



Socio-Economic Impacts of Farm Forestry

**A report for the RIRDC/LWRRDC/FWPRDC
Joint Venture Agroforestry Program**

by Matthew Tonts, Colin Campbell and Alan Black

May 2001

RIRDC Publication No 01/45
RIRDC Project No. ECU-8A

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ISBN 0 642 58267 X
ISSN 1440-6845

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Published in May 2001
Printed on environmentally friendly paper Canprint

Foreword

The rapid expansion of tree plantations on cleared agricultural land has contributed to some community anxieties about the social and economic impacts that are associated with the change in land use.

This report provides an assessment of the social and economic implications of farm plantation forestry. It is based on detailed case studies within the south-west of Western Australia and the Green Triangle region of Victoria and South Australia, together with a more general review of the relevant literature. The conclusions and recommendations provide a strategy for ensuring that rural areas are able to minimise the negative impacts and maximise the positive benefits of farm plantation forestry.

This project was funded by three R&D Corporations — RIRDC, L&WA and FWPRDC in relation to their Joint Venture Agroforestry Program. These Corporations are funded principally by the Federal Government.

This report, an addition to RIRDC's diverse range of over 600 research publications, forms part of our Agroforestry and Farm Forestry R&D program, which aims to integrate sustainable and productive agroforestry within Australian farming systems.

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Acknowledgments

The authors would like to acknowledge the Regional Plantation Committee representatives, Leonie Offer, Julia Levinson and Diana Lloyd for their role in providing initial advice on selection of case study communities and providing contacts for some of the initial interviews. Debbie Hagger from the University of Adelaide also provided valuable research assistance in South Australia.

We would also like to thank the local government representatives, timber industry representatives, business owners, State government personnel and, of course, all of the local residents who participated in interviews and provided us with a range of insights into the issues and impacts associated with the expansion of forestry on cleared agricultural land in their communities.

The views, conclusions and recommendations contained in this report are those of the authors and do not necessarily reflect the views, conclusions and recommendations of all of the stakeholders consulted during the course of the study.

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Executive Summary

In this report, the term ‘farm plantation forestry’ refers to the relatively large-scale planting of trees on land that was formerly cleared for agriculture. This frequently involves whole farms being planted to trees. The term ‘integrated farm forestry’ refers to the incorporation of trees into farming systems so as to complement conventional agricultural enterprises at the individual property level.

Over recent years, there has been a rapid expansion of extensive farm plantation forestry in a number of high rainfall regions in Australia. In some areas, this has contributed to concerns that the expansion of whole farm plantations is having negative impacts on demographic structures, local and regional economies, employment, and services and infrastructure. On the other hand, there are claims that timber plantations can deliver significant environmental and economic benefits to rural Australia. This report presents the findings of a study into the socio-economic implications of farm forestry for rural regions and communities. Based on these findings, the report recommends strategies to maximise socio-economic benefits and minimise any negative socio-economic impacts of farm plantation forestry in rural communities.

Following an extensive review of the literature on the social and economic implications of farm forestry, two regions that have experienced a rapid recent expansion of farm plantation forestry were chosen as case studies. The regions selected were the south-west of Western Australia and the Green Triangle region of South Australia and Victoria. Within these regions, four local government areas were chosen for a detailed analysis of the socio-economic impacts of farm plantation forestry. These local government areas were Boyup Brook (WA), Bridgetown-Greenbushes (WA), Wattle Range (SA), and West Wimmera (Vic). The literature review and the case studies provide insights into the local and regional impacts of farm plantation forestry on: economic and employment activity; population and community structure; services and infrastructure; land values; and land use planning. The report also examines the impacts attributable to various government and private farm forestry schemes, and makes a comparison between farm plantation forestry and other strategies for structural adjustment at the farm and regional levels.

The following are key conclusions and recommendations from the study:

Impact on the economy and employment

- At a broad regional level, farm plantation forestry has the capacity to offer important economic and employment benefits associated with servicing the industry and, in the longer term, downstream processing activities.
- While the regional impacts of farm plantation forestry can be positive, they can also mask negative economic and employment impacts at more local levels. The findings of this project, and those of a number of other studies, indicate that the economic and employment benefits associated with farm plantation forestry are likely to be concentrated in larger regional centres. In smaller rural communities, the emergence of plantation forestry on cleared agricultural land is contributing to significant restructuring in local economies.
- Volatile commodity prices, falling farm incomes, farm amalgamation, and farm family outmigration have been affecting some rural communities for at least four decades. The emergence of farm plantation forestry might well be regarded as a symptom of broader processes of restructuring in Australian agriculture. Nevertheless, it is evident that the rapid expansion of farm plantation forestry is accelerating processes of rural economic restructuring. Consequently, some businesses and residents in small towns are finding it difficult to adjust to both the nature and the pace of change.
- In some localities, the potential negative social and economic impacts of farm plantation forestry appear to be mitigated (or at least obscured) by the diversity of the local economy. Conversely,

those communities with a narrow economic base and few alternative prospects for diversification are particularly susceptible to negative impacts associated with land use change.

- In addition to the regional and community level impacts, farm plantation forestry has important economic implications at the individual farm level. By purchasing or leasing land, the plantation industry offers some farmers a means of exiting agriculture in a stronger financial position than might otherwise be the case.

Recommendation 1

Federal and State government regional development agencies should identify communities experiencing, or likely to experience, an expansion of farm plantation forestry. These agencies, together with local governments, should play a proactive role in assisting communities to engage in long-term planning and development aimed at maximising the benefits and minimising the negative impacts of the associated rural adjustment process. This should include investigating the feasibility of developing downstream processing ventures in the vicinity of these farm plantations.

Impact on population and community structure

- Farm plantation forestry, with the associated outmigration of farm families, appears to have accelerated an ongoing process of population decline in some small rural centres. The implications of depopulation for the remaining residents are often profound, and can contribute to the collapse of social networks and institutions, to a sense of isolation, and to a feeling that a community is ‘dying’. However, it is important to recognise that, in some areas, processes of population decline are being offset by immigration associated with the expansion of other industries. At a more regional level, farm plantation forestry can contribute to an increase, or at least a stabilisation, in population levels, although growth is likely to be concentrated in larger regional centres.

Recommendation 2

Following the release of data from the 2001 Census of Population and Housing, there is a need for ongoing research into the impacts of farm plantation forestry on demographic, economic and employment structures.

Impact on services and infrastructure

- One of the concerns that was expressed by stakeholders in the two case study regions was that depopulation occurring as a result of farm plantation forestry might contribute to the withdrawal of services and infrastructure in some small rural communities. While there was little evidence that farm plantation forestry had hitherto made a direct contribution to service withdrawal, there is little doubt that, if plantation expansion and farm family outmigration continue at the current rate, then the provision of services in some rural communities is likely to become difficult to sustain.
- A common concern raised by communities is the impact of farm plantation forestry on local volunteer fire services. According to a number of interviewees, the loss of volunteers as a result of depopulation has meant that some of these services are now unable to cope with a serious fire. Residents often doubted the commitment of plantation companies to the maintenance of local volunteer fire services. On the other hand, several plantation companies maintained that they were actively supporting fire prevention services through provision of fire fighting equipment, and that well managed plantations may reduce fire risks when compared to traditional agricultural activities.
- A particularly important issue identified in both this study and other research is the impact of farm plantation forestry on local roads. Transporting harvested logs has the potential to cause serious damage to underdeveloped public roads. Maintaining and upgrading local roads is a responsibility of local governments, which already devote a significant proportion of their budgets to this activity. Ensuring that local roads are able to cope with log haulage during the harvesting of plantations may require a considerable increase in spending on transport infrastructure.

Recommendation 3

State governments should facilitate the development of Cooperative Fire Management Strategies between local governments, farmers, the plantation industry, and local fire services. These strategies should cover fire prevention and detection, equipment needs and provision, fire response planning and management, and training.

Impact on land values

- The findings of this research indicate that the plantation industry has made a direct contribution to rising land values in areas where timber companies are purchasing properties. At the individual farm level, increasing land values associated with the development of farm plantation forestry can have various positive and negative impacts. For those farm families who wish to leave agriculture, the expansion of farm plantation forestry has helped to ensure that there is a likely buyer for the property. It has also provided these farmers with a higher return for their land than they would have otherwise received. This additional return has the capacity to improve the financial wellbeing and security of departing farm families. However, the rising cost of land can make it difficult for remaining farmers to enlarge their properties in the pursuit of structural adjustment.

Implications for land use planning and local governance

- Local governments have a key role to play in implementing planning regulations to minimise negative impacts associated with farm plantation forestry. There is general recognition by all stakeholders that there needs to be a more consistent approach to planning and regulation of farm plantation forestry across all tiers of government.

Recommendation 4

State government agencies responsible for land use planning, together with regional development organisations, local governments and regional plantation committees, should collaboratively establish and maintain regional databases that draw on their respective resources and expertise to provide information on:

- the expansion of farm plantation forestry on cleared agricultural land;
- the socio-economic trends attributable to farm plantation forestry;
- the environmental/landscape changes attributable to farm plantation forestry;
- trends and future developments in the plantation industry;
- likely impacts of various future development scenarios.

Such resources would provide a more thorough basis for land use planning and other policy decisions.

Recommendation 5

Local governments, timber industry representatives, and State government agencies responsible for land use planning should devise a set of standardised planning provisions that can be applied to farm plantation forestry consistently across local government areas. These regulations should be tied to existing Codes of Practice for the plantation industry and should also be incorporated into local government planning schemes.

Other social and economic issues

- In both the Green Triangle and the south-west of Western Australia, there is widespread debate about the environmental impacts of farm plantation forestry. Some of the positive impacts identified include land degradation control through effects on reducing the rise of saline water tables and reduced soil erosion through reduction of wind and surface water runoff. Offsetting greenhouse gas emissions and reduced reliance on native forests for logging were also cited as environmental positives. On the other hand, concerns were raised about control of feral animals, impacts of reduced groundwater table recharge on irrigation entitlements, and impacts of sprays on

adjoining agricultural enterprises. Accordingly, there is a need for close monitoring of the impacts of farm plantation forestry industry on the environment.

- One of the most common criticisms of the farm plantation forestry industry is that it is dominated by ‘faceless corporations’ with little or no commitment to the rural areas in which they operate. A number of plantation companies stated that they are becoming more proactive in addressing community concerns through public seminars and workshops and provision of community liaison officers. Many of the concerns raised in this report could be allayed by closer liaison between plantation companies and the communities in which they operate.

Recommendation 6

Relevant Federal and State government agencies should conduct ongoing research into the environmental impacts of farm forestry plantations.

Recommendation 7

Regional Plantation Committees should establish local working groups consisting of timber industry representatives and farmers in areas where extensive planting is occurring or is likely to occur. These working groups should develop locally specific guidelines/protocols for:

- weed and pest control;
- fire prevention and control;
- catchment management and environmental rehabilitation;
- other issues affecting farm management and neighbour relations.

Recommendation 8

In order to reduce negative attitudes and opposition to farm forestry plantations, timber companies should foster closer economic and social links with rural communities. These might include basing their operations in small communities, patronising local businesses and services, employing local residents, preserving and renting out farmhouses, and sponsoring community events.

Recommendation 9

Regional Plantation Committees should organise regular community workshops that bring together representatives from the timber industry, relevant government agencies, and local farmers, business people and other residents. These workshops should aim to:

- outline trends and proposed developments in the timber industry;
- outline local economic and employment opportunities in the timber industry;
- address concerns about any social, economic and environmental impacts;
- foster positive relationships between the timber industry and local residents.

Impacts attributable to various government and private schemes

- The rapid expansion of whole farm plantations, driven by the emergence of afforestation investment schemes, has contributed to many of the community anxieties outlined in this report. By contrast, integrated farm forestry, whether financed by the individual farmer or as a joint venture with a government agency or private organisation, is widely regarded as providing a range of environmental, economic and social benefits at the farm, local and regional levels.

Farm plantation forestry versus other strategies for structural adjustment

- This research has indicated that farm plantation forestry can be an important component of rural structural adjustment. By changing the nature of local economic and social structures, farm plantation forestry can contribute to both positive and negative aspects of structural adjustment at the local and regional levels. However, it is also important to note that farm plantation forestry is

as much a symptom of structural adjustment as a cause of it. Arguably, if farming were more profitable, fewer farmers would be willing to leave the industry and sell their properties to plantation companies. Farm plantation forestry appears to be accelerating processes of structural adjustment. Farm plantation forestry also appears to have the greatest negative outcomes at a local community level in those areas that are already suffering adverse consequences of rural decline.

Implications for medium to low rainfall areas

- Much of literature and data analysed in this study relates to farm plantation forestry in high rainfall areas. Where integrated farm forestry is adopted in medium to low rainfall areas, many of the negative socio-economic impacts that have been identified in this study will be largely avoided. Nevertheless, commercial tree planting could experience significant growth in medium to low rainfall areas if market prospects for particular species appear to be favourable. The report outlines some of the main prospects currently being explored, such as the planting of maritime pine or similar species, sandalwood, oil mallees, and high quality timber species, as well as the potential for the development of various markets for environmental services associated with trees, such as the sequestration of carbon, the conservation of biodiversity, the purification of water, and the maintenance of hydrological balances that prevent dryland salinity. If any of these prospects were to make whole farm plantations economically viable in particular medium to low rainfall areas, these areas could experience economic and social impacts similar to those that have occurred in some high rainfall regions. It is important, therefore, to keep monitoring these prospects and, where appropriate, to learn from experience already gained in high rainfall areas.

Recommendation 10

State and Federal governments should continue to promote joint ventures between farmers and government business enterprises/private enterprise to establish integrated farm forestry in medium to low rainfall areas.

Recommendation 11

Local governments, regional development organisations, timber industry representatives, and relevant State and Federal government agencies should begin to consider the long-term potential for downstream processing industries in medium to low rainfall areas. This should include:

- **an analysis of potential industries and their infrastructure and service needs;**
- **the possibility of providing inducements for processing firms willing to establish themselves in country towns;**
- **avenues of government and other funding for infrastructure and development inducements.**

Recommendation 12

Regional Plantation Committees should be established in those medium to low rainfall areas that are experiencing, or likely to experience, an increase in commercial farm forestry. The Committees should play a central role in:

- **monitoring the development of the industry;**
- **providing a source of information to rural communities and other stakeholders about the nature and development of the industry;**
- **monitoring national and international trends in commercial forestry.**

Recommendation 13

As farm forestry develops in medium to low rainfall areas there should be ongoing monitoring of the social and economic impacts of the industry.

A suggested communication strategy for the findings of this study is contained in Chapter 6.

1. Introduction

This report deals with the social and economic implications of farm plantation forestry. For the purposes of this study, farm plantation forestry refers to the relatively large-scale planting of trees on land that was formerly cleared for agriculture. Thus, farm plantation forestry incorporates: (i) large-scale plantings by individual farmers; (ii) joint ventures between farmers and companies and/or governments; (iii) plantations that have been established on cleared agricultural land and are owned and managed by companies. The report considers the implications of farm plantation forestry on economic and employment activity, population, services and infrastructure, land values, local governance, and a number of other social and economic issues. It also provides a series of recommendations that seek to minimise the negative socio-economic impacts, and to maximise positive impacts, in areas yet to experience a rapid expansion of farm plantation forestry. This chapter outlines the background to the project, the objectives of the study, and the research methods. It concludes by providing an overview of the remainder of the report.

1.1 Background to the Project

Farm plantation forestry is emerging as a significant alternative land use in a number of regions across Australia. At the end of March 1996, established plantings of trees on Australian farms occupied a total of approximately 166,000 hectares. Of the 166,000 hectares, 51 per cent were in Western Australia and 26 per cent were in Victoria. Taking Australia as a whole, one third of the area devoted to such plantings was for timber or pulp production (Australian Bureau of Statistics 1998, p. 24). Since then, there has been a rapid expansion of tree plantings on cleared agricultural land, especially in the south-west of Western Australia, in parts of Tasmania, and in the Green Triangle region of Victoria and South Australia (Burns *et al.* 1999; Wood and Allison 2000b). Indeed, there is evidence to suggest that the total area of trees planted on agricultural land in Australia now exceeds 252,000 hectares (Joint Venture Agroforestry Program 2000a). Much of this growth is attributable to industrial scale plantations, rather than plantings that are integrated with other farm enterprises.

The rapid expansion of plantations has given rise to growing concerns about the wider social and economic implications of such land use (see Spencer and Jellinek 1995; Houston 2000b; Kelly and Lymon 2000; Schirmer 2000). For example, some opponents of plantations argue that they result in a reduction of farm families and employees, a contraction of local economies, the withdrawal of services, depopulation, and a decrease in levels of social interaction. There are also concerns that 'good farming land is going to trees'. On the other hand, there is some anecdotal evidence to suggest that farm plantation forestry can contribute to the emergence of alternative local industries based on forest products and services, and that the feared negative demographic, economic and social impacts will not necessarily eventuate. Indeed, both in the short-term and the long-term, the economic and social effects might well be positive.

This project sets out to provide an objective assessment of the socio-economic impacts of the expansion of forestry on cleared agricultural land. The research draws on two case study regions (the south-west of Western Australia and Green Triangle region of Victoria and South Australia) to examine the key issues at the regional and local levels. An important element of these case studies was to compare the perceived socio-economic impacts of farm plantation forestry with the actual (measurable/objective) impacts. In addition, the case studies compare the impacts of farm plantation forestry against other strategies for structural adjustment at the farm and regional levels. By conducting a rigorous assessment of the socio-economic impacts of farm forestry, a series of recommendations have been developed to inform the expansion of the industry elsewhere in Australia, including the more marginal medium and low rainfall areas.

1.2 Objectives of the Study

The project has six key objectives:

1. Review available literature (including grey literature) concerning the social and economic impacts of farm forestry in Australia at the following three levels:
 - Individual property level
 - Regionally
 - Nationally.
2. Determine through case studies in two regions what the socio-economic impacts of extensive farm forestry are at the farm and regional levels. This will specify the perceived impacts versus objectively determined impacts. It will also include impacts on population and community structure, land price, services and social amenities, employment and infrastructure.
3. Within the case studies, determine the socio-economic impacts which can be attributed to various government and private schemes.
4. Compare the socio-economic impacts of farm forestry with other strategies for structural adjustment at the farm and regional levels.
5. Summarise the positive and negative socio-economic impacts of farm forestry at national, regional and local levels based upon 1-4 above.
6. Provide principles and guidelines that can be used by stakeholders to minimise negative socio-economic impacts and to maximise positive socio-economic impacts for future investment into farm forestry in low to medium rainfall areas. This will include a communication strategy for ensuring that these recommendations are used by stakeholders where farm forestry is implemented in new developments. Potential differences between high rainfall areas and medium to low rainfall areas will be clearly identified in developing these recommendations.

1.3 Research Methods

This section describes the research methods used in this project. These methods included a review of the literature, an analysis of official statistics, semi-structured interviews with key stakeholders, and a telephone survey of residents in the case study regions.

The first stage of this research involved a detailed review of academic papers, published and unpublished reports, policy documents, and newspaper/magazine articles that were concerned with issues relating to forestry plantations on cleared agricultural land. Particular attention was paid to the impacts of forestry activities on individual properties, local economic activity, employment, demographic structure, land values, planning and governance, and regional development. The literature review also considered the national socio-economic implications of farm plantation forestry. While the review concentrated on existing Australian literature, it also examined relevant material from overseas. This included literature from New Zealand, Western Europe, and North and South America.

