viable industry may well prove a good investment, as their presence will raise the profile of farm forestry as an opportunity worthy of consideration and they can provide factual information on which to base discussions. Their input could be particularly useful at the regional auditing stage. By providing communities with the biophysical data that many forestry organisations have access to, the areas where the forestry organisation believe farm forestry is viable and its environmental benefits could be shown to the community. At the same time, if the

community is able to use this information for other purposes this will be very useful to them and help build mutual trust and respect between the forestry body and the community.

One of the major lessons about community participation that can be drawn from this study is that when the community is given genuine control over the process and the outcomes, although it can be a time-consuming and challenging process, it can not only result in action strategies that balance multiple objectives, it also helps build a culture of trust and cooperation within society and the capacity to effectively plan and work together on other issues in the future.

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Modelling Non-Industrial Private Forest Timber Supply: An Economic Approach

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Introduction

In an earlier paper entitled “Modelling private timber supply – a survey of approaches” we identified the need to develop the capacity to model the economic timber supply behaviour of non-industrial private forest (NIPF) growers¹ in Australia. We argued that this would improve our understanding of the way in which NIPF owners make wood supply decisions and thereby enable us to increase the overall effectiveness of public sector intervention². The analysis reported in this paper represents our first step in developing this capacity.

In our earlier paper, a review of the NIPF timber supply modelling literature identified a range of possible theoretical frameworks and technical approaches. In particular we found that NIPF timber supply models could be distinguished by whether they are normative or positive,³ whether they model long-run or short-run supply behaviour⁴ and by the assumptions made about individual producer behaviour. While the assumption of profit (or land rent⁵) maximisation on the part of the forest grower is common (Binkley, 1993; Hyde, 1980), many studies propose utility maximisation as a plausible alternative (Dennis, 1989; Max and Lehman, 1988; Kuuluvainen, 1990; Koskela, 1989). This paper illustrates the use

¹ The NIPF grower classification encompasses a diversity of owner and institutional ownership types, including professional farmers, resident and non-resident hobby farmers and investment growers.

² Potentially, empirical work in this area will enable us to quantify the responsiveness of supply to changes in key variables such as price and input costs; predict the response of supply to changes in policy and institutional variables such as taxes, subsidies and marketing arrangements; and, in concert with timber demand estimates, predict prices and welfare consequences of changes in supply related variables.

³ Normative models of timber supply endeavour to determine the optimal or efficient supply. Positive models attempt to explain observed timber supply behaviour.

⁴ In the short-run, timber suppliers are unable to adjust the level of all forest growing inputs. A short-run timber supply relationship reflects the responsiveness of quantity supplied per period to a change in stumpage price, accounting for only a limited set of possible adjustments. In the long-run, forest growers are able to vary the level of all forest growing inputs including the rotation period, the intensity of forest management and the number of sites (or area) managed for timber production. A long-run timber supply relationship reflects the responsiveness of quantity supplied per period to a change in the stumpage price, once all possible adjustments at both the intensive and extensive margins have taken place.

⁵ In economics the term rent is used to denote the above normal profit which accrues to the owner of a scarce natural resource.

of normative analysis, to determine a regional private long-run timber supply relationship, assuming profit maximising behaviour.

The rest of this paper proceeds as follows. Section 2 describes a general long-run timber supply model based on Hyde (1980). Section 3 describes the data required to implement Hyde's approach and identifies the data used in the illustration presented in this paper. In Section 4 we report our estimates of efficient long-run harvest and input levels. These estimates are discussed in Section 5 and a preliminary assessment of their sensitivity to changes in key variables is highlighted. Section 6 presents conclusions and indicates the direction of our ongoing research agenda in this field.

The Long-run Timber Supply Model

To derive empirical estimates of the long-run efficient timber supply schedule for a particular region we follow the general approach detailed in Hyde (1980). This first involves solving the optimal, or rent maximising, economic rotation and level of management effort for representative hectares of different classes of forestland, for exogenously given input costs and stumpage price. Land suitable for timber growing is then established as those tracts for which the expected rent is positive. Assuming a fully regulated forest over the long-run, timber supply for each profitable land class is calculated as the mean annual increment (MAI) per hectare given optimal management, multiplied by the number of hectares in each land class. We then sum these efficient harvest levels across all land classes to establish a single price – harvest point on the efficient long-run supply schedule. By repeating this process for different expected stumpage prices we are, *ceteris paribus*, able to determine a regional economic timber supply schedule.

Timber supply relationships derived in this way are clearly a function of the engineering and biological estimates that underlie the analysis. In particular, the nature of the biological timber production process and the technical relationship between the input of man-made factors of production and timber output are reflected in the timber supply relationship. In addition, the timber supply relationship reflects the explicit assumptions made about landowner or manager behaviour. In this analysis, all landowners are assumed to maximise the net present value of timber production in the face of competitive input and output markets.

More formally, we assume that for each hectare of available forest growing land⁶ the landowner selects harvest age, a , and the level of silvicultural effort, E ,⁷ to maximise forest rent, where

⁶ Hyde (1980) assumes a fixed forest land base in his empirical estimates of long-run timber supply in the Douglas-fir region of the Pacific North West of the US. This assumption is quite easily relaxed to permit shifts in the extensive margin between timber production and other land uses such as agriculture. We foreshadow this as a possible extension in future work.

⁷ We can think of E as an index measure of all factors of production other than time and land. For example, effort may include the labour, material and capital involved in various silvicultural activities such as fertilisation and thinning, and productive factors used in crop protection and administration.

$$\pi = \frac{pv_i(a, E; q_i)e^{-ra} - wE}{1 - e^{-ra}} \quad (1)$$

p is the exogenous stumpage price of timber and w is the cost of a unit of management effort; $v_i(a, E; q_i)$ is the timber production function for land of quality q_i , where $i=1,2,\dots,n$. For land of given quality q_i , the volume of wood fibre, v_i , is, therefore, a function of stand age and the level of silvicultural effort. Furthermore, r is the individual landowner's discount rate, and reflects his opportunity cost of capital. Thus, equation (1) defines forest rent as the present value of the net return to timber growing over an infinite sequence of identical rotations.⁸

Differentiating equation (1) with respect to E and a , then solving the first-order conditions yields the optimal harvest age a_i^* and optimal effort level E_i^* , for land of quality q_i . At their optimum levels, the extra revenue gained from the last unit of both a and E is equivalent to their extra cost. Therefore no further improvements in efficiency or increases in land rent can be obtained by either extending the rotation or applying additional silvicultural and/or management inputs.⁹

Having solved for the optimal rotation age a_i^* and the optimal level of silvicultural effort, E_i^* , we may then compute the optimal harvest level v_i^* according to the production function $v_i(a_i, E_i)$ for various exogenous classes of land quality. Note that the management decisions $a_i^*(p)$ and $E_i^*(p)$, and therefore the optimal harvest level, are a function of price. For exogenously given values of p , w and r , the annual long-run supply for a representative hectare of land of class q_i , namely s_{q_i} , is given as:

$$s_{q_i}(p) = \frac{(v_i a_{q_i}^*(p), E_{q_i}^*(p))}{a_{q_i}^*(p)} \quad (2)$$

Aggregate efficient regional timber supply at this price, $S(p)^*$, can then be calculated as shown in equation (3), as the sum of supplies over land classes where $A_1, \dots, A_n$ are the number of hectares of available land of class $q_1, \dots, q_n$ respectively.

$$S(p)^* = \sum_{i=1, \dots, n} A_{q_i} s_{q_i}(p) \quad (3)$$

The long-run regional economic timber supply curve is expected to have a positive slope since the efficient quantity of timber production increases for higher prices. The intuition behind this result is that a higher permanent stumpage price will increase the optimal

⁸ Specifying the landowners decision in this way is correct only if timber production is the highest valued use, both now and in the future.