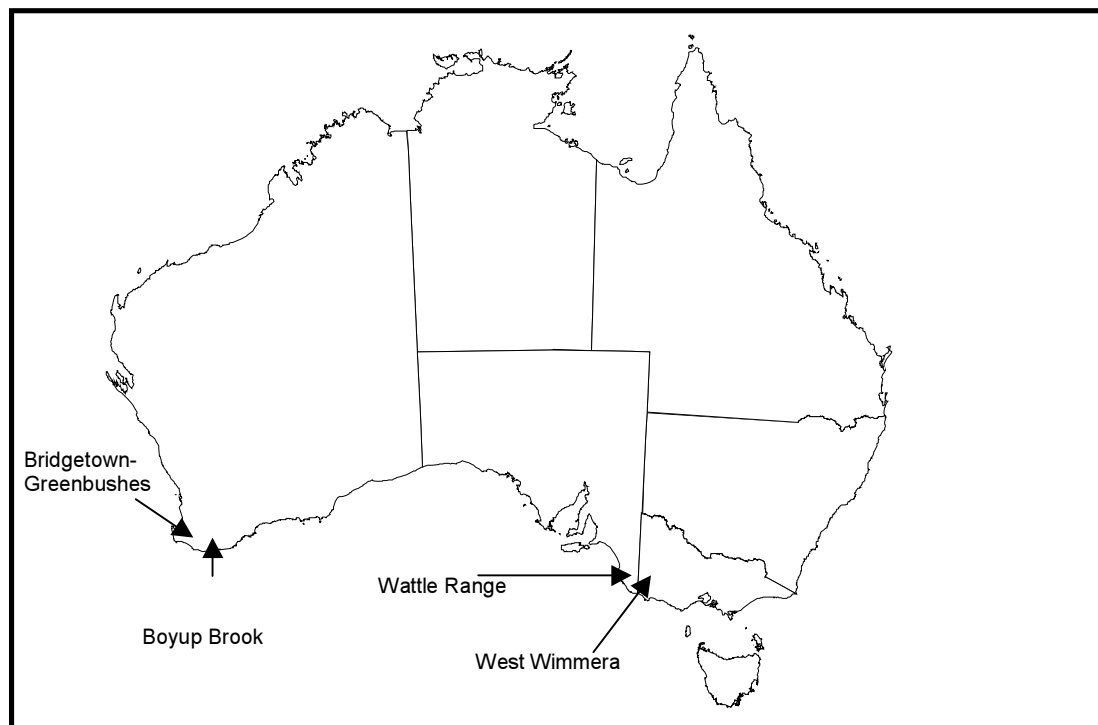
Following the review of the literature, two case study regions were selected for a more detailed empirical examination of the socio-economic implications of farm plantation forestry. The rapid expansion of forestry on cleared agricultural land in the south-west of Western Australia and the Green Triangle region of South Australia and Victoria made these regions suitable locations within which to conduct case studies. Preliminary investigations also indicated that, within these regions, a number of local government areas (LGAs) might be worthy of more detailed analysis. These included Bridgetown-Greenbushes, Boyup Brook, Albany, Denmark and Plantagenet in Western Australia, and Glenelg, Southern Grampians, Moyne, West Wimmera and Wattle Range in the Green Triangle region. Following consultations with the Regional Plantation Committee representatives in Western Australia and South Australia/Victoria, the LGAs chosen for the case studies were Bridgetown-Greenbushes and Boyup Brook in Western Australia, Wattle Range in South Australia, and West

Wimmera in Victoria (see Figure 1). These local government areas were selected for several reasons. Firstly, they have all experienced a rapid recent increase in plantation forestry on cleared agricultural land. Secondly, each of these areas offers a different economic, demographic and social context in which to examine the key issues and, thirdly, these LGAs have not been the subject of previous research on the social and economic impacts of farm plantation forestry.

Detailed economic, demographic and social profiles of these case study localities were developed using a range of published and unpublished data. These sources included:

- Australian Bureau of Statistics Census of Population and Housing reports.
- Australian Bureau of Statistics Agricultural Census reports.
- The Department of Employment, Workplace Relations and Small Business series *Small Area Labour Markets*.
- The Australian Taxation Office annual publication *Taxation Statistics*.
- Local government annual reports.
- Land values data from the Valuer General's Office in Western Australia, the Department for Environment and Heritage in South Australia, and the Department of Natural Resources and Environment in Victoria.
- Data on tree plantings from local governments and the Regional Plantation Committees.

Figure 1 **The Location of the Case Study Areas**



These data sources were used to examine the economic, social and demographic changes that have occurred within the case study localities over the previous decade or so. Following an analysis of these changes, semi-structured interviews were conducted with 25 major stakeholders in the case study regions during July and August 2000. This included 13 people in Western Australia and 12 people in the Green Triangle region. These stakeholders included local councillors, local government officials, timber company representatives, local business owners/managers, farmers, regional development practitioners, plantation committee representatives, and staff from relevant State government agencies, such as the Western Australian Ministry of Planning and Forests SA. Interviews lasted between 40 minutes and two hours, and attempted to elicit information on: the economic, social and demographic impacts of farm plantation forestry; changing land values; planning issues; local government issues; regional development issues; and community anxieties about changing land use.

Fieldwork in the south-west of Western Australia and the Green Triangle region also presented opportunities to engage in numerous informal conversations with local residents on issues associated with planting trees on agricultural land. In addition to helping to identify some of the impacts of farm plantation forestry, these conversations provided invaluable insights into the attitudes of local residents towards the industry. The participants in these 'informal interviews' included: a former shearer who is now planting trees for a timber company; a number of farmers; a farm labourer; a publican; and an employee of a timber mill.

The semi-structured and informal interviews were followed by a telephone survey of 80 residents (35 males and 45 females) in the two case study regions. Interviewees were selected at random from local telephone directories until a total of 20 interviews had been achieved in each of the case study communities. The interviews lasted for approximately 20 minutes and sought information on the following:

- Attitudes towards and/or experience with forestry on agricultural land.
- Actual experience and/or perception of employment impacts associated with forestry on agricultural land.
- Actual experience and/or perception of the impacts of farm plantation forestry on population levels in communities.
- Actual experience and/or perception of land value impacts of forestry on agricultural land.
- Actual experience and/or perception of the impacts of farm plantation forestry on community structure.
- Actual experience and/or perception of infrastructure impacts.

A copy of the telephone questionnaire is included as an Appendix to this report.

1.4 Structure of the Report

The remainder of this report is structured as follows:

Chapter Two provides a review of the literature on the social and economic implications of farm plantation forestry. It considers these impacts at the farm, local/regional and national levels. Particular attention is given to issues such as the different impacts of integrated and whole-farm plantations, local and regional economic and employment outcomes, the implications for infrastructure and services, the land economy, land use planning and local governance, and the national socio-economic implications of farm plantation forestry.

Chapters Three and Four provide detailed case studies of the social and economic implications of farm plantation forestry in the south-west of Western Australia and the Green Triangle region of South Australia and Victoria. These chapters examine the impacts of farm plantation forestry on economic activity, employment, population, infrastructure and services, and a range of other social and economic issues in the case study regions. These chapters also determine the impacts that can be

attributed to various government and private schemes, and compare the implications of farm plantation forestry with other strategies for structural adjustment at the farm and regional levels.

Chapter Five presents a summary of the case studies, together with a series of recommendations that can be used by stakeholders to maximise the positive impacts and minimise the negative impacts of future farm plantation forestry investment in low to medium rainfall areas.

Chapter Six provides a communication strategy for the findings of this report.

2. The Socio-Economic Impacts of Farm Forestry: A Review

This chapter provides a review of recent literature on the socio-economic impacts of farm forestry. It draws primarily on Australian sources. Where appropriate, reference is also made to material published in Europe, New Zealand and North and South America. The Chapter begins by providing an overview of the socio-economic impacts of farm forestry at the individual property level. Particular attention is paid to issues such as farm profitability, land degradation and farm business structure. The Chapter then goes on to examine the regional and local level implications of farm plantation forestry. These sections review the impacts on local and regional economies, employment structures, land use planning and local governance. The Chapter concludes by examining the socio-economic impacts of farm forestry at the national level.

2.1 Impacts at the Individual Farm Level

The economic and social difficulties that have been experienced by many Australian farmers over the past two decades are now well documented. Declining returns for traditional commodities (Taylor 1996), rising farm input costs (Smailes 1996), a reduction in government support for agriculture (Higgins 1999), declining levels of socio-economic well-being (Smailes 1997), and severe levels of environmental degradation (Vanclay and Lawrence 1995) are just some of the problems facing Australian producers. In response to these difficulties, a growing number of farmers have begun to diversify their operations by adopting alternative farm enterprises. These enterprises often have the capacity to provide not only direct economic benefits, but also positive environmental and social outcomes. In many of Australia's higher rainfall regions, farmers have turned to timber production as a form of alternative farm enterprise. To some extent, the social and economic impacts of planting trees on farms depends on the nature of the plantations. For example, farmers can opt to integrate trees with existing farm enterprises, or can choose to devote their entire property (or large parts of it) to tree plantations.

2.1.1 Impacts of Integrated Plantings

One of the most significant benefits of integrating trees into farms is the opportunity to improve farm incomes. There is even evidence to suggest that, in some cases, growing trees can be more profitable than traditional crop and livestock enterprises (Centre for International Economics *et al.* 1996). Planting trees can also have significant indirect economic benefits for farmers. For example, farm forestry has the potential to provide shelter for crops and livestock, thereby improving the productivity and profitability of these land uses (Robins *et al.* 1996). Trees also play an important role in protecting the natural resource base for agriculture by preventing or reversing land degradation (McDonald 1993). By addressing problems such as waterlogging, soil salinisation, and water and wind erosion, farm forestry can help to maintain or improve the productive capacity of agricultural land (Conacher and Conacher 1995). Indeed, a recent study by Campbell White & Associates and Black (1999) suggests that integrating trees into existing agricultural enterprises can increase farm incomes by as much as 25 per cent.

There is, however, a need for some caution when assessing the financial impacts of trees on individual farms. Investing in trees needs to be viewed as a long-term proposition, with harvests unlikely within 10 years of initial establishment (Campbell White & Associates and Black 1999). Other considerations for individual farmers include the significant initial capital investment required to establish plantations, and the impact of changing land use on annual cash flow from other sources, such as crops and livestock (Hall 1990; AACM International *et al.* 1996a). As Curtis and Race (1997) have pointed out, some of these difficulties can be overcome through joint ventures between farmers and commercial timber producers. Such arrangements help to reduce establishment costs and

commercial risk, while at the same time maintaining part ownership for both parties. In addition, joint ventures that provide annuity payments to the landholder can reduce the short-term income loss associated with diverting land use away from crop and livestock production (AACM International *et al.* 1996a).

If integrated farm forestry is able to deliver improved incomes for individual farmers, then there are likely to be a number of important social benefits for farm families. It is widely recognised that low farm incomes and financial uncertainty contribute to problems such as poverty, illness, stress, depression, domestic violence, and reduced educational opportunities for farm children (Gray *et al.* 1993; Lawrence 1995; Cheers 1998). If farm forestry can help to increase farm incomes and improve financial certainty, a concomitant outcome might be a reduction in these problems. In addition, higher incomes can enable farmers to act on lifestyle preferences that might otherwise not be available. For example, increasing incomes might provide opportunities for farm families to participate more readily in local community organisations. The outcome is likely to be positive socio-economic benefits for both individual farm families and the wider community.

Alongside the socio-economic benefits that flow from an improved financial position, farm forestry has the capacity to provide other valuable social outcomes. For example, a recent study by Campbell White & Associates and Black (1999) found that farmer involvement in integrated farm forestry can have a positive impact on personal and family development, largely as a result of the sense of achievement associated with it. The study also noted that, having established plantations, some farmers increased their participation in various forestry and environmental organisations. This not only benefits the organisations involved, but has the capacity to provide farm families with important opportunities for social interaction. However, there is a danger that the pressure of maintaining such commitments can be considerable at a time when farmers are trying to manage a farm, plan for the future, and lead a fulfilling lifestyle. The pressure that this exerts can lead to a decrease in social welfare if commitments are not kept to a manageable level (Campbell White & Associates and Black 1999).

While there are numerous socio-economic benefits associated with the successful integration of farm forestry into existing agricultural enterprises, some consideration needs to be given to the implications of unsuccessful ventures. In cases where plantations were poorly planned, or established in unsuitable agro-ecological zones, there is a significant chance of failure (Farm Forestry Task Force 1995). Given the high cost of establishing farm forestry plantations, the financial and social impacts of failed ventures on farm families are likely to be considerable. Similarly, if the earnings from trees are less than those of pre-established enterprises, then there is likely to be a significant long-term financial cost (Campbell White & Associates and Black 1999). This has the potential to have a negative impact on social and economic well-being at the individual farm level. There is also a likelihood that failed ventures will have wider socio-economic implications. Unsuccessful schemes might have the potential to undermine local confidence in diversification projects in general and, more specifically, in farm forestry (Gasson 1988). This has the capacity to reduce the local economic, environmental and social benefits associated with farm forestry and/or other farm business diversification strategies.

2.1.2 Impacts of Whole Farm Plantations

While the majority of farmers integrate trees into existing farm enterprises, there are a growing number of instances where entire properties are being established as commercial plantations. Given the high cost of establishing such ventures, and the loss of annual income from crop and livestock activities, whole farm plantations tend to involve commercial timber companies leasing or, in many cases, purchasing entire farms (Curtis and Race 1997). The socio-economic impacts of these types of ventures at the individual farm level are diverse. For those farmers who lease out their property, the outcome is usually a regular income stream during the term of the lease (AACM International *et al.* 1996a). For farmers in industries with low and/or volatile commodity prices, this can provide an increase in both income and financial certainty. It also enables farm family members to seek work, where available, off the farm to further supplement income. For farmers who sell their properties, the

one-off payment, while often having significant taxation implications, provides the opportunity to relocate to new agricultural regions or to leave the industry altogether (AACM International *et al.* 1996b). That farmers view these lifestyle and income benefits as important was highlighted by research conducted in Finland, which indicated that farmers close to retirement age were often those most likely to sell or lease their properties to timber companies (Selby and Petajisto 1995). Some of the lifestyle benefits associated with selling or leasing out a farm include: the opportunity to live in a more desirable location; the opportunity to change career; increased leisure time; and greater involvement in community life.

It is also important to note that, for some families, there may be negative impacts associated with selling or leasing out a farm. For example, a number of studies have found that former farmers can have difficulties securing employment, either locally or elsewhere, following the temporary or permanent disposal of a farm (Epps 1993; Watson 1994; Garnett and Lewis 1999). There is also considerable evidence to suggest that some farmers can suffer grieving and anxiety following the sale or lease of a farm and the loss of a way of life (Rolley and Humphreys 1993). Thus, the psychological and social implications of leaving farming, either permanently or temporarily, might have significant impacts on the well-being of individuals, families and communities.

An important issue that has received little attention in the literature is the longer-term future of those farms that have been leased to timber companies. Once the timber has been harvested, and if the lease has expired, farmers will need to renegotiate contracts with plantation companies. If the company does not decide to renew the lease, and a new leasor cannot be found, the property owner may face a considerable financial burden. For example, if the owner decides to continue using the land for plantation forestry, the establishment and ongoing maintenance costs will be considerable. If the owner decides to return the land to crop and livestock production, then there will be significant costs associated with recapitalising the farm and returning the land to a condition suitable for this type of enterprise.

There are also concerns about the impact of whole farm plantations on neighbouring properties. For example, plantations can have a significant impact on water catchments, and can affect the capacity of neighbouring properties to meet their water needs (Watson *et al.* 1999; Madden *et al.* 2000). Research by Spencer and Jellinek (1995) also pointed to community concerns about the health impacts of pine plantations, particularly for people who suffer from hay fever, asthma and allergies. A recent study by Schirmer (2000) noted a number of other possible impacts of plantations on individual farm properties. Her research indicated that a number of Tasmanian farmers were concerned that paddocks adjoining plantations might be excessively shaded, thereby reducing crop and pasture growth on property boundaries. However, Schirmer also noted that the impacts of shading might be offset by the windbreak attributes of plantations, and that some tree companies were setting tree plantations back from farm boundaries. Schirmer's research also indicated that some farmers were concerned that plantations might result in an increase in pasture-grazing wildlife (e.g. wallabies and kangaroos), vermin animals (e.g. rabbits and foxes), and invasive weed species. A number of farmers and other rural residents in Tasmania were also concerned about the impacts of herbicides. Aerial spraying by tree companies was seen to have potential impacts on dairy and organic production by contaminating pasture and crops. It was also claimed that aerial spraying might contaminate domestic and farm water supplies as well as natural water courses. A number of studies have also highlighted farmer concerns about the likely fire risks associated with whole farm plantations (Keeves and Douglass 1983; Soutar and Wallis 1986; Kelly and Lymon 2000; Schirmer 2000; State Timber Regional Evaluation Strategy 2000), though the extent to which they present more of a risk than integrated plantings or crops and pasture is not clear.

2.2 Local and Regional Economic and Demographic Impacts

Integrated farm forestry is often seen as an important means of generating rural employment and arresting regional economic decline (see, for example, Farm Forestry Task Force 1995; AACM International *et al.* 1996b; Ministerial Council on Forestry, Fisheries and Aquaculture *et al.* 1997;

State Timber Regional Evaluation Strategy 2000). One of the apparent reasons for this is that a more diversified and profitable farming sector is likely to reduce the number of farmers leaving both the industry and their local communities. In those towns dependent on agriculture, a more viable farming sector means more vibrant local economies and stable demographic structures (Taylor 1996). It has also been suggested that more extensive farm plantation forestry can have a direct impact on local economic and employment structures. Lancefield Consultants (1995, p. 4) have estimated that about 75 people would need to be employed to establish, tend, harvest and transport timber for every 10,000 hectares of plantations. They go on to suggest that, if processing industries can be established locally, then the local employment requirements will be even higher. In the South Australian town of Millicent, for example, around 92 per cent of local manufacturing value was attributed to processing timber from nearby plantations (Industry Commission 1993). In the south-west of Western Australia, it has been estimated that Bluegum plantations have the potential to increase direct and indirect employment by 2,700 between 2001 and 2008 (State Timber Regional Evaluation Strategy 2000). The same study estimated that the Bluegum plantation industry would generate regional retail spending of around \$34 million per annum and around \$103 million of household income. The Bluegum industry was also expected to lead to population growth in the south-west of around 840 people per annum between 2001 and 2008.

While there have been numerous attempts to forecast the economic and demographic impacts of farm plantation forestry on regions and communities, very few studies have been based on detailed empirical research. One important exception is a recent study by Dwyer Leslie Pty Ltd and Powell (1995) in the town of Oberon, New South Wales. This study found that an increase in plantation forestry and timber processing had a substantial impact on employment and population growth within the district. The net outcomes of farm plantation forestry in Oberon appear to have been positive with: an increase in local economic activity; new residents migrating to the town due to improved employment prospects; off-farm employment opportunities for farm families; and population increases leading to improvements in health, educational and social services.

A number of studies conducted in New Zealand during the early 1980s lend some support to claims that farm plantation forestry can make a positive contribution to regional economic well-being. In Otago, for example, Aldwell and Whyte (1984) found that farm plantation forestry offered a higher intensity of rural employment than did more traditional agricultural enterprises. Indeed, when processing was included the ratio was found to be more than four to one in favour of farm plantation forestry. On its own, local timber processing accounted for seven times as much employment as that from local industries processing other farm commodities. Similar results were found in another New Zealand study by Farnsworth (1983). He established that, in Northland, forest plantations helped to arrest and reverse economic and demographic decline in a community traditionally dominated by pastoral farming. The forest industry also helped to create more diverse local communities, with higher percentages of young people and married couples residing in those towns with a combination of forest and farm industries. Nevertheless, there were a number of New Zealand communities that did express concerns about the impacts of plantations on employment, population and quality of life (Smith 1981a; 1981b; Smith and Wilson 1982).

While the overall impacts of plantation forestry in New Zealand during the 1970s appear to have been positive, there is evidence to suggest that the situation has changed dramatically since then. Afforestation in New Zealand was often undertaken with a high degree of government intervention in both planting and, to a lesser extent, processing (Roche and Le Heron 1993). Direct government employment in afforestation schemes made a substantial contribution to local populations and employment structures. However, New Zealand's program of economic reform in the 1980s led to a massive downsizing of government involvement in forest enterprises (Roche 1990). Harvesting rights in forests developed by the state were sold off to national and international companies who, in turn, rationalised employment in the pursuit of greater profits. The outcome has been the closure of timber mills, a dramatic reduction in employment in the forestry sector, and a subsequent process of economic, social and demographic restructuring in those communities dependent on forest industries (Roche 1990). Recent research indicates that a number of rural communities in New Zealand are

becoming increasingly concerned about the impacts of plantation forestry on employment, population, and land prices (Wall and Cocklin 1994; Cocklin and Wall 1997).

There is also evidence from other parts of the world suggesting that farm forestry does not always deliver positive regional and/or local economic and population outcomes. Research in Scotland by Mather and Murray (1987) found that, although forestry is more labour intensive than some traditional farming on a per hectare basis, much of the additional labour for harvesting and maintenance was provided by mobile gangs of workers, rather than local residents. The research concluded that, while the peaked nature of labour demand in forestry might favour such a pattern of employment, the benefits for local communities were, at best, marginal. In addition, Mather (1993a) has argued that, in the case of the United Kingdom, there is very little evidence to suggest that plantation forestry will contribute to population growth. Similarly in Chile, the expansion of forest plantations on former agricultural land has not been coupled with an increase in employment and, in many cases, has led to rural depopulation (Lara and Veblen 1993). Research in Australia has also pointed to growing concerns about the impact of plantation forestry on rural communities. Studies in Western Australia (Kelly and Lymon 2000; Ray 2000), Tasmania (Schirmer 2000), and Victoria (Institute for Land and Food Resources 2000) have highlighted community anxiety about the impacts on local economies, social networks and institutions, and population levels.