⁹ The two first-order conditions with respect to E and a are respectively:

$$(1) \quad \frac{\delta \pi}{\delta E} = \frac{pv_i(a, E; \frac{\delta q_i}{\delta E})e^{-ra} - w}{(1 - e^{-ra})} = 0 \quad \text{and}$$

$$(2) \quad \frac{\delta \pi}{\delta a} = \frac{\{pv_i(a, E; \frac{\delta q_i}{\delta a})(1 - e^{-ra}) - r[pv_i(a, E; q_i) - wE]\}e^{-ra}}{(1 - e^{-ra})^2} = 0$$

intensity of management of each and every site, and will expand the number of sites that are within the extensive margin of profitable timber supply.¹⁰

Data Requirements

Our approach in this preliminary illustration is to first examine single-hectare production as a function of expected stumpage and then to aggregate across all sites to obtain a regional long-run timber supply (LRTS) schedule for a hypothetical forest growing region. The supply schedule simulated in this manner is reported in Section 4. This section describes the data requirements of the Hyde model and the data used in the simulations.

Deriving the LRTS relationship in the way described in section 2 requires data on the following: the area available for timber production in private non-industrial ownership by land class or timber growing potential; the expected yield by timber product under all possible management regimes by land class; the cost of forest management by operation (including the cost of land rental) by land class; and the discount rate. Given data of this resolution, each representative hectare can be assigned its optimal management and the LRTS relationship reflects efficient production possibilities.

Data sets of the type described above are, at best, complex and costly to construct and, at worst, unavailable. Our preliminary attempt to compile a comprehensive data set for any one of the five forest growing regions in Tasmania has been frustrated in each case by a lack of data on the available NIPF land base. There is no comprehensive data set on either the area of land currently used for timber production or with timber producing potential owned by this class of grower at the regional level. Consequently, we simulate the LRTS curve for a hypothetical forest-growing region, using yield, management and cost data that broadly reflects Tasmanian conditions. The rest of this section describes the data used and assumptions made in these simulations.¹¹

Land Availability and Site Quality

The timber-growing potential of land is described by ‘site quality’. We model landowner behaviour with respect to two site qualities, namely high and low. In the absence of an appropriate data set we simulate timber supply schedules for a hypothetical region in which there are 2,000 hectares of timber-producing land available. We further assume that half of this area is classed as having low site potential and half has high site potential¹². We further assume that that timber production is the best use for this land.

¹⁰ Note that higher prices will result in a shorter optimal rotation period, which may be associated with a lower MAI per hectare. *Ceteris paribus*, this suggests the possibility of a downward sloping long-run supply curve at the single hectare level of analysis.

¹¹ Details of the data set used in these preliminary simulations are available on request from the author.

¹² The simulated supply schedules presented in this paper can easily be re-scaled to reflect other assumptions about the availability and timber growing potential of the land in a region.

Timber Yield and Forest Management

Yield data was obtained from Private Forests Tasmania (PFT) for five management regimes, namely softwood pulp (unpruned), hardwood pulp (unpruned), native hardwood, hardwood sawlogs (pruned) and softwood sawlogs (pruned). Regimes were specified and yields, by product type, were identified for both low and high quality sites. A summary of these data is displayed in Table 1.

TABLE 1:

Management Regime and Site Quality	Rotation Length (years)	Yield Pulpwood (m³/ha)	Yield Sawlog (m³/ha)
Softwood pulp (unpruned) regime			
High	18	450	0
Low	22	250	50
Hardwood pulp (unpruned) regime			
High	13	350	0
Low	22	300	0
Native regime			
High	50	200	60
Low	80	100	50
Softwood sawlog (pruned) regime			
High	23	150	300
(Thin Commercial)	(11,16)	(100, 80)	(0, 0)
Low	30	100	250
(Thin Commercial)	(13)	(120)	(0)
Hardwood sawlog (pruned) regime			
High	25	200	350
(Thin Commercial)	(11, 16)	(100, 110)	(0, 0)
Low	24	100	200
(Thin Commercial)	(15)	(80)	(0)

Forest Management Costs

PFT also provided data on the costs of the various forest management operations associated with each of the management regimes specified above. This data includes the silvicultural, establishment, annual maintenance and roading costs associated with the various regimes.