A further consideration in assessing the local and regional economic impacts of farm forestry in Australia is the labour intensity of competing land uses. In the case of Portugal, for example, some eucalypt plantations have been found to support lower employment densities than the olive groves and vineyards that they replaced (Kardell *et al.* 1986). Another issue is the time period between planting and harvesting, which can have significant regional and local economic and demographic impacts. In a study of the Snowdonia region in Wales, Johnson and Price (1987) found that the break in employment between planting and harvesting meant that large-scale plantings were unable to provide a stable base on which to maintain the rural population.

Clearly one of the critical factors influencing the economic and demographic impacts of farm forestry is the location of processing industries. Research from Australia and overseas indicates that, in those communities where high level processing occurs locally, there are likely to be significant economic and demographic benefits (Farnsworth 1983; Aldwell and Whyte 1984; Dwyer Leslie Pty. Ltd. and Powell 1995; State Timber Regional Evaluation Strategy 2000). This is despite the observation of Freudenburg and Grambling (1994) that timber processing tends to be highly mechanised, and that employment for long-term local residents is likely to be in low skill and low paid positions.

In those regions that are dominated by industrial scale plantings on cleared agricultural land, and that do not have processing industries, the literature tends to point to economic and demographic stagnation and/or decline (Johnson and Price 1987; Mather 1993b; Madden *et al.* 2000). Indeed, it has been argued that the economic benefits associated with farm plantation forestry do not accumulate in those areas growing trees, but in industrialised 'core' regions that use timber as an input into existing industrial processes (Freunbenburg and Gramling 1994). Accordingly, there are growing concerns that industrial scale plantations will lead to very few local and regional economic and demographic benefits (Spencer *et al.* 1989; Spencer and Jellinek 1995; Curtis and Race 1996; Mayo 1998; Kelly and Lymon 2000; Schirmer 2000). Unless alternative employment can be generated, these communities risk depopulation, contracting local economies, the erosion of social services, and declining levels of socio-cultural interaction (Tonts 2000). However, it is important to recognise that processes of economic, social and demographic restructuring have been affecting rural communities for some time. For example, restructuring in the wool industry has led to considerable socio-economic adjustment in the country towns that service woolgrowers (Stayner 1990). It is some of these wool-growing regions that have recently experienced an increase in tree plantations. Indeed, planting trees might be regarded as a symptom of restructuring, rather than a direct cause of it. Perhaps if farming systems in their existing form had been sustainable and profitable, farmers might not be diverting land into plantations.

An important issue raised recently by Mayo (1998) concerns the local and regional spending patterns of various land uses and industries. Mayo noted that a transition from crop and livestock production to industrial scale forest plantings can have significant negative consequences for shearers, fencing contractors, veterinarians, stock and station agents, fertiliser and farm chemical retailers, and farm labourers. On the other hand, research from New Zealand indicates that alternative businesses might prosper following an expansion of farm plantation forestry. In their study of afforestation in Otago, Aldwell and Whyte (1984) noted increasing opportunities for firms engaged in land preparation, tree thinning and maintenance, and weed and pest control. This study also found that some sectors provided services for both agriculture and forestry. These include retail and wholesale trade, road transport, vehicle maintenance and repair, and public administration. While most of these services were provided locally, there was evidence to suggest that tree companies might purchase goods and services from outside local communities. If a high proportion of goods and services are being purchased from outside local communities, then the positive economic impacts are likely to be diminished.

2.3 Infrastructure and Service Impacts

The potential economic and demographic decline caused by large-scale farm forestry has raised some concerns about the impacts on local and regional services and infrastructure (Spencer and Jellinek 1995; Curtis and Race 1996; Kelly and Lymon 2000; Schirmer 2000). Falling populations and a contraction of economic activity can lead to an inevitable decline in support for local organisations, community facilities and public services. While there is a risk that population and economic decline can lead to the closure of some commercial services, such as banks, the provision of government services and infrastructure are likely to be linked to prevailing government budgetary and service standards (Madden *et al.* 2000). While there is some evidence that recent government policies have resulted in the rationalisation of some public services, such as schools and health facilities, a study by Madden *et al.* (2000) in rural Victoria found little evidence that farm plantation forestry would have a major impact on the provision of essential services. On the other hand, research by Ray (2000) in Western Australia found that depopulation associated with farm plantation forestry did have the potential to result in the closure of key services.

Another issue facing rural communities is the impact of farm plantation forestry on local and regional infrastructure, particularly roads. The use of heavy haulage vehicles in transporting logs from plantations is often cited as a cause of road damage (South West Development Commission 1995; York Gum Services 1995; State Timber Regional Evaluation Strategy 2000). There is also some evidence to suggest that unsuitable transport infrastructure in rural areas can act as a disincentive to investment in farm plantation forestry by commercial timber companies (AACM International *et al.* 1996a). These potential problems have been the subject of at least two major recent studies on the interrelationships between plantation forestry and transport infrastructure (Maunsell McIntyre Pty Ltd 2000; State Timber Regional Evaluation Strategy 2000). In the case of the south-west of Western Australia, it has been estimated that around \$195 million is required for road upgrading to handle the log haulage efficiently and safely (State Timber Regional Evaluation Strategy 2000). Of this amount, around \$66 million is needed for roads provided by local governments. Similar requirements were identified in a study of South Australia by consultants Maunsell and McIntyre (2000).

In response to the potential long-term problems caused by log haulage, a number of tree companies are now providing local governments with 10-year haul plans so that shires can budget for potential road damage (Mayo 1998). However, not all local governments agree that these forecasts will help to solve the problems associated with log haulage. Mayo (1998) argued that one of the key concerns of local governments and ratepayers is that of cost, and who should pay for additional road maintenance expenses. The view of an increasing number of local governments is that the industry should meet the costs of repairing road damage associated with farm forestry (Jones 1999). However, some industry representatives have suggested that State and Commonwealth governments should meet the cost, since it is these tiers of government that are calling for an expansion of farm plantation forestry (see Ministerial Council on Forestry, Fisheries and Aquaculture *et al.* 1997). A representative from one

tree company argued that if the industry is to expand then the Commonwealth and State governments 'should be supporting the required infrastructure, in particular the roads' (Mayo 1998, p. 48). In direct response to concerns about future road damage, a number of local governments have considered increasing local rates for forestry plantations (Jones 1999).

In addition to road requirements, farm plantation forestry can create demands for other infrastructure. Meeting these infrastructure needs is particularly important if processing facilities are to be established in rural communities (South West Development Commission 1995). As Barnes and Hayter (1992) have pointed out in the case of Canada, the provision of adequate infrastructure, such as water, electricity, waste treatment facilities, industrial land, and housing is critical if processing industries are to be successfully established or maintained in smaller country towns. Some of these needs can be met by timber companies, although governments may need to play a proactive role in ensuring the availability of adequate infrastructure if smaller communities are to succeed in attracting or retaining processing industries in the face of competition from larger regional centres (Lugg 1999). Given this apparent need, it is perhaps surprising to find that relatively little attention has been paid to the needs of farm forestry processing industries in recent literature on regional economic development.

2.4 Land Use Planning and Local Governance

The emergence of farm forestry, and particularly industrial scale plantations, has had important implications for both land use planning and local governance. Throughout most of rural Australia, planning strategies are developed through collaboration between local governments and State government planning authorities. One of the key characteristics of these planning strategies is that they tend to privilege 'traditional' agricultural production over alternative land uses, including farm forestry. For example, the Western Australian State Planning Commission rural policy objectives include:

- to discourage the removal of prime agricultural land from agricultural production;
- to prevent adverse effects on the viability of established or potential agricultural industries;
- to facilitate the introduction of new rural economic activities.

While the planning strategy aims to encourage the establishment of new rural industries, a growing number of local governments have expressed concerns about the impacts of forest plantations on prime agricultural land (York Gum Services 1995). Similar concerns have also been raised in other States (Mounster 1998; Schirmer 2000). It would appear that part of the problem is that planting trees is not always seen as a legitimate form of agricultural production (Farm Forestry Task Force 1995). At the same time, however, it appears that many local governments are acutely aware of the need to tackle land degradation issues, and often see trees as one of the most viable ways of rehabilitating local environments (Barr *et al.* 2000).

According to Mayo (1998), local government resistance to farm forestry developments (particularly those on an extensive scale) is also linked to concerns about the impact of such activities on local populations, economies, rates and roads (see also Cabbage 1997). Similar conclusions were drawn from a study by York Gum Services (1995), which identified six areas of concern to local government:

- councils do not wish to carry out any additional cost of maintaining local roads used by tree growers and logging companies;
- councils do not wish to approve projects that will result in a new fire hazard being developed within their area of jurisdiction;
- councils fear that plantations may replace 'traditional' agricultural land use, especially high volume/value/labour activities such as dairying and vegetable growing;
- councils wish to protect remnant native vegetation on farms, including paddock trees, and to ensure that these are not replaced by commercial tree crops;
- councils are concerned that 'fence to fence' tree planting on farmland may lead to depopulation;

- councils wish to preserve traditional agricultural landscapes and roadside vistas.

The York Gum Services (1995) report concluded that much of the resistance to (and misunderstanding of) farm plantation forestry stems from the absence of detailed and accurate information on the potential size and nature of the industry, and on its likely local economic, social and managerial impacts (see also Schirmer 2000; Tabart 2000).

For some local governments, concerns about the perceived negative impacts of tree plantations have contributed to the emergence of planning regulations that restrict farm forestry developments. This type of response has been evident in certain shires in Western Australia that have attempted to place restrictions on Bluegum plantations (York Gum Services 1995). By contrast, some local governments perceive farm forestry to offer substantial environmental, economic and social benefits, and have adopted planning regulations designed to stimulate development. For example, until recently the Shire of Dardanup in Western Australia did not permit the establishment of commercial trees on land zoned as 'general farming' (York Gum Services 1995). As this regulation stifled the establishment of a farm forestry industry, amendments were made to local planning regulations in order to facilitate the development of plantations.

These examples help to highlight one of the apparent problems with land use planning – a general lack of uniformity. Individual local governments have frequently developed different planning requirements for forestry plantations, with some being seen as unnecessarily strict, and others as too liberal. A report by the Farm Forestry Task Force (1995) emphasised the need not only for greater uniformity, but also for local planning regulations to keep pace with developments in the farm forestry sector. This was re-emphasised by Mayo (1998), who has claimed that local governments have generally been unable to cope with the rapid expansion of the farm forestry industry.

From the perspective of the industry, current planning processes present a number of serious concerns. One of the most significant is the time delay associated with obtaining planning approval from local governments once a landowner has agreed to lease or sell land for timber plantations (South West Development Commission 1995). Planning applications for farm forestry can be:

- rejected because the project does not comply with the general planning provisions of a local government;
- rejected because the proponent is not prepared to meet any special conditions (e.g. those associated with roads or fire control) imposed by a local government;
- delayed, while negotiations on conditions take place between the proponent and the local government, and the application or the conditions are reconsidered; or
- delayed while a project is advertised and public comment sought.

According to the South West Development Commission (1995), these responses would be accepted if there was an abundance of property-owners with land available for planting and the desire to farm trees. Tree companies also see the assessment procedures and special conditions often imposed on tree farming projects by some councils as more stringent (restrictive) than those placed on other alternative agricultural pursuits. While it is generally possible for tree companies to appeal to State governments about local planning decisions, there is little evidence that this has been a common course of action. York Gum Services (1995) claim that the outcome is often lengthy delays, or even the abandonment of plantation projects.

2.5 Impacts on the Land Economy

The impact of farm forestry on the land economy in localities and regions is a theme that has attracted relatively little attention in the literature. This is somewhat surprising, since there is anecdotal evidence from Western Australia and Victoria that farm forestry has had a significant impact on land values (Houston 2000a; Kelly and Lymon 2000; Madden *et al.* 2000; Ray 2000; Schirmer 2000). The purchase and/or lease of farming land by timber companies appears to have increased both land rents

and purchase prices. While this has the potential to bring significant benefits for those landholders looking to sell or lease their properties, it can create considerable problems for remaining farmers, particularly those aiming to expand their operations by leasing or purchasing additional land. Thus, increasing land prices can act as a barrier to farm expansion and improvement. Increasing land prices can also accentuate processes of depopulation. Research by Selby and Petajisto (1995) in Finland has indicated that, in cases where forestry contributes to higher prices than those offered by competing agricultural land uses, the preparedness of farmers to sell can be quite high. Indeed, there was evidence to suggest that some landholders brought forward their retirement from agriculture to 'cash in' on high land prices.

While farm forestry can result in an increase in the price of farmland, it can have the opposite impact on land prices in small towns. According to Rose (2000), property prices in the Tasmanian town of Preolenna have fallen by around one third, largely as a result of forestry-linked depopulation. Rose claims that only one of the area's 25 dairy farms remains, with the rest being planted to trees. The outcome has been a contraction of the local economy, outmigration and the collapse of the property market. The danger for the remaining residents in such towns is that they will experience considerable financial disadvantage if they decide (and are able) to sell their property. Given the possibility of falling employment levels in contracting rural economies, the prospect of residents facing such disadvantage appears very real.

The impact of farm forestry on landscape amenity can also have significant implications for local property markets. In an increasing number of rural areas, landscapes based on open grassland, scattered trees and working farms have contributed to significant levels of population growth (Greive and Tonts 1996). New residents often purchase small 'hobby farms' to capitalise on the lifestyle aspects of living in the countryside. Lifestyle driven population growth can make an important contribution to local economies, demographic structures, and socio-cultural interaction (Lewis 1998). However, as Madden *et al.* (2000) have pointed out, the conversion of large areas of farmland to tree plantations can be in direct opposition to the preferred landscape amenity of existing and potential landholders. The outcome of such developments can be a significant reduction of in-migration, a dampening or even a reversal of population growth, and a loss of the social and economic benefits associated with such growth (Murdoch and Marsden 1994).

In addition to these direct impacts on the land economy, farm forestry may have significant implications for local government land rates (Jones 1999). Because in most States such rates are determined according to the value of land, rising property values as a result of the expansion of farm plantation forestry can, in turn, lead to an increase in rates payable by existing farmers and landholders (Houston 2000c). There is also a concern that, if the enthusiasm for farm forestry wanes and land values fall, local governments could face a decline in their revenue base (Madden *et al.* 2000). Moreover, it has sometimes been argued that forestry plantations ought to be charged higher rates than other land owners, since it is often held that they should bear the cost of road damage and fire risk. On the other hand, plantations that have the capacity to deliver considerable environmental benefits may wish to argue for rate relief (Madden *et al.* 2000). Despite these possible implications, the impacts of tree plantations on local land rates have received very little attention in the literature.

2.6 Other Local and Regional Socio-Cultural Impacts

It has been suggested that farm forestry can have major impacts on the socio-cultural characteristics of rural communities (Mather 1993b; Selby and Petajisto 1995; Black *et al.* 2000). If large-scale tree plantations do contribute to depopulation and economic decline, then there is likely to be a concomitant impact on local and regional social institutions and networks. As Madden *et al.* (2000) point out, the feeling of both departing and remaining residents that the local sense of community is being lost should not be underestimated. However, they go on to point out that depopulation associated with economic and social restructuring in existing agricultural industries is often producing similar outcomes. Nevertheless, the potential socio-cultural ramifications of industrial scale farm forestry need to be taken seriously. The loss of community organisations, institutions and linkages can

contribute to a reduction in opportunities for social interaction, especially for older residents, can undermine networks of local social support, and can contribute to a sense of impoverishment for the remaining residents (Jones and Tonts 1995). However, the situation in those communities benefiting from the establishment of timber processing industries may be quite the reverse. An influx of new residents, and the subsequent stabilisation (or expansion) of the population base, can lead to more vibrant local institutions and networks.

Another emerging issue in some parts of Australia is the socio-political conflicts associated with tree plantations. In the Hamilton region of Victoria, local conflict has emerged over the environmental degradation caused by a timber company that destroyed remnant bushland while establishing a plantation (O'Brien 2000). This bushland provided an important habitat for the endangered red tail black cockatoos (*Calyptrorhynchus banksii*). In response, a number of local residents, including local councillors, were seeking compensation for the environmental damage. This type of local conflict has the potential to undermine local community cohesion. Similar conflicts have emerged in Western Australia, where a growing number of communities have expressed concern about the expansion of farm forestry plantations and the possible socio-economic impacts (South West Development Commission 1995; Kelly and Lymon 2000). One of the apparent problems is that there may be local animosity towards those landholders who sell or lease their properties for farm forestry, and towards local employees of tree companies. Again, this has the potential to threaten community cohesion.

2.7 National Socio-Economic Outcomes

For some years, various government agencies, environmental groups and industry bodies have extolled the virtues of planting trees on cleared agricultural land (Commonwealth of Australia 1991; Commonwealth of Australia 1992; Commonwealth of Australia 1995; Farm Forestry Task Force 1995; Ministerial Council on Forestry, Fisheries and Aquaculture *et al.* 1997; Primary Industries and Resources South Australia 1998; Private Forestry Council Victoria 1998; Queensland Department of Primary Industries 1998; State Timber Regional Evaluation Strategy 2000). This response has been driven largely by concerns about environmental degradation in agricultural regions. Planting trees has the potential to reduce or arrest national problems such as soil salinisation and erosion, waterlogging and the destruction of natural wildlife habitats (Young 1996). In addition, farm forestry contributes to improved water quality, biodiversity, and the control of greenhouse gases through carbon sequestration (Robins *et al.* 1996). It should also be emphasised that in order for farm forestry to have environmental benefits, it needs to be designed to target these benefits. Farm forestry can also make an important contribution to reducing pressure on timber resources in native forests both in Australia and overseas (Ministerial Council on Forestry, Fisheries and Aquaculture *et al.* 1997).

Alongside these environmental impacts, farm forestry has the potential to deliver significant national economic benefits. Australia has a balance of trade deficit of around \$2 billion in wood and paper products (Commonwealth of Australia 1995). A recent study by AACM *et al.* (1996b) estimates the net commercial benefits from farm forestry over 40 years to be in the vicinity of \$3 billion per year, with additional processing benefits of around \$26 billion per year. It was also estimated that farm forestry could generate around 54,000 jobs over 40 years. By diversifying farm incomes, planting trees also has the potential to improve the profitability and well-being of the nation's rural sector.

There are, however, a number of concerns about the long-term economic potential of farm plantation forestry at a national level (Goode 2000). For example, Race and Curtis (1997b) note that fluctuating and highly competitive markets for timber products have created considerable uncertainty on the part of industry, governments and farmers. Minor fluctuations in the economies of nations such as China and India have the capacity to generate significant changes in the market for wood products. Forecasting these long-term market conditions remains, at best, highly problematic. Furthermore, high demand for wood products will not necessarily result in high prices for timber products. High prices are likely to stimulate increasing supply from countries with low labour and operating costs, and that eschew environmental concerns in favour of short-term economic gains (Race and Curtis 1997b). There is also a risk that locking up land in trees will result in a short to medium reduction in annual

agricultural exports. Current farm forestry developments often utilise land that might otherwise be used for crop and livestock production that returns higher values, even over the longer-term.

2.8 Conclusion

The evidence presented in this Chapter suggests that the widespread adoption of farm forestry, particularly ‘fence to fence’ plantations, is likely to have important socio-economic impacts at the farm, local/regional, and national levels. At the individual property level, the literature indicates that farm forestry has the potential to deliver significant economic and environmental benefits. By arresting or reversing problems such as soil salinisation and erosion, and by providing shelter for crops and livestock, trees can maintain or improve the productivity of the land. Trees also have the potential to provide farmers with a number of important financial options. These include producing commercial timber, and/or leasing or selling part or all their properties to timber companies. Other possible implications of farm forestry at the individual property level include changes to water catchments, possible fire risks, and the social and economic ramifications of failed ventures.

Literature on the impacts of farm plantation forestry at the local and regional scales tends to focus on issues such as employment, population, infrastructure and services, and land use planning. To date, research into the economic and demographic impacts of farm plantation forestry in Australia tends to be based on modelling and forecasting, rather than detailed research on the actual experience of planting trees. Where more empirical research has been conducted, the evidence is that, unless local processing facilities can be established, farm plantation forestry is unlikely to contribute to population and economic growth. Indeed, research from overseas would suggest that, if it is undertaken on an extensive scale and is not integrated into existing farm enterprises, farm plantation forestry is likely to contribute to a process of decline. However, it is important to recognise that many of the regions in which farm plantation forestry is being established now have a long history of demographic and economic decline.

One of the most prominent issues in the literature was the impact of farm plantation forestry on infrastructure, particularly roads. Concerns were raised about the impact of heavy log haulage vehicles on local roads. It was also noted that, if timber processing facilities are to be established in small rural communities, then there is a need for a greater recognition of the local infrastructure and service requirements of these industries. Failure to recognise these might result in processing being confined to larger regional centres, with few of the potential economic benefits of farm forestry being realised in those communities where trees are being grown. That farm forestry might not contribute significant benefits and, indeed, may be detrimental to rural communities, was seen as an issue of some importance to local governments. A growing body of literature suggested that local governments were often using the planning system to restrict or retard farm forestry developments until the local positive and/or negative impacts became more clear. There were, however, some local governments that had amended planning regulations to encourage further farm forestry developments, largely in the pursuit of perceived environmental and economic benefits.

At a more national level, farm plantation forestry is widely seen as a source of important environmental and economic benefits. Plantation timber is regarded as a source of export income, as means of generating employment, and as a way of addressing environmental degradation. Despite these benefits, it is recognised that Australian timber exports face considerable uncertainty on international markets. Throughout much of the literature it was noted that a general lack of Australian research on the socio-economic impacts of farm forestry often hampered decision making by government policy makers, rural communities, timber companies, and industry bodies. While there has been considerable research on these socio-economic impacts overseas, particularly New Zealand and Europe, the extent to which these experiences are likely to be similar to the Australian context is unclear. In this respect, it is important that ongoing empirical research be conducted on the social, economic, and demographic implications of farm forestry.

3. The Social and Economic Impacts of Farm Plantation Forestry in South-West Western Australia

This chapter examines the social and economic impacts of farm plantation forestry in the south-west of Western Australia. The chapter pays particular attention to the impacts in two local government areas – Boyup Brook and Bridgetown-Greenbushes. It examines both the measurable impacts of farm plantation forestry and community perceptions of the socio-economic implications. The chapter begins by outlining the development of the farm plantation forestry industry in the region. It then assesses the impacts of this industry on local economic and employment activity, population, services and infrastructure, and land prices. The chapter also considers other socio-economic issues, such as planning regulations, as well as other strategies for structural adjustment at the farm and regional levels.

3.1 Farm Plantation Forestry in South-West Western Australia

Over the past 15 years or so, farm plantation forestry has emerged as an important industry in the south-west of Western Australia. While a small number of farmers established softwood plantations (predominantly *Pinus pinaster* and *Pinus radiata*) during the 1960s, it was not until the mid-1980s that more extensive hardwood plantations were established on farms. These plantings emerged largely as a result of collaborative ventures between the Department of Conservation and Land Management (CALM) and the Bunnings timber company (York Gum Services 1995). This collaboration was aimed primarily at reducing the dependence on native forests for woodchips. It involved establishing partnerships between CALM-Bunnings and those south-west farmers willing to establish commercial plantations of Tasmanian Bluegum (*Eucalyptus globulus*) (Shea and Bartle 1988). These initial plantings were usually integrated into existing farm enterprises.

There is also little doubt that some of the impetus for planting Tasmanian Bluegums came from the Landcare movement. As part of the Decade of Landcare, various State and Federal government programs encouraged farmers to plant trees as a way of dealing with problems such as dryland salinity, waterlogging, and wind and water erosion (Conacher and Conacher 1995). For those farmers in suitable rainfall zones, Tasmanian Bluegums offered not only a means of countering these environmental problems, but also a way of diversifying farm incomes. The result was widespread integrated plantings of Bluegums on cleared agricultural land. A report by York Gum Services (1995) indicates that, by the early 1990s, there were approximately 38,000 hectares of Bluegum plantings integrated into farming systems in the south-west of Western Australia.

During the mid-1990s, various other initiatives promoted further farm plantation forestry expansion. Acting on proposals by the Australian Conservation Foundation and the Forestry and Forest Products Industry Council, the Commonwealth government's Forest and Timber Inquiry in 1992 recommended that future plantation developments should be encouraged by using a system of financial incentives (Stevens *et al.* 1993). Some of these recommendations were taken up in the joint government/industry document *Plantations for Australia: the 2020 Vision* (Ministerial Council on Forestry, Fisheries and Aquaculture *et al.* 1997). This major policy document aimed to treble Australia's plantation area to three million hectares by the year 2020. To achieve this objective, various incentives for plantation development were proposed (see Ministerial Council on Forestry, Fisheries and Aquaculture *et al.* 1997).

The 1990s also saw the emergence of a number of plantation investment companies that offered investors the prospect of upfront tax deductability of a substantial portion of their investment, along

with the potential for returns on the investment at harvest. These investment schemes received considerable attention from both the Australian Taxation Office (ATO) and the Australian Securities and Investments Commission (ASIC) with regard to the legitimacy of the tax deductions that were being offered to investors. The general point of contention was whether investors were in control and bearing the real risk of their investment. Plantation investment schemes are now set up in a way that meets the criteria of both ASIC and the ATO, the latter being regularly requested to deliver Product Rulings on specific schemes to ensure investors of their rights to claim tax deductions on the investment.

The popularity of these investment schemes has contributed to a rapid expansion of timber production on cleared agricultural land. According to a recent report by the Bureau of Rural Sciences, in 1999 a total of 31,200 hectares of new plantations were established in the south-west of Western Australia, of which around 90 per cent was on private cleared agricultural land (Wood and Allison 2000a). This represents a significant increase on the 10,049 hectares of new plantations that were established during 1995. Much of this growth is attributable to companies that are purchasing or leasing farmland and establishing whole farm plantations. In 1999, around 88 per cent of the area planted to trees on cleared agricultural land in Western Australia was hardwood, the dominant species being Tasmanian Bluegum (Wood and Allison 2000a). This rapidly growing tree can be harvested after 10 to 12 years and will be used primarily to produce woodchips for export. Softwood plantations in Western Australia are composed mainly of *Pinus pinaster* and *Pinus radiata*. These species have a 30 to 35 year rotation and are predominantly used for construction timber.

The majority of the farm plantation forestry activity in Western Australia has occurred in the south-west of the State. (State Timber Regional Evaluation Strategy 2000). This is reflected in the rate of expansion in the two case study LGAs. In Boyup Brook, tree planting on farms prior to about 1990 tended to be restricted to Landcare activities. Only a handful of farmers were involved in planting trees on a commercial basis, and this usually involved integrating trees into existing farm enterprises. During the 1990s, this situation began to change and an increasing number of farmers opted to become involved in joint ventures with timber companies and government business enterprises, such as CALM's Sharefarming division. These ventures involved integrating commercial trees on farms or, alternatively, leasing or selling entire properties. As a result, an average of 1,365 hectares of tree plantations have been established annually between 1990 and 1999 on farms in Boyup Brook (Shire of Boyup Brook 2000). The rate of growth has increased rapidly in the past year and, in the period between September 1999 and July 2000, a total of 5,896 hectares of trees were planted on cleared agricultural land. By July 2000, a total of 18,768 hectares of agricultural land in the Shire of Boyup Brook had been established as farm forestry plantations. This represents 9.4 per cent of the Shire's agricultural land.

The neighbouring Shire of Bridgetown-Greenbushes has experienced slower farm plantation forestry development than Boyup Brook, though it has an existing timber industry that draws predominantly from native forests and a number of State government pine plantations. As with Boyup Brook, tree planting on farmland in the Shire of Bridgetown-Greenbushes prior to about 1990 was mainly for environmental and aesthetic purposes, and tended to be integrated into existing enterprises. Over the past decade, however, commercial plantations have expanded steadily and current local government estimates indicate that around 5,500 hectares of hardwood plantations have been established on cleared agricultural land. This represents about 11 per cent of the Shire's agricultural land.

Interviews conducted with local shire councillors, government officials and timber company representatives suggested that the majority of recently established farm forestry plantations in Boyup Brook and Bridgetown-Greenbushes (and other LGAs in the south-west) involve whole farms, and are not integrated into farm enterprises. This was confirmed during interviews with timber company representatives who stated that their preference was to lease or purchase entire farms in order to maximise economies of scale.

3.2 The Local Economy and Employment

In both the Shire of Boyup Brook and the Shire of Bridgetown-Greenbushes, the agricultural sector plays a critical role in ensuring local economic and social well-being. In Boyup Brook the key farm enterprises are sheep and cattle grazing integrated with cropping. The average total value of agricultural production generated within the Shire between 1992 and 1996 was \$41.6 million per annum, with \$20 million from livestock products, \$10 million from cropping, and the remainder from fruits and other products (ABS, various issues). While the agricultural sector in the Shire of Bridgetown-Greenbushes is much smaller than in Boyup Brook, it still produced an average of \$13.8 million per annum between 1992 and 1996 (ABS, various issues). This included \$4.2 million from cropping, \$3.6 million from livestock products, and the remainder from fruits and other agricultural products.

As in other parts of Australia, the agricultural sectors of Bridgetown-Greenbushes and Boyup Brook have experienced major changes associated with broader processes of rural restructuring (see Black *et al.* 2000). Depressed commodity prices, particularly for wool, escalating input costs, rising levels of debt, and low or negative profits have had significant impacts on local farmers. One of the responses of producers has been to increase economies of scale through a process of farm expansion and amalgamation. In Boyup Brook and Bridgetown, the outcome has been a steady decline in the total number of commercial farms (Table 3.1).

Table 3.1 Changing Number of Commercial Farms in Case Study LGAs

	1986	1991	1996	Change, 1986-96
Boyup-Brook	162	137	132	-30
Bridgetown-Greenbushes	257	249	241	-16
TOTAL	419	386	373	-46

(Source: ABS, various issues)

The long-term decline of farm numbers would suggest that this process is not necessarily linked to the expansion of farm plantation forestry. Indeed, the most rapid expansion of the timber industry did not occur until after 1996, which is the most recent year for which detailed data on farm characteristics is available. Nevertheless, it is highly likely that the emergence of farm plantation forestry has resulted in the recent loss of a number of 'traditional' farms. In Bridgetown-Greenbushes, for example, the 5,500 hectares of timber plantations established on cleared agricultural land covers an area equivalent to about 17 average sized farms (based on an average farm size for the LGA of 330 hectares). In Boyup Brook, the 18,768 hectares of timber plantations that have been established on cleared agricultural land cover an area equivalent to 23 average sized farms (based on an average farm size for the LGA of 808 hectares). Given that 5,896 hectares of plantations were established in Boyup Brook between September 1999 and July 2000, it could be assumed that seven farms have experienced a major change in land use in the space of only 11 months. While this is a somewhat simplistic analysis, it does highlight the capacity of plantation forestry to contribute to a reduction in the number of traditional farms.

The recent Bankwest survey of farmers provides some indication of the different returns from 'traditional agriculture' and farm plantation forestry in the region. The average farm in Boyup Brook and Bridgetown-Greenbushes generates a gross income of \$217 per hectare per year, with costs of \$158 per hectare per year. This provides the average farmer with an operating surplus (or net return) of \$59 per hectare per year. By contrast, some plantation companies can offer farmers willing to lease out their properties a net return ranging between \$100 to \$250 per hectare per year, depending on the site and projected growth rates. While the returns for plantations are significantly higher than those for agriculture, the flow-on benefits to the local community depend, to a large extent, on the farm family remaining in the district. However, existing evidence would suggest that this is not always the case, and that many farmers move to large urban and/or coastal centres (Kelly and Lymon 2000). Similar outmigration tends to occur when farmers sell their properties to plantation companies. Thus, when a property is purchased by a plantation company, much of the capital received for the land often

leaves the local community. Furthermore, the income from tree plantations generally goes to investors outside of the local area. Because of these tendencies, farm plantation forestry does not necessarily provide a significant boost to local incomes. This is reflected in the data presented in Table 3.2, which shows that, in both of the case study shires, mean taxable incomes remained well below the Western Australian average between 1991/92 and 1997/98.

Table 3.2 Average Taxable Income in Case Study LGAs, 1992/93–1997/98

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98
<i>Boyup Brook</i>						
No. Non-Taxable Earners	344	333	293	243	271	248
No. Taxable Earners	647	672	670	709	693	659
Total Taxable Income ('000)	11,153	12,828	15,235	17,995	16,380	17,271
Mean Taxable Income	17,238	19,089	22,739	25,325	23,638	26,208
<i>Bridgetown Greenbushes</i>						
No. Non-Taxable Earners	507	494	498	497	495	500
No. Taxable Earners	1,559	1,642	1,687	1,750	1,712	1,705
Total Taxable Income ('000)	34,773	39,674	43,347	45,851	46,798	48,458
Mean Taxable Income	22,304	24,161	25,695	26,200	27,335	28,421
<i>Western Australia</i>						
Mean Taxable Income	26,940	28,561	29,204	30,628	31,342	32,735

(Source: ATO, various issues)

The importance of agriculture to the economies of Boyup Brook and Bridgetown-Greenbushes is also illustrated in Tables 3.3 and 3.4. Table 3.3 shows that, at the 1996 Population Census, 50.7 per cent of Boyup Brook's labour force were engaged in agriculture. This table also illustrates the town of Boyup Brook's role as a provider of services for agriculture. Thus, other important local employment sectors include Wholesale and Retail Trade, Education, Public Administration, and Finance and Property Services. The longer-term trend in Boyup Brook is one of labour force decline. This contraction is associated with the restructuring of agriculture. Between 1986 and 1996, the number of people employed in agriculture fell by 107, or 22.4 per cent. The flow-on impact was a reduction in employment in those sectors that service agriculture.

Table 3.3 Labour Force by Industry Sector, Boyup Brook, 1986-1996

	1986	1991	1996	Change, 1986-91	Change, 1991-96
Agriculture, fisheries and forestry	477	440	370	-37	-70
Mining	4	4	7	0	3
Manufacturing	21	13	31	-8	18
Utilities	3	5	7	2	2
Construction	9	12	18	3	6
Wholesale and retail trade	41	60	64	19	4
Hospitality	8	8	11	0	3
Transport	17	22	18	5	-4
Communications	0	6	6	6	0
Finance and property services	13	18	33	5	15
Public administration	26	28	29	2	1
Education	42	45	59	3	14
Health and community services	40	41	37	1	-4
Cultural and recreation services	0	0	3	0	3
Personal services	9	11	10	2	-1
Other/not stated	22	30	27	8	-3
Total	750	743	730	-7	-13

(Source: ABS, 1996)

The Shire of Bridgetown-Greenbushes has labour force structure slightly different from that of Boyup Brook (Table 3.4). This reflects the growth of hobby farms within the Shire, the gentrification of the Bridgetown townsite, and tin mining near the town of Greenbushes (Greive and Alexander 1995). Between 1986 and 1996, these developments/activities contributed to significant growth in Mining (60 per cent), Financial and Property Services (50 per cent), Manufacturing (46 per cent), and Education (44 per cent). However, as with Boyup Brook, there was a significant decrease in employment in the agricultural sector between 1986 and 1996 (-20.6 per cent). Nevertheless, agriculture remained a significant component of the Shire's diverse economy and, in 1996, accounted for 16.3 per cent of all employees.

Table 3.4 Labour Force by Industry Sector, Bridgetown-Greenbushes, 1986-1996

	1986	1991	1996	Change, 1986-91	Change, 1991-96
Agriculture, fisheries and forestry	340	263	270	-77	7
Mining	93	144	153	51	9
Manufacturing	105	130	227	25	97
Utilities	34	34	26	0	-8
Construction	70	72	95	2	23
Wholesale and retail trade	181	186	207	5	21
Hospitality	43	71	68	28	-3
Transport	45	51	46	6	-5
Communications	27	11	12	-16	1
Finance and property services	48	69	95	21	26
Public administration	44	30	48	-14	18
Education	67	95	150	28	55
Health and community services	103	113	126	10	13
Cultural and recreation services	12	7	9	-5	2
Personal services	22	32	38	10	6
Other/not stated	46	103	44	57	-59
Total	1,280	1,411	1,650	131	239

(Source: ABS, 1996)

Given that the most recent Population Census data is for 1996, and that most of the plantation development occurred after that date, it is difficult to assess the extent to which farm plantation forestry has affected local and regional employment structures. However, it is clear that Boyup Brook has been experiencing a long-term contraction of its labour market, largely as a result of the falling employment in agriculture. It is likely that some of this decline was linked to the emergence of farm plantation forestry and a concomitant reduction in employment associated with more traditional agricultural pursuits. Similarly, some of the decline in Bridgetown-Greenbushes' labour force was probably associated with plantation forestry. As a direct result of farm forestry plantations, the loss of around 17 average sized farms in Bridgetown-Greenbushes, and 23 average sized farms in Boyup Brook, has the potential to contribute to the loss of a similar number of farm families, should they decide to migrate from their respective local communities. Not only could this result in the loss of people from agriculture, but it has the capacity to reduce employment in those sectors servicing farming, such as Retail and Wholesale Trade or Education. The change in agricultural land use is also likely to result in a reduction in employment in occupations such as shearing and other farm labour positions. Despite this, recent evidence would suggest that farm plantation forestry is not fuelling unemployment in either Boyup Brook or Bridgetown-Greenbushes. As Table 3.5 illustrates, for most of second half of the 1990s unemployment rates have remained well below six per cent, and lower than the national average. However, these statistics do not reveal the level of hidden unemployment or the number of former farmers or workers who have left the region in search of alternative sources of employment.

Table 3.5 Unemployment Rates in Boyup Brook, Bridgetown-Greenbushes and Australia, 1991-1999

	1991	1992	1993	1994	1995	1996	1997	1998	1999
Boyup Brook	8.4	5.4	5.6	3.8	3.0	3.6	3.4	5.0	4.9
B'town-Greenbushes	8.4	10.9	6.1	5.4	4.4	4.6	4.8	5.7	5.9
Australia	9.5	10.5	10.7	9.2	8.1	8.5	8.5	8.2	7.2

(Source: DEETYA, *Small Area Labour Markets*, various issues)

In many respects, the labour market of Boyup Brook is more susceptible than that of Bridgetown-Greenbushes to economic changes associated with farm plantation forestry. The Shire's narrow economic base means that changes in agriculture are likely to have significant ramifications for the local economy. By contrast, the diversity of the Bridgetown-Greenbushes economy helps to shield it from impacts associated with a loss of employment or economic activity in the agricultural sector. However, it is important to stress that the changes affecting Boyup Brook's labour market are linked to longer-term processes of rural restructuring, and are not simply the result of farm plantation forestry. Nevertheless, there were quite valid concerns among some local residents that rate of expansion in the farm plantation forestry industry was such that local businesses were unable to adjust to the emerging economic landscape within the Shire.

While the direct contribution of farm plantation forestry to local and regional labour markets is not entirely clear, it does appear that the impacts of any associated employment growth are likely to be spatially uneven. A recent report by Lancefield Consultants (1995) estimated that every 10,000 hectares of hardwood plantation has the capacity to generate 75 jobs. However, the evidence collected as part of this study would suggest that those jobs are unlikely to be permanently located in small communities such as Boyup Brook. While one of the plantation companies has established an office in the town of Bridgetown, the majority are based in larger regional centres, such as Manjimup and Bunbury. As such, the concomitant economic and employment benefits are concentrated in these towns. These include employment generated by timber companies directly, as well as employment and economic activity associated with servicing the plantation companies. In the longer-term, these centres might also benefit from downstream processing industries. All of this means that many of the potential economic proceeds of farm plantation forestry seem likely to bypass smaller 'host shires' such as Boyup Brook.

3.2.1 Community Perceptions of Economic and Employment Change

The semi-structured interviews with stakeholders indicated that community concerns about the impact of farm plantation forestry on local economic activity and employment were quite different in Boyup Brook and Bridgetown-Greenbushes. In Boyup Brook there was a perception that the plantation industry was making a direct contribution to declining farm numbers. This was seen to have a direct impact upon the local economy. For example, one local stock and station agent suggested that the rapid establishment of plantations on cleared agricultural land was removing his clientele so quickly that, if the trend continued, he would be out of business within two years. Some of the other key issues raised by local stakeholders included:

- the reduction of employment in occupations allied to farming, such as shearing and fencing;
- the failure of timber companies to support local businesses;
- the absence of permanent timber company employees in the town.

Interviews conducted in Bridgetown-Greenbushes revealed a more positive attitude towards the farm plantation forestry industry. Stakeholders noted that:

- farm plantation forestry was just one of many land uses and economic activities in the Shire;

- the Shire, and particularly the town of Bridgetown, is likely to benefit from the decision of some timber companies to base themselves locally;
- Bridgetown has a strong service sector that is well placed to benefit from an expanding farm plantation industry;
- Bridgetown-Greenbushes has an existing timber industry that might be sustained by the emergence of farm plantation forestry.

The different views of local stakeholders about the impacts of farm plantation forestry in Boyup Brook and Bridgetown-Greenbushes were also reflected in the telephone survey of residents (Table 3.6).