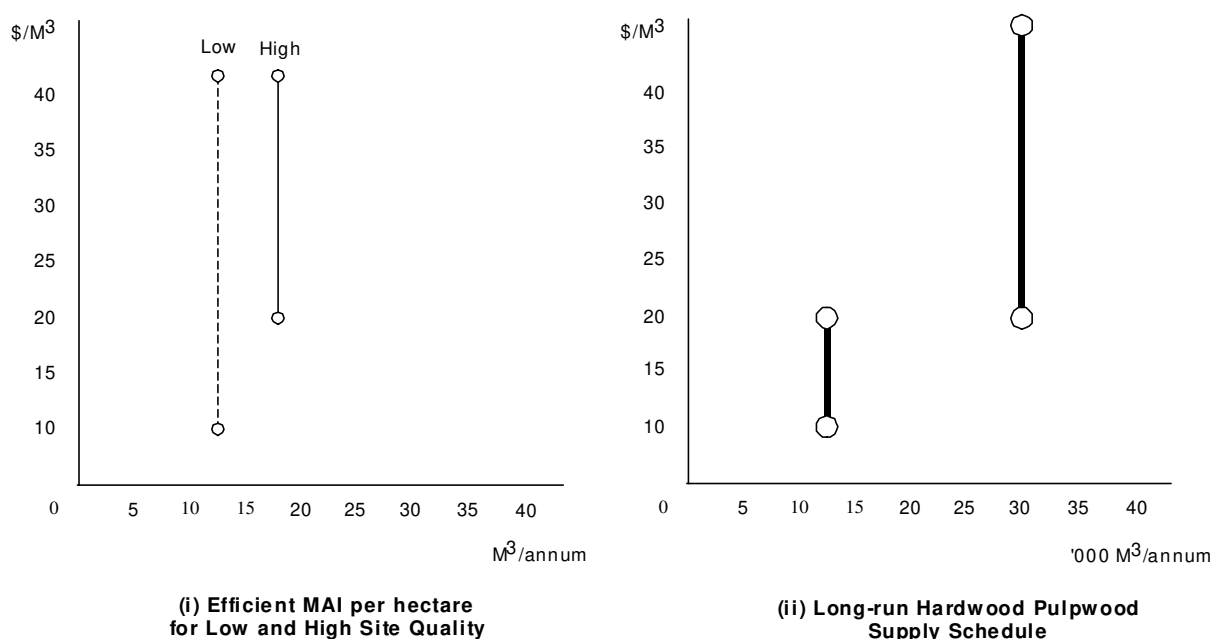
Discount Rate

The discount rate represents the relative value that landowners place on future receipts compared to current receipts. Choice of a discount rate should reflect landowner's opportunity cost of capital and their personal rate of time preference. Our initial simulations are conducted on the basis of a 6 per cent real rate of discount. Later in this paper we illustrate the sensitivity of the LRTS curve to a change in the discount rate.

The Long-run Timber Supply Schedule – a Simulation

We illustrate Hyde's approach by deriving the supply curve for a particular timber product, namely hardwood pulplogs, for a hypothetical region. Consequently empirical results should be seen purely as a means of illustrating the approach. The values of all economic variables, including the prices of all other timber products¹³, are held constant at their base case levels.¹⁴ Given these values, the assumption of rent maximising behaviour implies that low quality sites are best managed according to the hardwood pulp (unpruned) regime. This is the case over the entire range of hardwood pulp prices considered (ie. from \$10/m³ to \$40/m³). For high quality sites the pruned hardwood sawlog regime yielded the highest forest rent for prices in excess of \$20/m³. For hardwood pulp prices below \$20/m³, high quality sites would optimally be managed for softwood production. Figure 1(i) shows the corresponding efficient MAI per hectare as a function of product price for both high and low quality sites. Aggregating over the available land area in each land class yields a LRTS schedule (Figure 1(ii)). As expected, higher prices induce a higher level of supply per period.

Figure 1: Base Case Long-run Hardwood Pulpwood Supply Relationships



Sensitivity Analysis

The robustness of timber supply curve simulations to the assumed values of key variables in the analysis should be tested. We illustrate the nature of this sensitivity analysis by simulating the effect on the hardwood pulplog supply curve under the following alternative scenarios:

- i) an increase in the discount rate; and
- ii) a decrease in the price of competing timber products.

¹³ The regimes defined by PFT produce both hardwood and softwood pulp and sawlogs, and veneer quality logs.

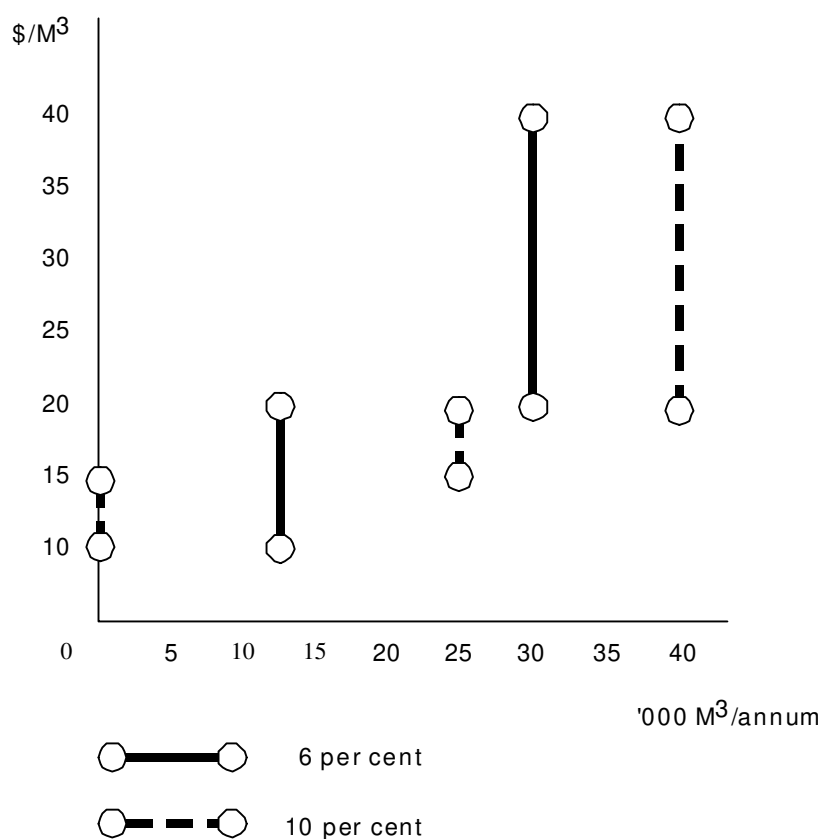
¹⁴ Details of the base case values are available on request from the author.

Discount Rate

The discount rate was increased from the base case level of 6 per cent to 10 per cent. A higher discount rate reflects a higher opportunity cost of capital and/or a stronger preference for current over future receipts. Higher discount rates tend to favour investments where revenues are received earlier and/or costs are delayed. As expected, therefore, although reducing the profitability of timber growing overall, an increase in the discount rate makes the hardwood pulpwood regime more attractive relative to alternative management regimes. More specifically, at a discount rate of 10 per cent, managing low quality sites for hardwood pulp production is still the most efficient management strategy for hardwood pulp prices of \$20/m³ and above. For prices less than this, however, leaving low quality sites idle is the preferred option. For high quality sites, at the higher discount rate the short, hardwood pulpwood regime is now more profitable than the hardwood sawlog regime for a hardwood pulpwood price in excess of \$15/m³. For a price below this, all possible regimes would yield a negative return.

The total regional hardwood timber supply curves for discount rates of 6 and 10 per cent are shown below in Figure 2. As anticipated, an increase in the discount rate will increase the aggregate regional supply of hardwood pulpwood, at least over the range of discount rates considered. It has, however, resulted in an increase in the minimum price (from \$20/m³ to \$15/m³) required to induce a positive supply.