Table 3.6 Community Perceptions of Economic and Employment Change Associated with Farm Plantation Forestry: Percentage by LGA

	Boyup Brook (n=20) %	Bridgetown- Greenbushes (n=20) %	All respondents (n=40) %
Impact of Farm Plantation Forestry on Local Employment			
Positive impact	15	55	35
Negative impact	60	10	35
Little or no impact	25	35	30
Uncertain of overall impact	0	0	0
Impact of Farm Plantation Forestry on Local Business Activity			
Positive impact	20	30	25
Negative impact	45	5	25
Little or no impact	35	65	50
Uncertain of overall impact	0	0	0

(Source: Telephone Survey)

Thus, in Boyup Brook, 60 per cent of those surveyed indicated that farm plantation forestry was having a negative impact on local employment. By contrast, 55 per cent of residents surveyed in Bridgetown-Greenbushes felt that the industry was having a positive impact on local employment. The telephone survey also found that 45 per cent of surveyed residents in Boyup Brook felt that the farm plantation industry was having a negative impact on local business activity, while 65 per cent of residents in Bridgetown-Greenbushes perceived there to be little or no impact.

3.3 Population and Community Structure

Between 1986 and 1996, the population of Boyup Brook fell from 1,747 to 1,604; a decrease of 8.2 per cent (Table 3.7). This decline was largely the result of the outmigration of farm families which, in turn, led to the contraction of the local economy and the outmigration of local town residents. In many respects, Boyup Brook is suffering what Sorensen (1993) has described as a vicious cycle of decline. By contrast, Bridgetown-Greenbushes experienced steady population growth between 1986 and 1996, mainly as a result of lifestyle related immigration, hobby farm development, and tourism (Greive and Alexander 1995).

Table 3.7 Population Change in the Case Study LGAs, 1986-1996

	1986	1991	1996	Absolute Change, 1986-91	Absolute Change, 1991-96
Boyup Brook	1747	1665	1604	-82	-61
B'town-Greenbushes	3,293	3,713	3,904	+420	+191

(Source: ABS, 1996)

As with the labour force trends, it is evident that the process of demographic decline in Boyup Brook is long-term. It is difficult to provide an accurate assessment of the impact of farm plantation forestry on population levels, since most of the large-scale plantations were established after the 1996 Population Census. However, it is highly likely that the emergence of plantations, and the subsequent sale or lease of some properties to plantation companies, has had an impact on the population of the Shire. In this respect, the farm plantation forestry industry might be a direct contributor to the vicious cycle of decline affecting Boyup Brook. In the case of Bridgetown-Greenbushes, any loss of farm families associated with the emergence of the farm plantation forestry industry appears to be offset by growth in other areas. Again, the diversity of Bridgetown-Greenbushes' economic and demographic base makes it less susceptible than Boyup Brook to changes in the nature of agricultural land use.

3.3.1 Community Perceptions of Population Change

Residents in Bridgetown-Greenbushes tended to be less concerned about the impacts of farm plantation forestry on population levels than people in Boyup Brook (Table 3.8). In Boyup Brook, 45 per cent of residents surveyed felt that the industry was having a negative impact on population levels, while 35 per cent felt there was little or no impact. In Bridgetown, 65 per cent of surveyed residents felt the industry would have little or no impact.

The in-depth interviews with local stakeholders also suggested differing opinions on the impact of farm plantation forestry on population levels in the two shires. In Bridgetown-Greenbushes it was noted that population increases associated with lifestyle related immigration were likely to outweigh any impacts associated with the loss of farm families as a result of plantation establishment. In Boyup Brook, however, there was concern that farm plantation forestry was worsening long-term patterns of decline.

Table 3.8 Community Perceptions of Population Change Associated with Farm Plantation Forestry: Percentage by LGA

	Boyup Brook (n=20) %	Bridgetown- Greenbushes (n=20) %	All respondents (n=40) %
Impact of Farm Plantation Forestry on Local Population Levels			
Positive impact	20	30	25
Negative impact	45	5	25
Little or no impact	35	65	50
Uncertain of overall impact	0	0	0

(Source: Telephone Survey)

3.4 Services and Infrastructure

One of the emerging issues in communities experiencing an expansion of farm plantation forestry is the impact of the industry on services and infrastructure. Service and infrastructure provision is closely related to issues such as population and employment change. For example, population decline and the contraction of local economies can contribute to the withdrawal of local services and infrastructure. Conversely, a diversification of the local economy or a change in land use can sometimes contribute to new infrastructure and service needs.

One of the most important issues facing both case study shires is the impact of farm plantation forestry on local roads. While interviews with local stakeholders indicated that the impacts during the plantation establishment phase were minimal, there was widespread concern that road damage would be significant once harvesting of trees commences. Part of the problem with plantations is that the harvesting of trees is accompanied by concentrated log haulage, often on narrow and underdeveloped dirt roads. A typical log haulage truck (B-double) carries 45 tonnes of timber per load, with a hectare of Tasmanian Bluegums producing between 150 and 200 tonnes of wood. This compares to normal agricultural production which produces around 2.5 tonnes of produce per hectare per year. The current standard of roads is such that they are designed to handle the normal agricultural haulage requirements, but will not withstand the heavy concentrated traffic that will occur as plantations are harvested. Thus, one of the key issues is who should bear the cost of upgrading the roads to meet the standards required for log haulage during harvest.

Maintaining and upgrading local roads is a responsibility of local governments, which already devote a significant proportion of their budgets to this activity. For example, the Shire of Boyup Brook currently spends around \$600,000 per annum on maintaining and upgrading its road network. Ensuring that local roads are able to cope with heavy traffic associated log haulage will require long-term strategic planning and investment. These issues are currently being investigated by the Western Australian Timber Industry Regional Evaluation Strategy (TIRES) group. This organisation is made up of representatives from the Western Australian Department of Transport, other relevant State government agencies, local governments, and the timber industry, and is examining ways of mitigating the likely impacts of the plantation industry on local roads. A recent report by this group highlighted the need for a significant increase in funding for local governments if they are to upgrade local roads to a standard that will cope with heavy log transport (State Timber Regional Evaluation Strategy 2000). However, even with the additional funding required to upgrade existing road infrastructure, local governments still recognise the need for careful planning of haulage routes to address safety issues that arise as large log trucks begin to share small country roads with local farmers, tourists, school buses and the like.

One of the other key issues for residents of Boyup Brook was the impact of farm plantation forestry on the local volunteer fire service. The loss of farmers from the Shire has gradually been undermining this service. Given the rate of recent expansion in farm plantation forestry, there are now a number of areas within the Shire without an adequate number of volunteers to cope with a serious fire. There was also a degree of frustration amongst members of the fire service because plantation companies were not seen as willing to support the group, even though they were likely to be a major beneficiary of existence of the service in the event of a fire.

There were also concerns in Boyup Brook that population decline associated with farm plantation forestry would threaten the viability of other local services, such as the school, the police station, and the bank. To date, however, there is no evidence that such services have closed as a direct result of the plantation industry. Nevertheless, population loss associated with plantations does have some potential to contribute to the withdrawal of services. While the rapid expansion of the industry over the past two or three years may not yet have lowered population thresholds to levels where services will close, a continuation of current trends might contribute to the withdrawal and/or rationalisation of certain services. However, it should also be noted that the closure of key services is not an issue that is restricted to regions experiencing a growth in farm plantation forestry. Indeed, there are many parts of rural and regional Australia where key services have been rationalised, centralised or withdrawn (Tonts 2000).

3.4.1 Community Perceptions of Service and Infrastructure Impacts

The telephone survey of local residents in the case study LGAs indicates that half of those surveyed in Boyup Brook felt that farm plantation forestry would contribute to poorer service and infrastructure provision. By contrast, the majority of surveyed residents (60%) in Bridgetown-Greenbushes felt that there would be little or no impact (see Table 3.6).

Table 3.6 Community Perceptions of Service and Infrastructure Change Associated with Farm Plantation Forestry: Percentage by LGA

	Boyup Brook (n=20) %	Bridgetown- Greenbushes (n=20) %	All respondents (n=40) %
Impact of Farm Plantation Forestry on Services and Infrastructure			
Better Services and Infrastructure	20	25	22.5
Poorer Services and Infrastructure	50	10	30
Little or no impact	30	60	45
Uncertain of overall impact	0	5	2.5

(Source: Telephone Survey)

The views of residents who participated in the telephone survey were generally supported by the findings of the semi-structured interviews. Interviewees in Bridgetown noted that, although issues such as roads were very important, the total area of farm plantation forestry in the Shire is smaller than in many other LGAs. In Boyup Brook, however, local councillors, local government officials, farmers and business representatives pointed to many of the key issues outlined above, including:

- the impact of farm plantation forestry on fire services;
- the upkeep of local roads, and the capacity of the local government to fund this activity once logging commences;
- the impact of plantation driven population decline on the security of basic services, such as schools and banks.

3.5 Land Values

The impact of farm plantation forestry on land values has been an issue of some concern in both Boyup Brook and Bridgetown-Greenbushes. Data from the Valuer General's office in Western Australia indicates that, between 1990 and 1995, the average value of agricultural land per hectare in Boyup Brook increased from \$1,200 to \$1,350; a rise of 12.5 per cent. However, between 1995 and 1999, land values increased to \$1,850 per hectare; a rise of 37 per cent. That this increase occurred at a time when the local wool industry was experiencing economic difficulties would suggest that the activities of plantation companies have fuelled an increase in land values. However, between 1998 and 1999, average land values per hectare increased by only \$50, rising from \$1,800 to \$1,850 per hectare, indicating that plantation companies might have reached close to the maximum price that they are willing to pay for land in the Shire.

Table 3.7 Agricultural Land Values in Case Study LGAs, 1995-1999 (\$/ha)

	1995	1996	1997	1998	1999
Boyup Brook	1,350	1,550	1,700	1,800	1,850
Bridgetown-Greenbushes	2,400	2,750	3,000	3,000	3,000

(Source: Valuer General, 2000)

The situation in Bridgetown-Greenbushes is slightly different from that of Boyup Brook. Agricultural land prices have traditionally been much higher in Bridgetown-Greenbushes, largely as a result of the quality of the land, the higher rainfall and, to some extent, the growing number of part-time hobby farmers (Greive and Tonts 1996). Despite a rapid increase in property values between 1995 and 1997, average property prices have remained around \$3,000 per hectare over the past three years. These higher land prices might also help explain why the expansion of farm plantation forestry has been less extensive in Bridgetown-Greenbushes than in Boyup Brook.

3.5.1 Community Perceptions of Changing Land Values

In both Bridgetown-Greenbushes and Boyup Brook local stakeholders who participated in interviews often noted the impacts of farm plantation forestry on land prices. In Bridgetown-Greenbushes, however, some interviewees indicated that it was difficult to make a precise assessment of the impact of plantation forestry on land prices because of the diversity of land uses within the Shire. Claims about rapidly rising agricultural land prices in Bridgetown-Greenbushes are somewhat difficult to sustain given the stable agricultural property values in the area over the past three years (see Table 3.7). In the case of Boyup Brook, interviewees were very clear about the impacts of farm plantation forestry on agricultural land prices. One farmer noted that 'prices of up to \$2,000 per hectare have been paid for farms which previously sold for \$600 per hectare'. Some of the other issues noted by stakeholders include:

- the inability of some farmers to expand their properties because of rising land prices;
- the impact of increasing land values on farm plantation forestry investment. A representative from the timber industry noted that high land prices were forcing companies to look for suitable land in lower rainfall areas and/or other States;
- the impact of rising land values on the cost of local rates. There is, however, no evidence that farm plantation forestry has contributed to a rise in rates.

The telephone survey of local residents also revealed an awareness of the impact of farm plantation forestry on land prices (see Table 3.8).

Table 3.8 Community Perceptions of Land Values Changes Associated with Farm Plantation Forestry: Percentage by LGA

	Boyup Brook (n=20)	Bridgetown- Greenbushes (n=20)	All respondents (n=40)
Impact of Farm Plantation Forestry on Land Values			
Increased Land Values	70	50	60
Decreased Land Values	5	15	10
Little or no impact	25	35	30
Uncertain of overall impact	0	0	0

(Source: Telephone Survey)

Thus, in Boyup Brook, 70 per cent of respondents claimed that the industry was contributing to rising land values, while in Bridgetown-Greenbushes half of the residents surveyed claimed that this was the trend. While the residents of Boyup Brook are probably quite right in pointing to the farm plantation forestry industry in contributing to increasing land prices in their shire, there is less evidence that there is a close link between the expansion of the plantation industry and increasing land values in Bridgetown-Greenbushes.

3.6 Other Social and Economic Concerns and Impacts

A combination of interviews with local stakeholders, informal conversations with residents, and press reports indicate that there are a number of other important socio-economic concerns and impacts associated with farm plantation forestry in Boyup-Brook and Bridgetown-Greenbushes. One of the notable issues was the impact of plantations on visual amenity, particularly within Bridgetown-Greenbushes. Over the past decade or so, Bridgetown-Greenbushes has experienced an influx of residents from Perth and elsewhere who have migrated to the Shire as a result of perceived lifestyle benefits (Greive and Tonts 1996). One of the key attractions for new residents is Bridgetown's 'rolling green hills'. There was some concern among local stakeholders that a shift in land use from agriculture to farm plantation forestry might degrade the visual amenity of the area, and thereby reduce the prospects for future population growth. Somewhat paradoxically, there was also a concern that the harvesting of longstanding pine plantations might undermine visual amenity. These plantations, particularly where they occur in steep valleys, have become an integral and valued part of the visual landscape of the district. Another issue raised was that the noise associated with harvesting timber might impact negatively on hobby farms or other residences that are located close to plantations.

An important issue raised in Boyup Brook was the feeling of isolation experienced by those farmers who remain in the Shire after their neighbours have sold or leased their properties to timber companies. It was noted that most former farmers do not remain in the district, which was seen to be contributing to a breakdown of longstanding social networks. It was suggested that this is having a direct impact on community organisations, and sporting and social clubs, most of which have experienced a decline in membership over recent years, and some of which are now under threat of closure. It is, however, difficult to assess the extent to which the demise of social organisations is directly attributable to the growth of farm plantation forestry, or to more general processes of rural economic, demographic and social decline. Nevertheless, it is clear that the loss of the equivalent of around 20 farms over the past few years to tree plantations in the relatively small Boyup Brook community will have an impact on levels of social interaction and the viability of some local organisations.

Another issue raised in both Boyup Brook and Bridgetown-Greenbushes was the environmental impact of aerial spraying of farm plantations with herbicides and pesticides. A number of local residents pointed out that drifting chemical sprays have the potential to damage watercourses, natural vegetation, neighbouring crops, and other sensitive agricultural enterprises, such as vineyards, orchards and aquaculture. Aerial spraying also raised concerns regarding general public health.

The control of feral animals in plantations was another issue raised by some local residents. As one farmer pointed out:

'It is in farmers' own interests to protect their stock from foxes, but the plantation companies have no incentive to do anything about it. We have a number of endangered species here, and have put a lot of effort into controlling foxes and cats, but all this work will be wasted if the plantation companies don't do anything'.

A recurring theme in many of the discussions with local farmers and residents was the nature of farm plantation forestry investment schemes. It was often suggested that the development of farm plantations were driven by tax incentives for investors, rather than by proven market demand. In this respect, some saw the plantation industry as producing a commodity that might not be economically sustainable. The concern associated with this was that the timber companies might not survive in the longer-term, and that the trees might not be harvested. This was seen to have significant local economic ramifications, particularly if it posed a risk to local employment and industry. Some farmers also noted that if the trees were not harvested, or if there was not a second rotation, then the cost of returning land to a state suitable for agricultural production would be considerable.

Given many of the social and economic concerns about the expansion of the farm plantation forestry industry, it is perhaps not surprising to find that there were a number of calls to use the planning system to regulate the development of the industry. Existing regulations require local government planning approval for the establishment of large-scale farm plantations. Planning applications typically include a general management plan, a fire management plan, and a harvesting plan. In addition to these, some residents felt that local governments should ensure that timber companies meet a number of conditions before approving the establishment of plantations. The sorts of planning regulations/guidelines and conditions that were mentioned included:

- ensuring the preservation of existing farm homesteads on proposed plantations;
- restricting plantations to poor quality agricultural land;
- forcing timber companies to maintain local roads during harvest;
- limiting the total area within a shire that can be used for farm forestry plantations.

While local governments in both shires were sympathetic to some of these suggestions, current State Planning regulations limited their ability to enact them. Planning applications that are rejected by local governments can be appealed to the Western Australian Minister for Planning. In adjudicating on planning disputes over plantations, the Minister tends to use the Code of Practice for Timber Plantations in Western Australia as a guide when upholding or rejecting appeals. The Code of Practice was developed by the Australian Forest Growers Group in conjunction with the Department of Conservation and Land Management. As long as the planning application follows the guidelines set out in the Code of Practice, the Minister for Planning will generally approve the application. However, one of the means by which some local governments have attempted to discourage expansion (and increase revenue) has been to substantially increase the application fee required before councils will review proposed developments. For representatives of the timber industry, such fees were frustrating but generally accepted. Of more concern to members of the timber industry was the lack of uniformity in planning procedures across different local governments in the south-west.

3.7 Impacts Attributable to Government and Private Schemes

Disentangling the social and economic impacts of various government and private farm forestry schemes is made difficult by the nature of tree planting in both the case study areas and the wider south-west region. In the early part of the 1990s, there were a number of schemes that encouraged the integration of plantations with existing agricultural enterprises (Berney and Rado 1999). These schemes generally involved joint ventures between farmers and private timber companies and/or government business enterprises. Depending on the nature of the individual farm enterprise, and the scale of the planting, these integrated plantations generally have a positive impact at the farm level (Campbell White & Associates and Black, 1999). For example, a farmer in Boyup Brook who had been involved in a joint venture with a plantation company recently harvested 400 tonnes of timber on his property. The annuities paid to this farmer, as well as the harvest value of the tree crop, provided an important source of additional income. Furthermore, this farm family remained in the community and made an important contribution to the local economy, and to local social networks and institutions.

More recently, however, there has been a shift away from integrated plantings in favour of whole farm plantations. According to a timber company representative, joint ventures that integrate trees within existing farm enterprises are unable to maximise economies of scale and risk being unprofitable. While there are a number of cases where farmers have leased their entire properties to plantation companies, interviews with local stakeholders (including timber industry representatives) suggested that an increasing number of farms are being purchased by for 'fence to fence' plantations. These purchases are generally made by companies with investment schemes. The attractiveness of these schemes lies in the significant tax incentives for investors. For timber companies, purchasing rather than leasing land is generally seen as preferable, since it avoids the need to establish detailed contracts with landowners. This means that there are no contractual restrictions over the nature of the plantation

development. It is predominantly these types of purchases (as well as whole farm leases) that have contributed to the social and economic impacts described in this chapter.

3.8 Other Strategies for Structural Adjustment

3.8.1 Structural Adjustment at the Farm Level

Structural adjustment at the individual property level generally involves restructuring the nature of the farm enterprise in response to changing market and other conditions. This might include, for example, increasing the size of a farm to achieve economies of scale, or changing the mix of commodities on a property. For a detailed review of some of the structural adjustment strategies adopted by farmers see Gray *et al.* (1993), Cook *et al.* (1994), and Campbell White and Associates and Black (1999). Governments often play an important role in facilitating adjustment by using various financial and other incentives. Until recently, the Federal government provided farmers with low interest loans and other financial assistance to tide producers over while they adjusted the nature of their farm enterprises (Stayner 1996). However, these strategies were frequently implemented too late, and were often unable to help many farmers remain economically viable. As one government representative commented:

‘Generally it takes about eight years for a farmer to go bankrupt. They often don’t realise, or are in denial, for the first five years by which time it is too late to do much about it anyway. So all that financial assistance does is prolong the inevitable’.

In recognition of this problem, recent structural adjustment schemes have moved away from providing direct financial assistance to farmers, and have focussed on business management training. One of the objectives of this training is to enable farmers to develop comprehensive farm business plans. In Western Australia, this training is provided through the ‘Better Business’ program (formerly ‘FarmSmart’), which has been operating since the mid-1990s.

These schemes, arguably, focus on promoting structural adjustment amongst those farmers that are more likely to remain viable in the longer-term. As part of these adjustment schemes, farmers can attend workshops that investigate alternatives to traditional agricultural enterprises. These alternatives might include farm tourism, aquaculture, viticulture, and other forms of crop and livestock. The Better Business program (and, indeed, many other farmer education programs) has the capacity to provide farmers in Boyup Brook and Bridgetown-Greenbushes with the skills to investigate opportunities for structural adjustment that might be appropriate to their particular circumstances.

Of course, one of the other forms of structural adjustment available to farmers is to leave the industry. The Federal government currently provides some assistance to eligible families that choose this course of action through the Farm Family Restart Scheme. In the case of Boyup Brook and Bridgetown-Greenbushes (and other areas), the opportunity to sell or lease farms to timber companies provides families with another means of exiting the industry. Some farmers and local residents see this as particularly important given the difficulties facing the local crop and livestock industry. A number of stakeholders pointed out that the purchasing and leasing of farms by plantation companies was allowing many families to leave farming with dignity and a secure financial future. On the other hand, it is worthwhile noting that rising land prices associated with farm plantation forestry may be reducing the capacity of other farmers to expand their properties in the pursuit of structural adjustment.