Figure 2: Sensitivity Of Long-run Hardwood Pulpwood Supply Schedule to Increase in Discount Rate to 10%



The Price of Related Products

Economic theory suggests that the amount of a good that producers are willing and able to supply in a particular period should be sensitive to the prices of related products.¹⁵ We illustrate the sensitivity of our hypothetical hardwood pulp supply schedule to a change in the value of related products, namely hardwood veneer and sawlogs (native and plantation grown), and softwood sawlog and pulplog prices. Reducing these prices to the minimum value in the range indicated by PFT¹⁶ resulted in the following effects on efficient forest land management. Firstly, the hardwood sawlog regime became the most profitable alternative on high quality sites at the lower price of \$10/m³. However, for hardwood pulp prices in excess of \$15/m³ high quality sites were profitably switched from the hardwood sawlog regime to the hardwood pulplog regime when the price of related products was reduced. Secondly, for low quality sites the hardwood pulpwood regime remained the most profitable across the entire range of hardwood pulp prices investigated. Aggregating efficient MAI across areas and site qualities yielded The LRTS curve for our hypothetical region shown in Figure 2. This illustrates that a decrease in the price of alternative products will increase the supply of hardwood pulplogs at each and every price.

Discussion and Proposed Extensions

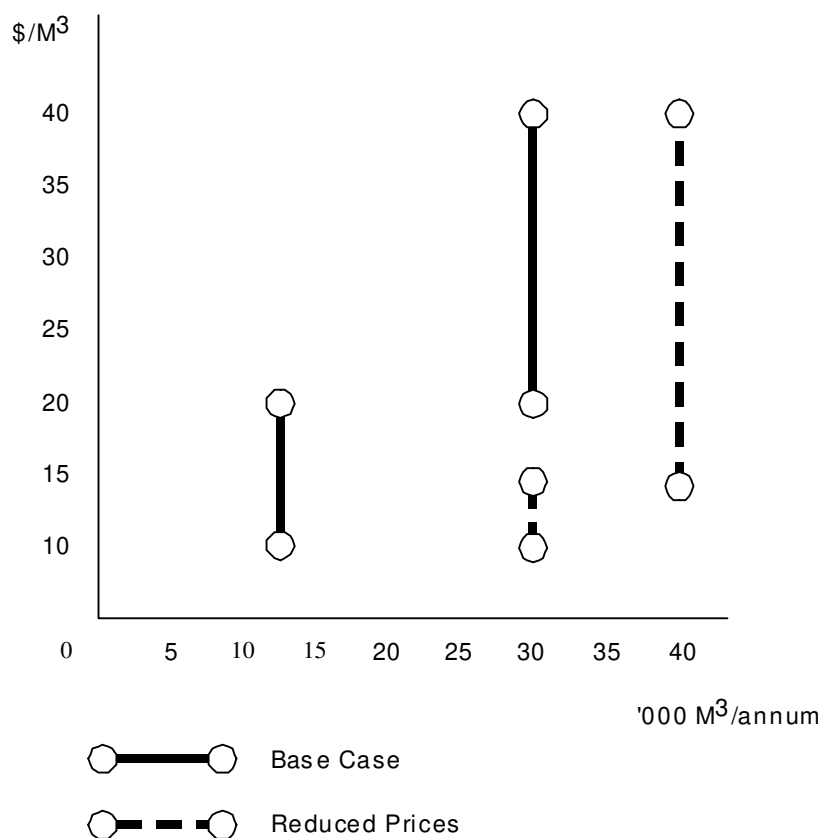
This paper has reviewed Hyde's (1980) method for deriving efficient timber supply schedules under the assumption of profit maximisation. We have also illustrated this method using a constructed example, wherein actual forest management, cost and yield data has been combined with hypothetical land availability data. Although preliminary in nature, the results highlight a number of practical and theoretical issues, and suggest directions that future research in this area might profitably take. In particular,

- *a number of extensions to the preliminary empirical work presented above are desirable.*
- (i) The results reported here are of very limited practical value. This is due to the poor quality of the data set available. Access to an enhanced data set would clearly improve practical interest in the results. Detailed data on the area of land available for forest growing within a specific geographical region by land class, and on the relationship between specific forest management practices and forest product yield by land class is required. The latter would permit a greater level of optimisation to be incorporated in the analysis, and the comparative static effects of innovations in forest growing technology (such as the availability of improved genetic stock) to be explored.

¹⁵ Timber products are related as both complements and substitutes in production. For example, most regimes produce both pulp and sawlogs as joint products. This suggests that an increase in the price of sawlogs will increase the supply of pulplogs. They may, however, also be viewed as substitutes as growers choose between sawlog and pulplog regimes. In this case an increase in the price of sawlogs should reduce the supply of pulplogs.

¹⁶ Details of these values can be obtained on request from the author.

Figure 3: Sensitivity Of Long-run Hardwood Pulpwood Supply Schedule to Reduction in Price of Competing Products



- (ii) In this preliminary work we have treated forest growers as a homogeneous group with respect to their timber supply behaviour. We have, however, also acknowledged the great diversity of ownership types encompassed by the non-industrial forest grower category. An extension to the current project would involve extending Hyde's approach to account for this diversity by incorporating different behavioural assumptions, discount rates and other assumptions for various categories of growers, such as investment growers and resident farmers.
- (iii) That forest growing is the highest value, and hence best, use of the available land area is implicit in our preliminary analysis. Yet the extensive margin of forest growing often occurs at the interface of forest growing and some other non-forest productive land use, such as agriculture. The way in which the extensive margin for non-industrial timber growing responds to changes in the relative prices of timber and other products is of interest.
- the extension of our investigation to a positive model of non-industrial forest grower timber supply is also anticipated.
- (i) Hyde's approach enables us to identify the efficient timber supply relationship. In other words, it describes how timber supply would respond to changes in its determinants (such as price and input costs) if all producers behaved in the way assumed. It does not attempt

to either explain how actual supply decisions are made (by testing various behavioural models) or to predict actual supply behaviour. Explaining actual supply behaviour will inevitably lead to the consideration of alternative behavioural hypothesis such as utility maximisation and the inclusion of non-timber values.

- (ii) The lack of data on the supply behaviour of this group of growers restricts our ability to explore supply behaviour based on evidence revealed in actual market transactions. An alternative, therefore, is to exploit the survey based choice experiment approach in order to generate stated preference data as a basis for empirical investigation. The possibility of combining actual and stated behaviour data is particularly attractive as both the *prima facie* validity of revealed preference data and the desirable statistical design properties of stated preference data can be exploited.

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Abstracts of Additional Presentations

Forestry and Regional Australia: Changes for the Good?

Professor Roy Rickson

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Integrating economic and environmental goals are now fundamental to development. We further have to consider the social impacts of either or both. Modern industry now refer to the “triple bottom line” and yearly reports routinely list how they are integrating these activities or how they propose to do so. This is especially critical for such important initiatives as farm forestry. As it is a type of development that can contribute to production and conservation goals at the farm and the community level, programs designed to promote farm forestry must be careful that they too consider that the social and environmental consequences of tree production are on the minds of many farmers and rural communities. Spatial and scalar dimensions need always to be considered in this type of development. Questions that need to be asked include (1) what does farm forestry mean for the rural community? More specific questions include (2) How does farm forestry affect population, the number of people in rural communities? (3) How does it affect the diversity of services (schools, hospitals, access to physicians, economic activities associated with these services)? At another level, other farmers may see what may be an opportunity for the individual farmer as detrimental to the community they live in. What do individual farmers think about growing trees for production on their land? How do they feel about farming next to a farm forest? I would argue that these are critical questions if production forestry is to achieve the balance of production and conservation goals necessary for it to conform to modern conceptions of sustainable development or environmental sustainability. Clearly, forestry and farm forestry refer to much more than the biology of growing trees.

Farmer reactions to farm forestry programs have not been the focus of our research in Australia or overseas, but we are increasingly getting comments about it. These include distinct concerns about the decline of services due to population declines. There is a conception among those we study that farm forestry will accelerate declines in rural areas. Farm families are already faced with declining services. They have to travel further and further for routine medical care, financial services, hospitals and schools are being centralized. Concern about opportunities for their children with declining services and declining numbers of people are paramount for many rural families. Farmers have routinely said to us that they do not want to farm next to a forest. They are concerned about vermin, insects and plant disease that could affect the quality of their contract crops (potatoes, onions, peas, beans). Evidence for a general concern is illustrated by a public meeting in one of the Tasmanian rural farming communities entitled: “Chemicals in the Water and Forestry Next Door”. Because our research program has focused on the environmental and social consequences of contract production in Australia and overseas, we cannot offer definitive data

about farmer or farm community reactions to farm forestry. Other papers, in this symposium, and elsewhere are beginning to report good data that will help us understand what is happening. However, our data do clearly demonstrate some of the important parameters of modern change and development, which will affect farm forestry.

One is that local issues can rapidly become national and even global issues. The agri-food and cement companies we study are well aware of that. Local non-government associations can now easily and effectively connect with national and global organizations to block change. At the height of the environmental protests over forestry and other issues in Tasmania a few years ago, there was a statement, rather exaggerated, that “The World is Watching”. You can be assured that it is now with 26,000 registered NGOs capable of connecting with local groups through the Internet and influencing national policies on development. For this reason, a careful balancing of environmental and economic goals has to be considered in any development. This includes setting-up means for public involvement so that issues can be handled as they arise rather than exploding into rancorous conflict and inaction.

Farming Communities and Change: What Can We Expect From Farm Forestry?

Dr Neil Barr

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The changing demographics of the basin farming community offer some challenges and opportunities for those promoting farm forestry. Given the ageing of the farm population, investment in farm forestry by individual farmers is becoming less likely with each succeeding year, as the period of before a return on investment increases in relation to the remaining years of life available to farmers. Demographic trends may offer some opportunities for the promotion of investment in forestry rights. One of the barriers to the creation of a forestry industry based upon forestry rights is the difficulty of obtaining a sufficient area of forestry rights in a region to justify future investment in wood processing infrastructure. The ageing of the farm population and the potential for a future acceleration of the rate of properties being placed upon the market may offer an opportunity to foresters to position themselves to enter the land market and make significant land purchases in a relatively small time. Overseas experience of farmland to forestry conversion programs has shown that these generally meet with significant resistance. They are most successful in regions where there is a high proportion of older farmers entering the retirement phase, and where purchase is targeted at the sale of the farm on retirement.

As an example in the Basin, there are plans to develop a farm forestry industry in the Delatite shire (Victoria). This would occupy 7 per cent of the current farm area. The median age of farmers in the Delatite North SLA is almost 54 years of age. A third are over the age of 60. The farm population median age has increased by over four years in the last 10. These figures all suggest a strong pattern of delaying adjustment till the point of inter-generational transfer, and the strong possibility of increased property sales within a decade. Such assumptions could be confirmed with an improved understanding of the current retirement patterns of farmers, and demographic analysis extended to a greater level of resolution (collector districts). It may be possible to develop marketing plans for farm forestry which are based upon such a detailed understanding of the future changes in the structure of rural communities.

The major demographic threat to the establishment of plantation forestry in upland areas may be where the agricultural values of a region have been overtaken by demographic trends which increase the value placed by the local community on landscape amenity. Again, overseas research indicates that the loss of population caused by agricultural adjustment is often counter-balanced by in-migration in areas where there is high natural amenity and the opportunity for commuting to large centres with employment opportunities. Such “suburbanisation” appears to be occurring in north-east Victoria, and in proximity to centres such as Bathurst and Canberra. The value placed upon landscape amenity by the community of these districts may be greater than the value placed upon salinity control.

Decision Making in the Farm Family Business: Implications for the Adoption of Farm Forestry

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³Masters candidate, CRC for Sustainable Production Forestry, School of Agricultural Science,
University of Tasmania

The development of effective strategies for the integration of farm forestry into agriculture requires a detailed understanding of the farm family business. The paper defines the farm family business, showing it to be the dominant structural unit of Australian agriculture. Its key components are examined. Agrarian ideology is shown to impact on the organisation of the farm family business, in combination with the family cycle and the desire for inter-generational transfer. The goals, labour use, decision making and human capital in farm family businesses are examined. It is concluded that for farm family businesses to adopt farm forestry, extension efforts need to recognise the diversity of farm family businesses and of those contributing to their functioning. This can be done by:

- developing farm forestry options to suit the needs of the relevant parties;
- providing relevant information in useable form;
- working with the particular member(s) of the farm family business involved in the decision making, decision taking and/or implementation of decisions relating to entry into farm forestry; and
- making the technology, information and associated education or training accessible to farm family businesses, particularly through the use of existing networks and communication structures.

Refining North Forest Products Approach to Farm Forestry Development

John Hewitt & Stephen Manson

North Forest Products,
Tamar, Tasmania.

Plantations have been established on farmland in north-east Tasmania since the 1970's however, getting farmers interested in planting trees as a commercial crop was difficult. In 1997-'98 Jacki Schirmer did a study of landowners attitudes towards commercial farm forestry and from this study put forward some recommendations that would help sell commercial farm forestry to landowners.

Tamar Tree Farms a joint venture between North Forest Products, Mitsubishi Paper Mills, Mitsubishi Corporation and more recently the Tokyo Electric Power Company has taken on these recommendations with some success.

Private Native Forest Management in South East NSW: Challenges, Opportunities and Approaches

Dr. Jürgen Bauhus¹, Simon Greenaway² & Peter Deane¹

¹ Department of Forestry, Australian National University,
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² Greening Australia, South East NSW Farm Forestry Project.

The potential of private native forests (PNF) to maintain regional wood supply and to complement the reserve system on public land are being increasingly appreciated. This appreciation is partly a result of the Regional Forest Assessments, and it is reflected in the financial support, largely through the National Heritage Trust, that has been provided to improve the management of private native forests in a number of regions. Here, we will present a project attempting to facilitate, support, and integrate management for conservation and management for production objectives. On public land the integration of these often conflicting objectives has led to much dispute. Currently, land is allocated to a single management purpose in order to avoid the perceived conflict between different management objectives. In PNF, however, landholders often pursue both objectives simultaneously, though commonly without firm knowledge about how to do so. The extent to which PNF management can achieve this balancing act will influence whether or not the conflict over native forest use will shift to private land.