3.8.2 Structural Adjustment at the Regional Level

At the regional level, the expansion of farm plantation forestry can be regarded as a structural response to a declining agricultural sector. Ongoing low commodity prices and a severe cost-price squeeze have contributed to a shift towards an alternative land use – farm plantation forestry. In those areas that are likely to experience negative socio-economic outcomes as a result of this change, there is a need to attract or develop alternative industries to substitute for the decline in crop and livestock

farming. While farm plantation forestry presents some opportunities to attract processing and service industries, these are more likely to be based in larger regional centres, rather than in more isolated centres that have a declining infrastructure and service base.

Current Federal and State government policies on regional development encourage small and declining rural communities to develop 'self-help' survival strategies. In order to facilitate these, the Western Australian government has developed a number of programs designed to support rural revitalisation (see Beer 2000; Tonts 1999; 2000). These programs include:

- Doing More with Agriculture
- WA Rural Leadership Program
- Community Builders
- Future Farming
- New Rural Generation
- Bushnet

Details on these projects can be found at: www.progressrural.wa.gov.au

3.9 Conclusion

The recent expansion of the farm plantation forestry industry is having important implications for Boyup Brook and Bridgetown-Greenbushes. There were a number of issues that were common to both shires, such as the impact of the plantation industry on roads, the local environment, and land prices. However, it is also evident that there are some critical differences in both the actual impacts of the farm plantation forestry, and in the community perceptions about the industry. The combination of extensive plantation development, a narrow economic base, and a small population in Boyup Brook meant that the impacts of farm plantation forestry were more visible than in Bridgetown-Greenbushes. The outmigration of farm families as properties were sold to timber companies was impacting negatively on the local business sector, social organisations and networks, and volunteer fire services. The industry was also driving increasing land values, which have the potential to undermine the ability of remaining farmers to expand their properties (of course, these also bring benefits to those farmers leaving the industry). These impacts were reflected in the generally negative views of the plantation industry as expressed by local residents. Of particular concern was the impact of the plantation industry on population levels and economic activity in the Shire. However, it is important to recognise that the plantation industry is both a symptom and a cause of socio-economic change in Boyup Brook. Much of this change stems from restructuring in the agricultural sector. The ongoing difficulties facing the Shire's livestock and cropping industry have created local economic conditions that favour the emergence of alternative land uses. The outcome has been a transfer of land from a low-profit industry to companies that are supported by investment capital, taxation incentives, and the prospect of higher profits per hectare. There are some who argue that the loss of farmers, and the subsequent impacts on the local economy and society is an inevitable part of the process of restructuring (Forth 2000). However, it is clear that the farm plantation forestry industry has accelerated the process, and the inability of the local community to cope with, or adjust to, the pace of this change is contributing to considerable local anxiety and stress.

This situation represents something of a contrast to Bridgetown-Greenbushes, where local residents tended to report little or no impact associated with farm plantation forestry. This was also reflected in other data on population change, economic and employment activity, and land values. The diverse economic and demographic base in Bridgetown-Greenbushes has helped to shelter the community from some of the negative impacts associated with farm plantation forestry. Indeed, the Shire appears to be capturing some of the economic benefits associated with the industry through the decision of some timber companies to base part of their operations in Bridgetown. Nevertheless, there were concerns about the possible environmental impacts of plantations. There was also a fear that the plantation industry might undermine the visual amenity of the district, thereby slowing lifestyle related growth.

4. The Social and Economic Impacts of Farm Plantation Forestry in the Green Triangle Region

This chapter examines the social and economic implications of farm plantation forestry in the Green Triangle region of South Australia and Victoria. It focuses on the impacts in two local government areas, Wattle Range in South Australia and West Wimmera in Victoria. The chapter begins by providing a brief overview of the development of the farm plantation forestry in the Green Triangle before examining the social and economic impacts of the industry.

4.1 Farm Plantation Forestry in the Green Triangle

As in the south-west of Western Australia, farm plantation forestry has recently emerged as an important industry in the Green Triangle region. While parts of the Green Triangle, particularly in South Australia, have had major pine plantations since the 1950s and 1960s, hardwood plantations only began to emerge during the late 1980s and early 1990s. Much of the initial development involved small plantations of Tasmanian Bluegums that were integrated into existing farm enterprises. These tree plantings generally served a number of Landcare functions and offered farmers the prospects of some financial return when the trees reached maturity. Tree planting was also encouraged by a number of joint ventures with forest processors in the region (see Curtis and Race 1997). For example, Kimberly Clark established a number of joint ventures with farmers during the 1990s. This was further supported by the South Australian Department of Primary Industries, who were contracted by Kimberly Clark to initiate, oversee and manage joint ventures with landholders. However, changes in Federal government taxation rulings following the implementation of the *2020 Vision* policy in 1997 have contributed to the rapid extension of large-scale plantations on cleared agricultural land. The expansion has been characterised by a general shift away from joint ventures that incorporated trees integrated with existing enterprises to whole scale plantations.

Figures from the National Plantation Inventory indicate that, to September 1999, there were 12,000 hectares of hardwood (predominantly Tasmanian Bluegum) plantations and 106,000 hectares of softwood (predominantly pine) plantations in South Australia (Wood and Allison 2000a). The majority of these planting are located in the south-east of South Australia. In the case of the Wattle Range District Council, data from land transactions and interviews suggested that, by September 2000, there were around 15,000 hectares of trees on cleared agricultural land, most of which is in the eastern parts of the LGA. According to one timber company representative, this is likely to expand by another 2,000 hectares per annum for at least the next two years.

In the Victorian component of the Green Triangle there were around 65,000 hectares of hardwood plantations and 219,000 hectares of softwood as of September 1999 (Wood and Allison 2000a). Estimates derived from information provided by the Green Triangle Regional Plantation Committee suggests that there are now around 10,000 hectares of hardwood plantations on cleared agricultural land in the south-west corner of the West Wimmera local government area. The most extensive developments have been around the small settlements of Dorodong, Dergholm and Poolaijelo. According to some of the plantation company representatives in the Green Triangle region, the area of farm plantation forestry is likely to increase by between 4,000 and 6,000 hectares per annum for at least the next two years.

4.2 The Local Economy and Employment

In Wattle Range and West Wimmera, agriculture is the leading economic sector. In Wattle Range the key farm enterprises are viticulture, cattle and sheep grazing, and potato growing. According to the 1996/97 Agricultural Census, the total value of production in the area was \$115.9 million, with \$80.3 million from crops (including grapes) and the remainder from livestock and other agricultural

products. The total number of farms in Wattle Range increased between 1986 and 1996 (Table 4.1), though this was largely as a result of the proliferation of vineyards in the Penola district. The increasing number of properties in the viticulture sector masks a decline in the number of broadacre crop and livestock properties in Wattle Range. As in other parts of Australia, processes of rural restructuring have led to farm amalgamations and a reduction in the total number of farms. Similar processes have affected the mixed crop and livestock sector in West Wimmera, with the total number of farms falling from 502 to 472 between 1986 and 1996.

Table 4.1 Changing Number of Commercial Farms in Case Study LGAs, 1986-1996

	1986	1991	1996	Change, 1986-96
Wattle Range	585	567	654	69
West Wimmera	502	487	472	-30
TOTAL	1,087	1,054	1,126	39

(Source: ABS, various issues)

The long-term nature of this decline would suggest that it is linked more to the broader processes of agricultural restructuring outlined in the previous chapter than to the recent emergence of farm plantation forestry. However, it is clear that farm plantation forestry is having significant impacts on local agricultural land use. Evidence from land transactions data held by the South Australian Department for Environment and Heritage indicates that, between January 1996 and September 2000, a total of 32 farms (covering 14,000 hectares) in Wattle Range were sold to plantation companies. If local projections that the area under trees will increase by a further 4,000 hectares in the next two years are correct, then the loss of a further 10 farms might be expected within this period. This is based on an average farm size for the region being 375 hectares (ABS, 1997).

In West Wimmera, where detailed data on land transactions are less readily available, the estimated 10,000 hectares of plantations on cleared agricultural land would have resulted in the loss of the equivalent of 26 average sized farms (based on the average farm size of 375 hectares). If timber company estimates that the area of farm plantation forestry will increase by between 4,000 and 6,000 hectares per annum for the next two years are accurate, then West Wimmera might expect the equivalent of a further 26 or so farms to be turned over to trees during this period.

Data derived from ABARE's (2000) *Farm Surveys Report* provide an indication of the different financial returns from mixed livestock farming and farm plantation forestry for the Wattle Range/West Wimmera region. The average mixed livestock farm in the Wattle Range and West Wimmera agro-ecological zone generates a gross income of \$222 per hectare per year, with costs of \$180 per hectare per year. This provides the average farmer with an operating surplus (or net return) of \$42 per hectare per year. As pointed out in the previous chapter, returns from plantation forestry can range between \$100 and \$250 per hectare per year for farmers who lease their properties to timber companies. Despite the returns to plantations being significantly higher than those for mixed livestock farming, the flow-on benefits to the local community depend, to a large extent, on farmers remaining in the district. Existing evidence would suggest that this is not always the case, and that many farmers move to urban and/or coastal centres (Schirmer 2000). If a property is purchased by a timber company, then much of the income from plantations goes to investors outside of the local community.

The rapid expansion of the farm plantation forestry industry does not appear to have had a major impact on local incomes in the region (Table 4.2). In West Wimmera, mean taxable incomes remain well below the Victorian average. By contrast, in Wattle Range the mean taxable income is only marginally less than the South Australian average, which is probably due to the relatively high incomes generated by Penola's viticulture sector.

Table 4.2 Average Taxable Income in Case Study LGAs, 1992/93–1997/98

	1992/93	1993/94	1994/95	1995/96	1996/97	1997/98
<i>Wattle Range (SA)</i>						
No. Non-Taxable Earners	1,401	1,529	1,464	1,332	1,279	1,266
No. Taxable Earners	5,446	5,232	5,306	5,506	5,497	5,370
Total Taxable Income ('000)	134,351	138,997	147,758	154,380	156,395	160,889
Mean Taxable Income	24,670	26,567	27,847	28,038	28,450	29,960
Mean Taxable Income (SA)	25,331	26,855	27,403	28,217	29,361	30,474
<i>West Wimmera (Vic)</i>						
No. Non-Taxable Earners	707	735	588	584	537	508
No. Taxable Earners	1,614	1,489	1,638	1,630	1,586	1,547
Total Taxable Income ('000)	31,860	31,390	36,634	38,916	39,129	37,683
Mean Taxable Income	19,739	21,081	22,365	23,875	24,671	24,359
Mean Taxable Income (Vic)	26,940	28,261	29,238	30,356	31,433	32,730

(Source, ATO, various issues)

Tables 4.3 and 4.4 illustrate the importance of agriculture to the economies of Wattle Range and West Wimmera. At the 1996 Census, 23.7 per cent of the labour force in Wattle Range was employed in Agriculture, Fisheries and Forestry. The only sector with more employees was Manufacturing, with 25.6 per cent. Much of the employment in this sector is generated by firms processing timber from the region's pine plantations. As with many other parts of Australia, the level of employment in agriculture fell between 1986 and 1996. This tends to reflect a decrease in the number of farms in the region's mixed livestock industry. Between 1991 and 1996, the expansion of Penola's viticulture industry helped to slow the rate of decline in agricultural employment.

Table 4.3 Labour Force by Industry Sector, Wattle Range, 1986-1996

	1986	1991	1996	Change, 1986-91	Change, 1991-96
Agriculture, fisheries and forestry	1,761	1,242	1,238	-519	-4
Mining	20	8	42	-12	34
Manufacturing	1,305	1,317	1,333	12	16
Utilities	36	34	22	-2	-12
Construction	281	209	246	-72	37
Wholesale and retail trade	744	637	673	-107	36
Hospitality	155	161	187	6	26
Transport	105	95	103	-10	8
Communications	54	44	49	-10	5
Finance and property services	172	186	224	14	38
Public administration	143	123	145	-20	22
Education	316	286	286	-30	0
Health and community services	235	221	272	-14	51
Cultural and recreation services	40	32	32	-8	0
Personal services	84	79	100	-5	21
Other/not stated	112	690	268	578	-422
Total	5,563	5,364	5,215	-199	-149

(Source: ABS, 1996)

In West Wimmera, the proportion of the labour force engaged in agriculture at the 1996 Census was 52.4 per cent (Table 4.5). This highlights the area's dependence on agriculture for its economic wellbeing. The gradual decline in agricultural employment between 1986 and 1996 is similar to that experienced in many other rural communities in Victoria. This reduction has had significant implications for other sectors in the West Wimmera labour force, contributing to a contraction of employment in Wholesale and Retail Trade, Public Administration, Education, and Health and Community Services.

Table 4.4 Labour Force by Industry Sector, West Wimmera, 1986-1996

	1986	1991	1996	Change, 1986-91	Change, 1991-96
Agriculture, fisheries and forestry	1,612	1,237	1,149	-375	-88
Mining	8	6	7	-2	1
Manufacturing	45	68	104	23	36
Utilities	10	10	6	0	-4
Construction	82	47	82	-35	35
Wholesale and retail trade	232	216	181	-16	-35
Hospitality	40	49	56	9	7
Transport	66	57	51	-9	-6
Communications	29	26	16	-3	-10
Finance and property services	72	78	67	6	-11
Public administration	113	94	83	-19	-11
Education	152	141	109	-11	-32
Health and community services	128	155	142	27	-13
Cultural and recreation services	14	16	14	2	-2
Personal services	35	37	38	2	1
Other/not stated	82	156	89	74	-67
Total	2,720	2,393	2,194	-327	-199

(Source: ABS, 1996)

It is difficult to gauge the impact of farm plantation forestry on the labour markets of West Wimmera and Wattle Range. This is because the most recent Census (1996) was held before the rapid expansion of farm plantations. While long-term processes of restructuring are clearly affecting agricultural employment in the region, it is also likely that recent farm plantation forestry activities have impacted on the local workforce. The loss of more than 30 farms in Wattle Range and the equivalent of about 26 farms in West Wimmera is likely to reduce both the number of farmers living locally (as a result of outmigration) and levels of employment in the local farming industry. This, in turn, is likely to flow-on to other employment sectors, such as Retail and Wholesale Trade and Financial and Property Services. Despite this, recent evidence would suggest that farm plantation forestry is not impacting on the local unemployment rate (see Table 4.5). However, as with the Western Australian case studies, these statistics do not reveal the level of hidden unemployment or the number of farm workers and families who have left the region in search of alternative sources of work.

Table 4.5 Unemployment Rates in Wattle Range, West Wimmera and Australia, 1991-1999

	1991	1992	1993	1994	1995	1996	1997	1998	1999
Wattle Range	10.1	13.6	9.1	8.8	7.3	7.1	7.6	9.0	7.0
West Wimmera	6.2	7.2	10.2	8.3	7.4	6.5	6.4	6.1	5.7
Australia	9.5	10.5	10.7	9.2	8.1	8.5	8.5	8.2	7.2

(Source: DEETYA, *Small Area Labour Markets*, various issues)

Like the Shire of Boyup Brook in Western Australia, the local government area of West Wimmera is likely to be susceptible to economic changes associated with farm plantation forestry. The LGA's heavy dependence on broadacre agriculture means that changes in this sector can have significant implications for the local economy. In contrast to this, the District Council of Wattle Range has a particularly diverse economy. The presence of the thriving viticulture and winemaking industry, as well as manufacturing employment associated with the pine industry, helps to shield the economy from land use changes in broadacre agriculture. Nevertheless, it has still experienced a general decline in the labour force as a result of restructuring in agriculture.

It is also important to note that employment generated by the farm plantation forestry might not bring long-term benefits to either Wattle Range or West Wimmera. Plantation timber companies are tending to base themselves in larger regional centres, such as Hamilton in Victoria and Mt Gambier in South Australia. While there will undoubtedly be some employment based in smaller communities such as Penola, the impacts on the local economy are unlikely to be great. Furthermore, interviews with timber industry representatives and regional development practitioners in the Green Triangle suggested that future downstream processing industries associated with farm plantation forestry were unlikely to be located in Wattle Range or West Wimmera, but in larger regional centres such as Portland.

4.2.1 Community Perceptions of Economic and Employment Change

The semi-structured interviews with stakeholders, and the telephone survey of residents, revealed similar perceptions about the economic and employment impacts of farm plantation forestry in Wattle Range and West Wimmera to those found in the south-west of Western Australia. Generally, interviewees felt that the employment impacts would probably be neutral at the regional level, with forestry jobs replacing employment losses from 'traditional' agriculture. It was also noted that the level of employment for shearers and other agricultural contractors was likely to decrease. The decline in this type of work was seen as having important implications for those remaining farmers that rely on seasonal off-farm work to supplement their incomes.

Several people commented that it was the smaller communities that were likely to suffer in terms of business activity and employment opportunities, while the larger rural centres were likely to benefit. Interestingly, in one very small community where there had been a rapid expansion of large-scale plantations, the local publican/general store manager (and one of the few people still living in the area) suggested that the plantation industry had provided an important boost to his business:

'Before, the farmers didn't have any money to come here and spend. I was thinking seriously of selling up. Now with all the planting teams and contractors in the area, I reckon I have at least another five years of guaranteed business. I reckon it's great. This area was going down fast before the plantations moved in. The farmers that have left can afford to buy farms in better areas, or move down to the coast and retire'.

This resident also felt that it was inaccurate to assume that plantations meant a permanent loss of population. He argued that the emergence of the industry over the past four-to-five years, and an estimated four-to-five years of further plantings, meant that harvesting trees in the region was likely to be spread over a period of at least ten years and would not be a 'once-off' event.

In many respects, the above resident was a lone voice in suggesting that farm plantation forestry on its own was a positive development for small rural communities. However, a number of interviewees did suggest that, if timber companies or value-adding industries could be attracted to the small towns, then the economic and employment impacts would be positive. Generally, though, these statements were coupled with a recognition that timber companies were likely to be based in larger centres such as Mt Gambier and Hamilton, and that processing facilities would probably be established in one of the region's larger port towns.

The telephone survey of residents in Wattle Range and West Wimmera reflected similar perceptions about employment and economic impacts to those identified in the semi-structured interviews (see Table 4.6). Fifty per cent of surveyed residents in Wattle Range and 65 per cent of surveyed residents in West Wimmera felt that farm plantation forestry had little impact on jobs. However, the surveyed residents expressed little confidence that farm plantation forestry would increase jobs, with only 25 per cent in Wattle Range and 15 per cent in West Wimmera claiming that the industry would have positive employment outcomes.

It is interesting to note that 70 per cent of surveyed residents in both LGAs believed that there would be little impact on local business activity. Only 10 per cent of respondents in Wattle Range and 15 per

cent in West Wimmera felt that there would be a positive impact on business. Overall, there seems to be a relative lack of confidence that farm plantation forestry will contribute to major economic or employment benefits in the case study region.

Table 4.6 Community Perceptions of Economic and Employment Change Associated with Farm Plantation Forestry: Percentage by LGA

	Wattle Range (n=20) %	West Wimmera (n=20) %	All respondents (n=40) %
Impact of Farm Plantation Forestry on Local Employment			
Positive impact	25	15	20
Negative impact	25	20	22.5
Little or no impact	50	65	57.5
Uncertain of overall impact	0	0	0
Impact of Farm Plantation Forestry on Local Business Activity			
Positive impact	10	15	12.5
Negative impact	20	15	17.5
Little or no impact	70	70	70
Uncertain of overall impact	0	0	0

(Source: Telephone Survey)

4.3 Population Change and Community Structure

Population decline has mirrored the general decrease in employment in the agricultural sectors of both Wattle Range and West Wimmera. Table 4.7 shows that Wattle Range experienced a decline of 1,278 persons (-9.6 per cent) in the 10 years between 1986 and 1996. Over the same period, West Wimmera experienced a decline of 795 people (-13.9 per cent). It is not possible to make a direct link between this process of decline and the recent expansion of farm plantation forestry, since the bulk of the expansion occurred after the 1996 Census. However, based on the number of farms that have been turned over to plantations in both Wattle Range and West Wimmera, it is likely that the rate of population decline has increased since the last Census.

Table 4.7 Population Change in the Case Study LGAs, 1986-1996

	1986	1991	1996	Absolute Change, 1986-91	Absolute Change, 1991-96
Wattle Range	13,340	12,815	12,067	-525	-748
West Wimmera	5,728	5,334	4,933	-394	-401

(Source: ABS, 1996)

4.3.1 Community Perceptions of Population Change

Community concern about the impact of farm plantation forestry on population levels is an important regional issue. This was illustrated in an article in *The Naracoorte Herald* titled 'Blue gums vs community: can both prosper together?' (Himmerlich 2000, p.2). The article comments on the impacts of the recent expansion of Tasmanian Bluegum plantations in the Green Triangle stating that it '...has naturally sparked concern about the future – particularly whether the change in land use will reduce the rural population. The debate has been repeated over the border in the Dorodong and Poolaijelo areas where large tracts of land have also been planted to Bluegums in recent years'. The

article goes on to quote a local contractor who points out that the company that he works for ‘employs about 45 people, many of whom are off the land and are using plantation work to supplement their farm income’.

Table 4.8 provides an overview of the perceived population impacts of farm plantation forestry amongst participants in the telephone survey. Sixty per cent of residents surveyed in Wattle Range and 70 per cent of residents surveyed in West Wimmera felt that there would be little or no impact on population. Fifteen per cent of respondents in Wattle Range and 10 per cent in West Wimmera thought that farm plantation forestry would have a positive impact. As with employment and economic activity, this seems reflect relatively low confidence in the capacity of farm forestry to contribute to population growth. Indeed, 25 per cent of respondents in Wattle Range and 20 per cent in West Wimmera felt that there would be a negative impact on population. Conversations during the telephone interviews suggested that those residents living closer to farm forestry plantations tended to be more concerned about depopulation than those residents who lived in other parts of the case study LGAs.

Table 4.8 Community Perceptions of Population Change Associated with Farm Plantation Forestry: Percentage by LGA

	Wattle Range (n=20) %	West Wimmera (n=20) %	All respondents (n=40) %
Impact of Farm Plantation Forestry on Local Population Levels			
Positive impact	15	10	12.5
Negative impact	25	20	22.5
Little or no impact	60	70	65
Uncertain of overall impact	0	0	0

(Source: Telephone Survey)

4.4 Services and Infrastructure

Similar concerns to those noted in the south-west of Western Australia about the impacts of farm plantation forestry on services and infrastructure were raised during semi-structured interviews in Wattle Range and West Wimmera. Two main issues were identified:

- the impacts on roads and the ongoing maintenance costs associated with this;
- the impacts on local fire services.

As in the south-west of Western Australia, the key issue in terms of roads was the impact of heavy haulage trucks during harvest. There were concerns about the increased cost of road repairs and maintenance, planning of log haulage routes, and road safety issues. Partly in response to this, a number of local governments in the Green Triangle Region have established a Timber Industry Regional Evaluation Strategy (TIRES) group to identify and plan for future the road infrastructure requirements of the plantation industry. One recent study on transport issues in the south-east of South Australia recommended that Traffic Impact Statements should be incorporated into the planning process (Maunsell McIntyre Pty Ltd 2000). These impact statements would enable local governments and transport authorities to have a qualified assessment of the implications of new developments for the road network. The Maunsell McIntyre study argued that these statements would show what measures could be adopted by the proponents of the development to ensure that adequate transport and safety standards are maintained.

In addition to issues associated with roads, a number of interviewees indicated that the provision of fire services in some parts of the region were under threat as a result of farm plantation forestry. One

of the key issues was that plantation companies have been reluctant to contribute either finances or personnel to local fire services. Rural communities rely heavily on local volunteers to provide these services. In areas where the expansion of plantations has resulted in depopulation, there is concern that volunteer fire services are rapidly losing members and becoming unviable. However, the general view of timber industry was that Tasmanian Bluegums do not pose a greater fire risk than ‘traditional’ agriculture, provided that they are properly managed. A forestry representative indicated that when Bluegums are young they act as a fire retardant, but as they get older the fire risk intensifies with the gradual increase in ground litter. Pine plantations were seen to present a much greater fire risk than Tasmanian Bluegums. Given that both present at least some fire risk, and that both species are being planted on former agricultural land that is usually surrounded by pre-existing agricultural enterprises, it is not surprising that there are concerns from local residents about the deterioration in local volunteer fire services.

4.4.1 Community Perceptions of Services and Infrastructure Impacts

A recent article in *The Naracoorte Herald* (Himmerlich 2000, p.2) quotes a local councillor who suggested that the farm plantation industry was having serious impacts on services and infrastructure. She claimed ‘...the loss of population in some areas would cause difficulties for those who remained in getting services such as the school bus or a CFS (country fire service) brigade in the vicinity’. She also raised concerns about the impacts of the industry on the road network, stating that ‘It has been estimated that if plantations reach 100,000 hectares in size, the number of B-doubles on the road carrying woodchip to Portland would increase to 700 per day’. The article reflects similar concerns to those expressed during the semi-structured interviews with local stakeholders.

The results of the telephone survey of residents presents something of an interesting contrast to the views of participants in the semi-structured interviews. Fifty-five per cent of residents surveyed in Wattle Range and 60 per cent of participants in West Wimmera felt that farm plantation forestry would have little or no impact on services and infrastructure (see Table 4.9). It is, however, important to note that only 10 per cent of respondents in Wattle Range and five per cent in West Wimmera felt that the industry would have a positive impact on local services and infrastructure.

Table 4.9 Community Perceptions of Service and Infrastructure Change Associated with Farm Plantation Forestry: Percentage by LGA

	Wattle Range (n=20) %	West Wimmera (n=20) %	All respondents (n=40) %
Impact of Farm Plantation Forestry on Services and Infrastructure			
Better Services and Infrastructure	10	5	7.5
Poorer Services and Infrastructure	30	35	32.5
Little or no impact	55	60	57.5
Uncertain of overall impact	5	0	2.5

(Source: Telephone Survey)

4.5 Land Values

The availability of detailed data on land transactions in South Australia makes Wattle Range an ideal locality in which to examine the impacts of the farm plantation industry on land values. A review of land transactions data reveals that, prior to 1997 and the implementation of the *2020 Vision*, there were very few cases of timber companies purchasing entire farms to establish plantations. Those farms that were used for plantations were leased or involved integrating trees with existing farm enterprises.

Table 4.10 shows that, from January 1997 to September 1999, there has been a rapid increase in the number of farms being purchased by plantation companies. This has been accompanied by significant growth in the price being paid for land. Three farms were purchased in 1997 at an average price of \$1,391 per hectare, and four farms were purchased in 1998 at the lower average of \$1,019. Over the past two years, however, plantation companies have purchased a total of 28 farms. In the nine months until September 2000, the average price being paid by these companies was \$2,169 per hectare; an increase of more than \$750 on the prices being paid in 1997.

Table 4.10 Sales of Farms to Plantation Forestry Companies in Wattle Range, 1997-1998

	Farm Sales	Total Area (ha)	Average Property Size (ha)	Average Price Per Hectare
1997	3	986.4	328.8	1,391
1998	4	979.6	244.9	1,019
1999	10	2,656	265	1,498
2000 (to Sept)	18	9,486	527	2,169

(Source: Department for Environment and Heritage (SA), unpublished sales reports)

Table 4.11 provides an example of some of the land transactions completed by plantation companies between 1997 and September 2000. It illustrates that virtually all plantation developments on cleared agricultural land have occurred on sheep and cattle farms. Given the recent economic difficulties facing wool and cattle growers it is perhaps not surprising that it is these farmers that are willing to sell their properties. The table also demonstrates that the prices plantation companies have been paying for land increased rapidly between 1997 and 2000.

Table 4.11 Examples of Property Transactions Involving Plantation Forestry Companies in Wattle Range

Date of Transaction	Purchaser	Area (ha)	Original Land Use	Price Paid (\$)	Price per Hectare
30/04/1997	Penola Bluegum Plantations	299.3	Sheep and Cattle	435,000	1,453
28/06/1998	Australian Hardwood Holdings	150	Sheep and Cattle	137,585	917
08/12/1998	Auspine	326	Sheep and Cattle	315,000	965
16/06/1999	Australian Plantation Timber	452.4	Sheep and Cattle	590,000	1,304
28/06/1999	Australian Plantation Timber	299.4	Sheep and Cattle	504,000	1,683
24/12/1999	Timbercorp	306.8	Sheep and Cattle	552,060	1,799
31/01/2000	Auspine	573.2	Sheep, Cattle and Pines	1,136,720	1,983
31/01/2000	Australian Plantation Timber	424.5	Sheep and Cattle	915,304	2,156
09/02/2000	Plantation Land	408.7	Sheep and Cattle	1,010,306	2,472
09/03/2000	Australian Plantation Timber	1012.4	Sheep and Cattle	2,795,000	2,762
30/03/2000	Plantation Land	138.4	Sheep and Cattle	376,193	2,718

(Source: Department for Environment and Heritage (SA), unpublished sales reports)

While accurate data are less readily available for West Wimmera, it is reasonable to assume that similar trends are occurring to those in neighbouring Wattle Range. Indeed, one real estate agent claimed that there had been more sales in the six months prior to March 2000 than there had been in the previous 10 years (Houston 2000a). It was also estimated that the value of land sold to plantation companies in the Greater Green Triangle region could be as high as \$360 million.

4.5.1 Community Perceptions of Changing Land Values

In both Wattle Range and West Wimmera, participants in the semi-structured interviews generally noted a direct link between the growth of farm plantation forestry and rising agricultural land values. It was also pointed out that there are a number of different markets for land in the case study area, and that the Bluegum industry does not influence agricultural land values throughout the region.

Plantation companies tend to purchase lower value sheep and cattle farms, rather than high-cost viticultural land. Plantation companies also have minimal impact on land prices in the lower rainfall areas of Wattle Range and West Wimmera. Some of the other issues noted by stakeholders include:

- the inability of some farmers to expand their holdings as a result of the prices being paid by plantation companies;
- the longer-term implications of farm forestry for land prices. A number of stakeholders questioned the sustainability of current land values and suggested that, in the future, there may be a slump in prices.
- that high land prices enabled farmers to leave the industry in a secure financial position.

The telephone survey of residents in Wattle Range and West Wimmera revealed that most participants felt that there was a relationship between farm plantation forestry and land prices (see Table 4.12).

Fifty per cent of participants in Wattle Range and 60 per cent in West Wimmera claimed that the industry was contributing to rising land prices.

Table 4.12 Community Perceptions of Land Values Changes Associated with Farm Plantation Forestry: Percentage by LGA

	Wattle Range (n=20) %	West Wimmera (n=20) %	All respondents (n=40) %
Impact of Farm Plantation Forestry on Land Values			
Increased Land Values	50	60	55
Decreased Land Values	15	0	7.5
Little or no impact	35	40	37.5
Uncertain of overall impact	0	0	0

(Source: Telephone Survey)

4.6 Other Social and Economic Concerns and Impacts

A number of the other socio-economic issues raised during interviews and fieldwork in Wattle Range and West Wimmera were very similar to those noted in the south-west of Western Australia. These included:

- concerns about the impact of depopulation on local social networks and institutions;
- the sense of isolation and loss of community experienced by remaining farmers in areas that have experienced an expansion of plantation forestry;
- the use of the planning system to guide and/or restrict development;
- the loss of prime agricultural land to trees;
- concerns about the environmental impacts of plantations, particularly the aerial spraying of chemicals and the destruction of native vegetation;
- the lack of biodiversity associated with timber plantations;
- one local newspaper referring to Bluegum plantations as a mental health issue (Author Unknown 2000, p.3). The article suggested that the rapid expansion of the industry, and the lack of information about its activities/impacts, was a cause of stress which could, in turn, lead to various physical illnesses.

One issue of particular importance in Wattle Range was the level of water use by plantations, and the subsequent impact on the amount of water allocated to irrigation agriculture. Current water allocations are based on the amount of recharge to the groundwater aquifer. Farmers that rely on water allocation permits were concerned that plantations might reduce levels of groundwater recharge. Because of the possible impact of plantations on groundwater recharge, irrigators are arguing that plantation densities should be controlled and/or there should be greater restrictions on the total area of plantations in the region. The plantation industry argues that it is not legitimate to place restrictions on the industry, since it is not drawing from aquifer resources but from rainfall. Indeed, a representative from the timber industry suggested that irrigators were responsible for the overuse of groundwater, and that there was an element of ‘finger pointing’ occurring in relation to this issue.

An important issue in West Wimmera was the environmental damage caused by a plantation company in the Dergholm area (O'Brien 2000). A contractor employed by the timber company mistakenly removed a number of existing farm trees that provided an important nesting site for the endangered Red-Tailed Black Cockatoos (*Calyptrorhynchus banksii*). The incident caused considerable tension between a number of local residents, the local council, and the timber company involved. In another incident, a timber company removed landcare works, including trees and fencing, on a property that it had purchased (Powell 2000, p.1). This generated considerable concern within the local catchment group, largely because the works had been subsidised with government funding and undertaken as a community project. One local community representative argued that timber companies should be forced to protect native vegetation and landcare works (Powell 2000, p.1). He went on to suggest that plantation companies should work with, not against, local residents and should act as good corporate citizens.

4.7 Impacts Attributable to Government and Private Schemes

As in the south-west of Western Australia, it is difficult to separate out the various impacts that can be attributed to different government and private farm plantation forestry schemes. One of the important aspects of plantation forestry in the region is the pine industry in the Wattle Range area. Most of the large pine plantations were established by the State government in the 1950s and 1960s on public land. Over the past two decades or so, the gradual privatisation of the industry and the expansion of downstream processing involved the emergence of a number of large commercial pine companies. These companies have traditionally operated quite separately from the local agricultural industry.

The first commercial plantations on farms were established during the 1980s and 1990s. These types of plantings were encouraged by a number of State and Federal government Landcare programs (see Conacher and Conacher 2000). Trees such as Tasmanian Bluegums were integrated into existing farm enterprises as a form of environmental protection and rehabilitation, with the added possibility of a financial return in the long-term. The integration of trees on farms was also encouraged by joint ventures between farmers and timber companies. Initially these involved ‘contractual joint ventures’ (see Race and Curtis 1997a). This generally involved partnerships between landholders (providing land and possibly management) and industry/government (providing initial finance, management and marketing opportunities), with profits shared between the partners according to inputs and market value. These joint ventures retained farmers on properties, generated a valuable source of additional income, and provided important environmental benefits. Interviews with local stakeholders and conversations with residents suggested that these types of developments were generally viewed as positive at both the farm and district/regional levels.

The implementation of the *2020 Vision* has contributed to substantial farm plantation growth in the region. Evidence from interviews with timber company representatives and other local stakeholders would also suggest that there has been a shift away from integrated plantings towards whole farm plantations. This helps to increase economies of scale and reduce costs associated with small, dispersed plantings. The majority of farm forestry plantations are associated with private timber companies operating investment schemes, and involve properties being leased or, as is increasingly the case, purchased. The success of these schemes is driven, at least in part, by the taxation incentives

available to investors. The schemes are offered not only by companies growing Tasmanian Bluegums but also by some of the long established pine companies in the region. The large-scale plantations being established by these schemes are responsible for the various impacts that have been discussed in previous sections of this chapter.

4.8 Other Strategies for Structural Adjustment

4.8.1 Structural Adjustment at the Farm Level

In South Australia and Victoria, the State governments operate schemes aimed at promoting structural adjustment in the farm sector. These schemes, such as FarmBis (SA) and Farm\$mart (Vic), are partly funded through the Federal government's Property Management Planning program (Read and Heinjus 1998). Under these schemes, farmers can apply for funding to attend workshops and training courses, and to prepare strategic business plans for their farms. The central aim is to assist farmers to adjust their businesses to accommodate the changing nature of agriculture. Through these types of activities, farmers are encouraged to investigate alternative enterprise options and to give greater consideration to the environmental, social and economic aspects of their business.

Given that this project has not incorporated a detailed examination of the economic feasibility of alternative farm enterprises in Wattle Range and West Wimmera, it would be inappropriate to outline the exact means by which farmers in the region might pursue structural adjustment. However, it is evident that a number of farmers have successfully restructured their farm businesses. For example, in response to low wool prices, some growers have increased their cropping activity. Other farmers have become involved in viticulture, farm tourism, and new livestock enterprises. There is also evidence that many farmers have increased the size of their holdings in the pursuit of greater economies of scale. One of the dangers of expanding farm plantation forestry is that it might prevent some farmers from enlarging their properties in the pursuit of structural adjustment. The expansion and amalgamation of properties, and the emergence of farm plantation forestry, are also indicative of another component in the adjustment process – farmers leaving the agricultural sector.

4.8.2 Structural Adjustment at the Regional Level

The emergence of farm plantation forestry in Wattle Range and West Wimmera is, in many respects, indicative of wider regional processes of structural adjustment. The economic difficulties facing the region's crop and livestock industry has seen a shift towards more profitable land uses, such as farm plantation forestry. The climate and soil types in the Penola district have also resulted in the development of a thriving viticulture and wine industry.

In order to counter the long-term processes of economic and demographic decline associated with processes of rural restructuring, places such as Wattle Range and West Wimmera need to attract or develop alternative industries. Some jobs may be created by the plantation timber industry, though most of these jobs are likely to be concentrated in larger towns, particularly Hamilton and Mt Gambier. While both the South Australian and Victorian governments do have a number of lightly funded regional economic and social development programs, the current emphasis is on self-help approaches to rural revitalisation (Beer 2000). There is, however, evidence that this may be changing in Victoria, with the recently elected Labor government announcing a \$170 million Regional Infrastructure Development Fund. This fund aims to assist rural communities to identify and develop infrastructure requirements to encourage new economic activity in rural areas.

4.9 Conclusion

As with the LGAs studied in the south-west of Western Australia, both Wattle Range and West Wimmera have been experiencing an ongoing process of rural restructuring. While Wattle Range has a more diverse economy than West Wimmera, largely as a result of viticulture, winemaking and timber processing, the broadacre mixed crop and livestock industry is a central part of the economic base in

both of the case study LGAs. The difficulties facing broadacre agriculture, together with changes in government policy on timber plantations, have created the economic conditions that have facilitated the emergence of farm plantation forestry. This has accelerated the process of rural restructuring and is causing widespread concerns about the socio-economic sustainability of local communities.

While it is too early to argue that farm plantation forestry is having major impacts on the economic, employment and demographic base on rural communities, there are signs that the industry is contributing to a significant transformation. The shift in land use has reduced the number of broadacre properties in both Wattle Range and West Wimmera. This has the potential to erode local economic activity, employment opportunities, and social interaction. However, it might be argued that these outcomes would have occurred regardless of the activities of farm plantation forestry. Indeed, amongst some stakeholders, the industry was seen as providing farmers with a means of leaving the depressed agricultural sector with a degree of financial security.

It is also evident that the social and economic impacts of farm plantation forestry are spatially uneven. Plantations tended to be concentrated in a few local areas, such as around the township of Dergholm in West Wimmera. It is also apparent that farm plantation forestry companies tend to be locating their bases in larger regional centres, such as Hamilton. This means that many of the potential economic benefits tend to bypass smaller towns. This trend is similar to that discovered in the south-west of Western Australia. Other similarities with the south-west of Western Australia include the widespread community concerns about the impact of the industry on roads and the environment.

5. Summary and Recommendations

This chapter provides a summary of the key findings from the case studies of the socio-economic impacts of farm plantation forestry in the south-west of Western Australia and the Green Triangle region of South Australia/Victoria. These findings, together with the review of the literature, form the basis of a series of recommendations for the development of the industry both in high and in medium to low rainfall areas. These recommendations are aimed at minimising the negative impacts and maximising the positive benefits in those areas that have yet to experience the expansion of farm plantation forestry.

5.1 Impacts on Economic and Employment Structures

At a broad regional level, farm plantation forestry offers both the south-west of Western Australia and the Green Triangle a number of important economic and employment benefits. The case studies in these regions indicate that farm plantation forestry has the capacity to create new jobs and diversify regional economies. The industry is generating business and employment opportunities in contract planting, site inspection and preparation, fire management, tree nurseries, chemical spraying, and tree harvesting and haulage. There are also hopes that both of the regions will benefit from an expansion of downstream processing of timber products. The potential of farm plantation forestry to contribute similar outcomes in other high rainfall areas has been highlighted in a number of other studies, notably those by the Farm Forestry Task Force (1995), the State Timber Regional Evaluation Strategy (2000), Ray (2000), Dwyer Leslie Pty. Ltd. and Powell (1995), and the Institute of Land and Food Resources (2000).

While the regional impacts of farm plantation forestry can be positive, they can also mask negative local economic and employment impacts. The findings of this project, and those of a number of other studies (e.g. Johnson and Price 1987; Mather and Murray 1987; Kelly and Lymon 2000; Schirmer 2000; Institute of Land and Food Resources 2000), indicate that the economic and employment benefits associated with farm plantation forestry are likely to be concentrated in larger regional centres, such as Hamilton in Victoria, Mt Gambier in South Australia, and Bunbury, Albany and Manjimup in Western Australia. In smaller rural communities, such as Boyup Brook in Western Australia, the emergence of plantation forestry on cleared agricultural land is contributing to significant restructuring in local economies.