Work on this project is based on the premise that both conservation of biodiversity and utilisation of forest products require active management, that they are not mutually exclusive, and that the latter can provide the financial resources for the former. However, incentives for active management depend on market opportunities. This project takes a variety of approaches to improve PNF management in the South East of NSW with an overarching aim of establishing a native forest management culture in the local community that is sensitive to sustainability. This involves:

1. improving the knowledge and skill base of private landholders with regard to the ecology and management of the forests and the processing and marketing of products;
2. providing assistance to develop forest management plans, harvesting applications, and applications for voluntary conservation agreements;
3. investigating the motivations, values behind, and impediments to PNF management; and
4. establishment of trials and demonstration sites to showcase management approaches.

In this presentation, we will provide a general overview of the project, discuss the social science component of the project, and provide the rationale for the forest management research.

Impacts of Isolated Trees: What's the Difference?

Amanda Ozolins¹, Dr Cris Brack¹ & Dr David Freudenberger²

1 - Department of Forestry – Australian National University,
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2 - Wildlife and Ecology at CSIRO.

Before the advent of European settlement, the Lachlan Catchment in central-west New South Wales was dominated by forests and woodlands. However, extensive vegetation clearances, undertaken as an integral part of agriculture establishment and growth has reduced the tree cover to widely spaced patches, linear strips along roads and waterways, and isolated trees. Up until recently, research into the importance of trees and tree decline in the agricultural matrix has concentrated on the remnant patches and linear strips of trees. The isolated trees have been considered relatively unimportant because it has been thought that they were relatively few in number, were dying and not being replaced, and had effectively ceased to exist as ecologically functioning communities.

This presentation discusses a recent study of isolated trees in agricultural lands of the Lachlan Catchment (central-west NSW). Line intersect sampling on aerial photographs were used to determine number and spatial distribution of isolated trees in 1993-1997 and 1963-1965. This information is used to estimate the value of isolated trees and changes over the last three decades. The number of isolated trees has declined by about 20% over the period of study with the current density about 0.3 trees/ha. However these trees are not evenly spaced throughout the area and have values that are disproportionate to their abundance.

N.S.W. Local Government Land Use Policy Development Processes: Implications for Farm Forestry

Christina O'Grady & Dr John Field

Department of Forestry – Australian National University,
Canberra, ACT.

Local government has been identified as having an important role in farm forestry due to land use and planning responsibilities. At times, the regulatory requirements of local government land use policies are at variance with the aspirations of farm foresters. Eight local councils on the Southern Tablelands of NSW were analysed using surveys and interviews to determine: the nature of land use regulations affecting farm forestry; the processes used to create the regulations; and the, understanding, experiences and attitudes of community members in relation to land use regulations.

The prescriptive nature of Local government regulations results in farm forestry being difficult to manage because the wide range of activities which the term describes does not fit within existing land use categories. Regulations for "forestry" activities will generally be applied to farm forestry. The local government regulatory requirements for carrying out farm forestry vary across the Southern Tablelands due to different experiences with, and perceptions of, the activity. In some situations, the regulations impede the establishment and operation of farm forestry but in others, there are no constraints. There may also be a perception that the local government inhibits farm forestry, whether or not this is actually the case.

Despite the imposition of regulations, councils generally see farm forestry as a valid rural land use. Councils do not see their regulations as a problem but as a necessity under their 'duty of care' responsibilities to the whole community. This contrasts with landholders who, in the main, see regulations as an unnecessary imposition. If farm forestry is to gain the support of the local government in a way which satisfies the aspirations of practitioners, an understanding of the various viewpoints needs to be encouraged and facilitated.

Biographical Notes on Presenters

Mr Jason Alexandra grew up along side the Yarra River flood plain in the landscape that was blend of Heidelberg impressionist and 1950s suburbia. He roamed the farms (and golf courses), swam in river and got to know the reptiles, amphibian and birds that shared the landscape. Walking home from primary school he dreamt of the red gum forests returning (mostly as a home for the birds). At secondary school on hot summers days he day-dreamed, as he looked over the flood plain, of a future where the magnificent Red Gums regained their dominance of the valley. In adult life he became involved in the fledging revegetation movement about 20 years ago, after brief stint at art school. Since then he has operated a large tree nursery, a salvage sawmill, various farming businesses and worked as a conservation advocate and policy analyst for the ACF. He currently divides his time between organic farming (fruit production), parenting, consulting and research. Last year he completed a review of the issues and opportunities of using Environmental Management Systems for Australian Agriculture and several of the Mid-term reviews of the Commonwealth's NHT. He is a Director of the Land and Water Resources R&D Corporation and has been instrumental in getting the socio-economic, policy and institutional R&D program commissioned. Jason can be contacted at Alexandra and Associates, 16 Homestead Rd, Eltham Vic. 3095; Tel:/Fax: 03 9431 3426 (work); Tel: 03 9431 3657 (home).
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Dr Neil Barr is Leader – Rural Social Research Group at the Centre for Land Protection Research, Department of Natural Resources and Environment (Victoria). Neil was raised on a farm, which no longer exists. He studied social psychology as an undergraduate. His first job was a survey of adjustment pressures on West Gippsland farmers, some 20 years ago. Today he is undertaking research into structural change in agriculture and its implications for catchment management. What, you might ask, has changed over the last 20 years for Neil? The venues (various), the salary (increasing, albeit slowly), and thankfully, the understanding of the subject matter. Milestones along the way have included a book covering the history of rural environmental management in Australia, *'Greening a Brown Land'*, and a couple of higher degrees exploring the intersections of environmental psychology, salinity control and structural change in agriculture.
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Dr Jürgen Bauhus is a Senior Lecturer at ANU Forestry, teaching Silviculture, Forest Ecology, and Tree Physiology. His research focuses on the impacts of forest management on nutrient cycling, on silviculture of native forests, and indicators of sustainable forest management. Jürgen also takes great interest in the dissemination of scientific knowledge in the wider community and the application of it in management, which is reflected in his work on private native forests. He presented a paper written with Mr Simon Greenaway and Mr Peter Deane.
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Dr Chris Beadle is Principal Research Scientist with CSIRO Forestry and Forest Products. He has worked at the Tasmanian Research Centre in Hobart since 1983. His main interest is the use of physiology to further the understanding of how leaves and canopies respond to environmental factors and silvicultural practice and to use this information to improve the management and productivity of plantation forests. The main context for this work has been eucalypt plantations managed for pulp and solid wood products. He is currently Program

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Dr Cris Brack is a Senior Lecturer in Forest Measurement and Modelling at ANU Forestry, and presented a paper written with Ms Amanda Ozolins and Dr David Freudenberger.

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Dr Marlène Buchy is a Lecturer at ANU Forestry, and has extensive experience and expertise on social issues within the context of natural resources management (NRM) – especially forestry, agroforestry and participatory forestry. Her forestry experience is complemented by solid credentials in the adult training/education sector, where she has developed and run courses on rural extension (RECOFTC 1998), participatory forestry and gender in NRM (Women's studies' extra mural Masters; British Council support project, Ethiopia; ANUTECH). Marlène has been involved in two international consultancies directly related to farm forestry extension issues for the UK's Department for International Development (then the UK's Overseas Development Agency) at ICFRI (Jhansi, India) and IFGTB (Coimbatore, India). She has also undertaken consultancy work for AusAID as a gender and rural development specialist.

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Mr Peter Deane is currently undertaking research into values, knowledge and practices surrounding the management of native forests by private landholders in the Eden Region, for a Masters degree at ANU Forestry – Australian National University. He has an undergraduate qualification in ecology, a postgraduate qualification in environmental sociology and is pursuing his interest in interdisciplinary study between the natural and social sciences. He wrote a paper with Dr Jürgen Bauhus and Mr Simon Greenaway.

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Dr Hans Drielsma is General Manager – Forest Management with Forestry Tasmania. He has held his current role with Forestry Tasmania since 1997, when he joined the team negotiating the Tasmanian Regional Forest Agreement. He currently chairs the Australian Forestry Standard Steering Group, and is a member of the Tasmanian Forest and Forest Industries Council, the Tasmanian Timber Promotion Board, and the Forest Practices Advisory Council. Hans previously held a number of roles with State Forests of New South Wales from 1973 - 1997, including Managing Director from 1993 - 1997. Hans has a Bachelor of Science (Forestry) (Honours) from Australian National University, Canberra, for which he received the University Medal and the Schlich (Forestry) Medal and a Master of Forest Science and PhD from Yale University. He is also a Fellow of the Australian Institute of Company Directors and a Fellow of the Institute of Foresters of Australia.

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Dr John Field is a Senior Lecturer at ANU Forestry, and presented a paper written with Christina O'Grady.

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Ms Amabel Fulton is a Rural Sociologist with the University of Tasmania and CRC for Sustainable Production Forestry. Her role is research into the social and economic aspects of the integration of farm forestry into agriculture. Her paper was written with her colleagues at the University of Tasmania – Professor Rob Clark, Mr Paul Dargusch and Mr Tim Tabart.

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Mr Simon Greenaway was until recently the Community Education and Training Officer for Greening Australia in the South East NSW Farm Forestry Project and was the coordinator of the NHT funded PNF management project. Simon has previously coordinated revegetation programs in Central Australia with Aboriginal communities. In addition, he is putting his farm forestry ideas into practice on the family property. His paper was written with Dr Jürgen Bauhus and Mr Peter Deane.

Mr John Hewitt is the Operations Manager with Tamar Tree Farms – a joint venture between Associated Forest Holdings (AFH) and Tas Forest Holdings (TFH) – Mitsubishi Paper Mills, Mitsubishi Corporation and Tokyo Electric Power Company, commencing in May 1995. John's responsibility with Tamar Tree Farms is to manage plantation establishment, share farm and lease agreements and property purchases, landowner relations. He has liaisons with contractors, staff, landowners and government agencies. John has a background in agriculture in Tasmania and Victoria. His family owns land and timber, and he is a Forest Practices Officer with experience in timber harvesting and forest and land assessment. John wrote his paper with his colleague Mr Steve Manson.

Dr Sarah Jennings attained a PhD in Forestry Economics at the University of Alberta, and has since worked as a Lecturer in the School of Economics at the University of Tasmania. Sarah teaches primarily in the areas of Resource and Environmental Economics and Introductory Microeconomics. Her research interests include Resource and Environmental Economics and the Economics of Social Policy. Recent forays have been into the economics of childcare, youth justice programs and policing. Sarah is a member of the CRC for Sustainable Production Forestry. Her main project area is the economics of non-industrial timber supply. She has also been involved in joint projects on the economics of fertilisation and biological sprays.

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Professor Peter Kanowski is Head of ANU Forestry, and was a Schlich Medallist at ANU Forestry and a Rhodes Scholar at Oxford University. He has worked for the Queensland Department of Forestry, and lectured at the Oxford Forestry Institute, before taking up the Chair at ANU Forestry in 1995. Peter has specialist expertise in forest policy, analysis of institutional environments, tree genetics and farm forestry, and has also coordinated some 20 short courses and training attachments.

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Mr Steve Manson is Manager of Tamar Tree Farms, and is responsible for liaison with customers, staff, contractors, Government agencies. The aim of the project is to produce 500,000 tonnes per annum of high quality eucalypt woodchips on a sustainable basis. Tamar Tree Farms is currently in its 5th year of plantation establishment. Steve is Canadian born, and has worked in the forest industry in Canada, Solomon Islands, Indonesia, Middle East and extensively throughout Australia. Throughout his career he has gained experience in different forms of forest harvesting and management and more recently has been involved in the start up of a significant eucalypt plantation at North Forest Products, a joint venture between North Forest Products and Japanese interests. Steve wrote his paper with his colleague Mr John Hewitt.

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Ms Christina O'Grady completed her B.Sc. (Hons) in 1999 at ANU Forestry, with her research being the basis of her joint paper with Dr John Field.

Ms Amanda Ozolins completed her B.Sc. (REM) with Honours in 1999 at the ANU. Her thesis - *Abundance and decline of isolated trees in the agricultural landscape of Central West New South Wales* - was submitted in partial fulfilment of this degree. The other authors acted as Supervisors for this study and included Dr Cris Brack from ANU Forestry and Dr David Freudenberger from CSIRO.

Professor Craig Pearson is Chief of the Agriculture, Food and Social Sciences Division – Bureau of Rural Sciences, Canberra. In this role, Craig is responsible for leading research and provision of scientific advice to government agencies, in the disciplines encompassed within the Division, including climate change modelling, feral animals and weeds, gene technology and food chain organisation, and social sciences research. He also coordinates the Bureau's Greenhouse program across three Divisions. Craig is Adjunct Professor at the Centre for Resource and Environmental Studies (CRES) – Australian National University. He was previously Dean of the Faculty of Natural Resources, Agriculture and Veterinary Science and Pro Vice-Chancellor at the University of Queensland (Gatton) (1995-1999). Earlier he was Professor of Agronomy at the University of Sydney (1985-1995). He was a foundation member of the Wool Research and Development Corporation Council (1986-1990), and is currently a member of Board of CRC for Greenhouse Accounting and the Plant Industries Committee of SCARM. Craig has considerable professional experience in Australia, New Zealand, Canada, Sweden, USA, Argentina, Indonesia, Thailand, Ethiopia and the United Kingdom.

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Dr Roslyn Prinsley is currently General Manager at the Research at the Rural Industries Research and Development Corporation (RIRDC). Roslyn was previously the Corporation's Manager for Corporate Strategy. She is committed to the development of a sustainable and profitable agricultural sector and is furthering this ambition through her work in innovation in the sector - particularly in the fields of farm forestry, new communications systems, and other new industry development. Roslyn manages the Future Agricultural Systems Area, Agroforestry and Farm Forestry, Human Capital, Information Systems and Communications and Tea Tree Oil programs at RIRDC. Roslyn is currently a member of the Rural Women's Advisory Group to the Secretary of AFFA. She is also the Chairman of the Biomass Taskforce, member of the ATTIA / RIRDC Tea Tree Oil Research Advisory Committee, on the National Steering Committee for the AFFA Farm Forestry Program; Project Group Deputy of the IUFRO¹⁷ Agroforestry Project Group and on the Steering Committee for the review of the National Agricultural and Horticultural Training Packages. She has also published over 60 books and reports relating to agroforestry and innovation in agriculture.

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Mr Digby Race has been a Research Fellow (Farm Forestry) at ANU Forestry since January 1998. His primary research focus is upon analysing the socio-economic outcomes of farm forestry development for regional Australia, and he works as a partner of the CRC for Sustainable Production Forestry. In addition, he has current research contracts with the Commonwealth's Agriculture, Fisheries & Forestry – Australia (AFFA), Greening Australia Ltd., and the United Nation's Food & Agriculture Organisation (FAO). Digby was earlier employed as a Research Officer (Farm Forestry) at The Johnstone Centre – Charles Sturt

University (Albury, NSW) (1995-'97), and the Department of Agriculture (Victoria) (1991-'94) as an Agroforestry Development Officer.

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Professor Roy Rickson is Professor at the Australian School of Environmental Studies, Standing Deputy to the Dean, Faculty of Environmental Sciences, Griffith University, Nathan, Qld. His professional and research interests include: Sociology of Natural Resources, Community Sociology, Sociology of Agriculture, Organizational Analysis, and Interdisciplinary Analyses. In the context of these broader interests, his research has been on how production and conservation activities and structures might be integrated on the farm and in the factory and community. Studies include research on farmer responses to land and water degradation on their farms and in their communities, a comparative and organizational analyses of transnational agribusiness corporations and transnational cement corporations (currently the Holderbank Group of Companies, the world's largest cement corporation). The research focuses on corporate relationships with rural and urban communities and how these relationships affect local decisions about development, environmental quality and resource conservation. Complementary research and teaching interests are community development and change affecting land use and other natural resource issues, and social assessment of development. Roy's research and writing in social assessment concentrates on the local social and environmental consequences of national, international and, increasingly, global production and planning structures. This work has discussed the basis of local community autonomy in large-scale corporate frameworks, ability of local communities to influence decision-making in that framework and local power and influence structures. Research and writing on interdisciplinary analyses centres on establishing and managing interdisciplinary relationships in university teaching and research.

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Ms Jacki Schirmer is a PhD student with ANU Forestry and the CRC for Sustainable Production Forestry. Her research interests include the socio-economics of farm forestry, with particular reference to the decision making processes landholders undertake to decide whether or not to enter into farm forestry. Other recent work includes a nationwide survey on the economic costs of revegetation by community organisations in Australia. Her current work focuses on natural resource conflicts surrounding both afforestation of cleared land and the use of forested land.

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Mr Tim Tabart is a Masters student from the School of Agricultural Science at the University of Tasmania. His research is an evaluation of a collaborative regional development process currently underway in the Derwent Valley region of Tasmania. This research is supported by the CRC for Sustainable Production Forestry.

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Mr Philip Townsend works with the Plantations and Farm Forestry Section – Forest Industries Branch, for the Commonwealth's Department of Agriculture, Fisheries and Forestry Australia (AFFA). He is also completing a PhD with ANU Forestry.

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Colloquium Program

Socio-Economic Research to Support Successful Farm Forestry

with support by the CRC for Sustainable Production Forestry and
the Joint Venture Agroforestry Program

Monday 28th February 2000

ANU Campus, Canberra

8.50 Welcome and overview of colloquium

Prof. Peter Kanowski (ANU Forestry)

Session 1: The Context for Farm Forestry in Regional Australia

Chair: Dr Marlène Buchy (ANU Forestry) Synthesiser: Jason Alexandra (LWRRDC)

9.00 Dr Hans Drielsma (Forestry Tasmania & CRC SPF Board) *'CRC and partners: A view of successful farm forestry'*

9.30 Assoc. Prof. Roy Rickson (Griffith Uni & CRC SPF) *'Forestry and regional Australia: Changes for the good?'*

10.00 Dr Neil Barr (DNRE Victoria) *'Farming communities and change: What can we expect from farm forestry?'*

10.30 Morning tea

Session 2: Workable Solutions #1 – Research by the CRC and Partners

Chair: Dr Roslyn Prinsley (RIRDC & JVAP) Synthesiser: Dr Chris Beadle (CSIRO & CRC SPF)

11.00 Digby Race (ANU Forestry & CRC SPF) *'Strategies for improving landholders' response to farm forestry development'*

11.20 Amabel Fulton (UniTas & CRC SPF) *'Understanding landholders decision-making processes'*

11.40 Dr Sarah Jennings (UniTas & CRC SPF) *'Economic modelling to gauge forestry's regional contributions'*

12.00 Stephen Manson (North Tamar Tree Farms & CRC SPF) *'Refining North's approach to farm forestry development'*

Introduction to Research Posters

12.20 Dr John Field (ANU Forestry)

12.30 – 2.00 Lunch and review research posters

Session 3: Workable Solutions #2 – Additional Farm Forestry Research

Chair: Simon Greenaway (GA) Synthesiser: Graham Brooks (AFFA FFP)

2.00 Dr Jürgen Bauhus (ANU Forestry) *'Private native forests: The sleeping giant?'*

2.20 Tim Tabart (UniTas) *'Landholder perceptions of farm forestry in north-east Tasmania'*

2.40 Amanda Ozolins & Dr Cris Brack (ANU Forestry) *'Impacts of isolated trees on farming: What's the difference?'*

3.00 Christina O'Grady & Dr John Field (ANU Forestry) *'Local government and farm forestry: Changing views'*

3.20 Afternoon tea

Session 4: Synopsis and Future Directions

Chair: Prof. Peter Kanowski

3.45 Jason Alexandra *'Synthesis of Session 1' / Discussion*

4.00 Dr Chris Beadle *'Synthesis of Session 2' / Discussion*

4.15 Graham Brooks *'Synthesis of Session 3' / Discussion*

4.30 Prof. Craig Pearson (BRS) *'Maximising the outcomes from socio-economic research to benefit farm forestry'*

4.55 Close – Prof. Peter Kanowski

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RSVP for catering by 18 Feb 2000

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