The trend in all the case study areas is a shift away from integrated farm forestry towards whole farm plantations. One of the key features of the plantation industry is that it is not dependent on the same level of inputs as the mixed crop and livestock farming that it is replacing. It does not make regular purchases from stock and station agents, or buy farm machinery from local dealers, or utilise local services such as banks. In addition, the decline in the total number of farms in regions experiencing a growth in plantations is contributing to a reduction of jobs in: shearing and animal husbandry; planting, spraying and harvesting of annual crops; fencing; and other farm related duties. The concomitant outcome is often a reduction in economic activity and employment in small agricultural service towns. Furthermore, the tendency of timber companies not to base their operations in these small communities means that the plantation industry is not replacing the economic activity/employment formerly generated by agriculture.

It is, however, important to recognise that the contraction of local economies as a result of the changing structure of agriculture is not necessarily a recent trend (Black *et al.* 2000). Volatile commodity prices, falling farm incomes, farm amalgamation, and farm family outmigration have been affecting some rural communities for at least four decades (Anderson 1972). Indeed, the emergence of farm plantation forestry might well be regarded as a symptom of broader processes of restructuring in Australian agriculture. Perhaps if the terms of trade for agriculture were more favourable, farmers would be less likely to sell or lease their properties to plantation companies. Nevertheless, it is evident

that the rapid expansion of farm plantation forestry is accelerating processes of rural economic restructuring. Consequently, some businesses and residents in small towns are finding it difficult to adjust to both the nature and the pace of change. These difficulties were also noted in studies by Kelly and Lymon (2000) in the Shire of Plantagenet in Western Australia, and Schirmer (2000) in Tasmania and Victoria.

In some localities, the potential negative social and economic impacts of farm plantation forestry appear to be mitigated (or at least obscured) by the diversity of the local economy. For example, the economic base of the Shire of Bridgetown-Greenbushes includes an existing timber industry, mixed crop and livestock production, orcharding, lifestyle related in-migration, and tourism. Similarly, in the area around Penola in the Wattle Range District there is a combination of mixed crop and livestock agriculture, potato farming, the production and processing of softwood (pines), and viticulture and winemaking (including the tourism associated with this industry). These activities help to shield communities from the negative economic impacts associated with the transfer of farming land to timber plantations. By contrast, those communities with narrow economies, based largely on servicing agriculture, are particularly susceptible to the rapid loss of farm families and of the associated economic activity (see also Rasheed 2000). Given the self-help approach to regional development currently adopted by Federal and State governments, it is important that these communities investigate ways of encouraging economic development and diversification. In relation to farm forestry, these strategies might include:

- the provision of subsidised land/premises as an incentive for timber companies to base all or part of their operations locally;
- the establishment of farmer-owned cooperatives to develop, maintain and market timber from smaller growers (see, for example, Curtis and Race 1997, p.16-17);
- educational and tourist tours of plantation sites and local farm forestry establishments;
- in the longer term, establishing small-scale timber milling facilities for local timber products.

In addition to the regional and community level impacts, farm plantation forestry has important economic implications at the individual farm level. By purchasing or leasing land, the plantation industry offers some farmers with a means of exiting agriculture in a stronger financial position than might otherwise be the case. Indeed, there was a widespread recognition that the plantation industry was helping to ensure the longer term well-being of those farmers who had decided to lease out or sell their properties. Similar attitudes have also been reported in Australian and overseas studies (Selby and Petajisto 1995; Kelly and Lymon 2000; Ray 2000; Institute of Land and Food Resources 2000). However, there were also concerns amongst some stakeholders that not enough attention had been paid to the longer term economic consequences of leasing out properties. There were suggestions that, should the market for woodchips deteriorate, or a plantation company run into financial difficulties, then the cost of returning land to a state suitable for mixed crop and livestock agriculture could be considerable.

Recommendation 1

Federal and State government regional development agencies should identify communities experiencing, or likely to experience, an expansion of farm plantation forestry. These agencies, together with local governments, should play a proactive role in assisting communities to engage in long-term planning and development aimed at maximising the benefits and minimising the negative impacts of the associated rural adjustment process. This should include investigating the feasibility of developing downstream processing ventures in the vicinity of these plantations.

5.2 Impacts on Population and Community Structure

The case studies in the south-west of Western Australia and the Green Triangle region indicated that one of the key concerns of residents was the impact of farm plantation forestry on population levels. Interviews and discussions with residents in the case study communities suggested that those farmers who lease out or sell their properties are likely to: retire to coastal and/or metropolitan areas; move to larger urban centres in search of employment; or purchase properties in other farming regions. Very few farm families remain in their farmhouse or in the local community. A number of other studies have also noted the tendency of farmers to leave small communities once they have sold or leased their properties to timber companies (Kelly and Lymon 2000; Schirmer 2000). Some of the case study interviewees suggested that, on farms where large-scale plantations have been established, farmhouses do not necessarily remain vacant, with company employees sometimes occupying the dwelling. There were also cases where the farmhouse and a small area of land around it were excised from the plantation to form a small 'hobby farm'. However, there were also a number of cases where the farmhouse, sheds, dams and other facilities were demolished by plantation companies (see also Schirmer 2000). The destruction of farmhouses and infrastructure was often seen as symbolic of the death of an industry and a community. By contrast, integrating trees with existing farm enterprises was generally seen to have little or no impact on local population levels.

It should be noted that population decline is also linked to longer term processes of economic and social restructuring. As the previous section pointed out, the emergence of the farm plantation industry has coincided with deteriorating economic circumstances for many farmers. Indeed, the returns from broadacre agriculture in the regions suitable for plantations are generally lower than the predicted income from plantations, or than the annuities that are paid to farmers for land leased out to timber companies (Campbell White & Associates and Black 1999). Farm plantation forestry simply appears to have accelerated an ongoing process of population decline. Nevertheless, the impact of population loss (and particularly its apparent pace) on the local community should not be underestimated. The implications of depopulation for the remaining residents can be profound, and can contribute to the collapse of social networks and institutions, to a sense of isolation, and to a feeling that a community is 'dying'. However, it is important to recognise that, in some areas, processes of outmigration are being offset by immigration due to the expansion of other industries. For example, in Bridgetown-Greenbushes the expansion of tourism and lifestyle developments has contributed to a growing population.

One of the notable aspects of population change in the case study areas was its spatial context. Typically plantations are concentrated in certain areas within a LGA, rather than being spread evenly across a shire. In simple terms, the sale or lease of one farm in an area will often be followed in rapid succession by the sale or lease of neighbouring properties. The outcome is that plantations tend to occupy, say, 5-10 farms within a concentrated area. The localised nature of plantations was also reported in a recent study on land use change in the Green Triangle region of Victoria (Institute of Land and Food Resources 2000, p.7). The case studies conducted for the present project, and those completed by the Institute of Land and Food Resources (2000), suggest that plantations do accelerate the process of population decline in the those localities where the industry is expanding. They also provide rural communities with a visual reminder of the declining economic health of traditional farming.

At a more regional level, farm plantation forestry can contribute to an increase, or at least a stabilisation, in population levels. Population growth is likely to be concentrated in those same larger centres that are benefiting from economic and employment activity associated with the plantation industry. However, one of the problems in determining the exact impact of farm plantation forestry on the population of rural areas is the absence of recent Census data. The most recent population Census was held in 1996, with the next due to be conducted in 2001. Once results from the next Census are available, there is a need for further detailed research of the demographic impacts of farm plantation forestry.

Recommendation 2

Following the release of data from the 2001 Census of Population and Housing, there is a need for ongoing research into the impacts of farm plantation forestry on demographic, economic and employment structures.

5.3 Impacts on Services and Infrastructure

One of the concerns that was expressed by stakeholders in the two case study regions was that depopulation occurring as a result of farm plantation forestry might contribute to the withdrawal of services and infrastructure in some small rural communities. While there is little evidence that farm plantation forestry has thus far accelerated processes of service withdrawal, there is little doubt that, if plantation expansion and farm family outmigration continue at the current rate, then the provision of services in some rural communities is likely to become difficult to sustain. Indeed, a study by Ray (2000) suggested that the concentrated nature of plantation forestry around the settlement of Chowerup in the south-west of Western Australia, and the subsequent outmigration of farm families, contributed to the closure of the local school. Research on the social impacts of plantation forestry in Victoria and Tasmania by Schirmer (2000) provides evidence that depopulation and the breakdown of local social networks associated with the expansion of farm plantation forestry can lead to the closure of local facilities such as community meeting halls.

Another important issue is the impact of farm plantation forestry on local volunteer fire services. According to a number of interviewees, the loss of volunteers as a result of depopulation has meant that some of these services are now unable to cope with a serious fire. While plantation companies generally have fire fighting equipment, this is often located in regional centres some distance from the area of risk. Residents in both case study regions often doubted the commitment of plantation companies to the maintenance of local volunteer fire services. Similar concerns were raised in a study by the Institute of Land and Food Resources (2000) in the Green Triangle region of Victoria. It was also pointed out that timber companies are likely to be important beneficiaries of such volunteer services in the event of a fire. On the other hand, several plantation companies maintained that they were actively supporting fire prevention services through provision of fire fighting equipment, and that well managed plantations may reduce fire risks when compared to traditional agricultural activities.

A particularly important issue identified in both this study and other research is the impact of farm plantation forestry on local roads. Transporting harvested logs has the potential to cause serious damage to underdeveloped public roads that provide access to farms/plantations (Mayo 1998; State Timber Regional Evaluation Strategy 2000). Maintaining and upgrading local roads is a responsibility of local governments, which already devote a significant proportion of their budgets to this activity. Ensuring that local roads are able to cope with log haulage during the harvesting of plantations requires a considerable increase in spending on transport infrastructure. This raises questions about who should bear the cost of upgrading and maintaining roads that will service the plantation industry. There were suggestions by some stakeholders that plantations should be charged levies as a contribution towards the cost of road upgrades. However, timber industry representatives argued that, since they were paying rates and placing minimal stress on roads for a period of around 10 years, this was an unreasonable expectation. While a number of regions that have experienced an expansion in plantation forestry have established Timber Industry Regional Evaluation Strategy groups to identify problems and solutions associated with roads, it is evident that there are widespread community concerns about the long-term implications of the industry for local roads.

Stakeholders in a number of small towns and larger regional centres expressed a desire to attract processing industries for plantation timber. To date, however, only marginal consideration has been given to the infrastructure and service requirements of such industries. These requirements might include the provision on industrial land, transport infrastructure, housing, waste disposal/treatment facilities, and electricity, gas and water supplies. Although the quantity of timber available for harvesting now is still too small to make downstream processing economically viable at the present time, it is important for communities to give some consideration to their capacity to host such industries. As outlined in Chapter Two, if a small town is to compete successfully for processing industries, it needs to ensure that it can provide adequate services and infrastructure.

Recommendation 3

State governments should facilitate the development of Cooperative Fire Management Strategies between local governments, farmers, the plantation industry, and local fire services. These strategies should cover fire prevention and detection, equipment needs and provision, fire response planning and management, and training.

5.4 Impacts on Land Values

The findings of this research indicate that the plantation industry has made a direct contribution to rising land values in areas where timber companies are purchasing properties. For example, in Wattle Range (South Australia) the average price per hectare of cleared agricultural land that was sold to plantation companies increased from \$1,391 in 1997 to \$2,169 in 2000; an increase of 55.7 percent. Similar price increases were recorded in the other case study LGAs. The impact of plantation forestry on agricultural land prices has also been noted in other parts of Australia. For example, a study by the Institute of Land and Food Resources (2000) indicated that land values in south-west Victoria have increased rapidly as farm forestry plantations have expanded. Research by Ray (2000) in Western Australia estimated that land values had increased by up to 40 per cent in those areas experiencing a rapid expansion of farm plantation forestry.

Local residents and stakeholders in the case study regions were generally very conscious of the impact of farm plantation forestry on land prices. While this awareness is probably not surprising, it might also be a result of the relative infrequency of agricultural land sales prior to the emergence of the plantation industry. As a consequence, people may tend to base their perception of 'previous land values' on prices that applied many years ago. For example, in Boyup Brook one farmer claimed that a plantation company paid \$2,000 per hectare for land that was only worth \$600 per hectare. However, data from the Valuer General's office show that average land values in Boyup Brook were \$700 per hectare in 1986, while in 1999 they were \$1,850 per hectare. This suggests that, although the price that plantation companies pay for land may be above average, they are not paying double or triple the going rate as was sometimes suggested. In a number of interviews with plantation company representatives it was stated that the price timber companies pay for land is a key determinant of the viability of the plantation. This suggests that it is unlikely that the plantation companies will pay exorbitant prices for land. It was also pointed out that high land prices in the south-west of Western Australia were fuelling farm plantation forestry development in those suitable parts of Australia with lower land costs, such as the Green Triangle and Tasmania.

At the individual farm level, increasing land values as a result of farm plantation forestry can have a number of positive and negative impacts (see also Institute of Land and Food Resources 2000; Schirmer 2000; Ray 2000). For those farm families who wish to leave agriculture, the expansion of farm forestry has helped to ensure that there is a likely buyer for the property. It has also provided these farmers with a higher return for their land than they would have otherwise received. For example, an average 375 hectare farm in Wattle Range that is located in an area suitable for Tasmanian Bluegum plantations is likely to have sold for around \$520,000 in 1997 (based on the land values data reported in Table 4.10). Given the recent rise in property values, it is likely that the same property would have sold for more than \$810,000 in 2000; an increase of nearly \$300,000 over three years. This additional return has the capacity to improve the financial well-being and security of departing farm families. This theme was noted consistently by stakeholders in both of the case study regions. However, it was also pointed out that the rising cost of land made it difficult for remaining farmers to expand their properties. There were also concerns that remaining farmers rarely had the option of purchasing a nearby property because sales tended not to be advertised through regular fora (e.g. real estate agents and the rural press) and were generally negotiated directly with a timber company. As a result, some farmers felt that land sales had become increasingly secretive and excluded potential buyers.

5.5 Implications for Land Use Planning and Local Governance

In both of the case study regions, the planning system was often seen as an important means of mitigating some of the perceived negative impacts associated with the plantation industry. There is, however, some confusion over the different roles of Local, State and Federal governments in the planning process. The tier of government with the primary responsibility of land use planning is local government. However, local governments often expressed a reluctance to interfere with what they regarded as ‘market forces’. There was also a recognition that the advent of farm plantation forestry provided many families with a means of departing the agricultural sector in a secure financial position.

Research by the Institute of Land and Food Resources (2000) noted that the role of local governments is often undermined by their inadequate access to, and use of, expertise and resources. This includes a lack of information about the future development of the industry, land use change, and the social, economic and environmental impacts. The sense of powerlessness felt by some local governments was emphasised in Western Australia, where there were concerns that if local councils began rejecting plantation developments, the responsibility for some land use planning decisions might be transferred to the State government. Despite this, there was a view amongst some stakeholders that local government should adopt a firmer position and use planning regulations to:

- protect high quality agricultural land from plantation development;
- encourage integrated tree plantings rather than whole farm plantations;
- limit the total area of plantation development within local government areas;
- protect remnant vegetation;
- give consideration to the impacts of farm plantation forestry on aesthetic amenity;
- ensure that impacts on road infrastructure are addressed;
- prevent the demolition of farmhouses.

From the perspective of the plantation industry, there was a desire for greater planning consistency across local government areas. There was also a concern that some local governments have come to regard the plantation industry as a source of ‘easy revenue’. A number of councils have increased the application fees that are payable when plantation companies seek planning approval for new developments. It was also felt that the special conditions that are sometimes imposed on plantation developments by local councils are not consistent with those placed on other alternative agricultural pursuits. Part of the problem facing the industry is that local governments are particularly cautious about large-scale landscape changes. There also appears to be something of a lack of trust between local governments and timber companies. In general, councils have not been provided with good information on the potential size and nature of the industry at the local/regional levels, or on its likely local economic and social impacts. Furthermore, plantation companies are sometimes seen as uninterested in the social, economic and environmental consequences of their activities. Accordingly, local governments see themselves as having a legitimate role in protecting their community from the possible adverse impacts of any new development.

Recommendation 4

State government agencies responsible for land use planning, together with regional development organisations, local governments and regional plantation committees, should collaboratively establish and maintain regional databases that draw on their respective resources and expertise to provide information on:

- *the expansion of farm plantation forestry on cleared agricultural land;*
- *the socio-economic trends attributable to farm plantation forestry;*
- *the environmental/landscape changes attributable to farm plantation forestry;*
- *trends and future developments in the plantation industry;*
- *likely impacts of various future development scenarios.*

Such resources would provide a more thorough basis for land use planning and other policy decisions.

Recommendation 5

Local governments, timber industry representatives, and State government agencies responsible for land use planning should devise a set of standardised planning provisions that can be applied to farm plantation forestry consistently across local government areas. These regulations should be tied to existing Codes of Practice for the plantation industry and should also be incorporated into local government planning schemes.

5.6 Other Social and Economic Issues

In both the Green Triangle and the south-west of Western Australia, there were widespread concerns about the environmental impacts of farm plantation forestry. Some of the issues raised included:

- the destruction of remnant vegetation and wildlife habitats by plantation companies;
- the destruction of landcare works on farms turned over to plantations;
- the impact of chemical sprays on water courses and farm crops;
- the impact of plantations on groundwater aquifers;
- the lack of biodiversity associated with single species plantations;
- a lack of weed control;
- soil erosion following harvest;
- excessive shading of neighbouring paddocks.

Similar anxieties about the impacts of farm plantation forestry have been found in various studies in other parts of Australia (Institute of Land and Food Resources 2000; Schirmer 2000). While there are a number of cases where timber companies have been responsible for environmental damage (e.g. the felling of remnant vegetation), it is important not to overlook the negative impacts of broadacre crop and livestock agriculture (e.g. soil erosion, salinisation, natural habitat removal). Indeed, timber companies point out that plantations can help to counter soil salinisation, reduce pressure on native forest timber resources, and contribute to carbon sequestration. Nevertheless, there is a need for close monitoring of the impacts of the farm plantation forestry industry on the environment.

Perhaps one of the most common criticisms of the farm plantation forestry industry is that it is dominated by ‘faceless corporations’ with little or no commitment to the rural areas in which they operate. One of the apparent reasons for this attitude was the absence of resident managers and/or people living on the ‘tree farms’. This, together with a different approach to land use and management, tended to emphasise the social and cultural differences between plantation companies and local farmers. There was also a feeling that the industry brought very few, if any, economic and social benefits to the local community. One local councillor in Western Australia felt that the industry simply ‘mined the community by taking people and resources out and putting nothing back’. Research in the south-west of Victoria by the Institute of Land and Food Resources (2000) found that the large geographical context in which these corporations operate does not readily contribute to the development of the types of local social and economic connections and loyalties that exist among local farmers. While companies sometimes tried to establish links with communities through corporate sponsorship of some clubs and events, there generally remains a level of distrust by local residents. Much of this would appear to stem from the lack of communication between small communities and timber companies. At the local level, little is known about the future size and nature of the plantation industry. Furthermore, the sensationalist and emotive reporting of issues by some local newspapers does little to enhance the image of the industry. As outlined by the Institute of Land and Food Resources (2000), timber companies need to examine new ways of building social and economic networks and trust within smaller communities. This will require an industry-wide response to the negative perceptions of plantations, together with a focus on retaining attributes that communities

value, such as the development of a stable economic base, the adequate provision of services, the maintenance of social networks and organisations, and the retention of young people.

A number of plantation companies stated that they are becoming more proactive in addressing community concerns through public seminars and workshops and provision of community liaison officers. Many of the concerns raised in this report could be allayed by closer liaison between plantation companies and the communities in which they operate.

One of the apparent dangers associated with the current level of local concern and, in some cases, opposition to the timber industry is that it may cause a backlash against the very notion of planting trees on cleared agricultural land. In both of the case study regions, plantations that are integrated with existing agricultural enterprises are regarded by farmers, town residents and other stakeholders as having a number of important environmental, economic and social benefits. This form of tree planting is often seen as a means of:

- addressing environmental problems such as salinity, erosion and waterlogging;
- improving the productivity of other enterprises by providing shade and shelter;
- increasing farm incomes;
- maintaining farmers in agriculture by improving long-term profitability.

Interviews with a number of residents in the Green Triangle and the south-west of Western Australia noted that the backlash against whole farm plantations was leading to a more cautious approach to integrated farm plantations. As an example, some opponents to whole farm plantations often argue that the market for woodchips is not proven and that current prices are unsustainable. One possible outcome is that those farmers looking to integrate trees on farms might be more reluctant to do so. There was also a feeling among some stakeholders that integrated plantations (especially those established on a joint venture basis) will eventually lead to whole farm plantations. There is a danger that if an 'anti-trees' culture begins to emerge in some communities, then the expansion of plantations that are integrated with agriculture may be hindered.

Recommendation 6

Relevant Federal and State government agencies should conduct ongoing research into the environmental impacts of farm forestry plantations.

Recommendation 7

Regional Plantation Committees should establish local working groups consisting of timber industry representatives and farmers in areas where extensive planing is occurring or is likely to occur. These working groups should develop locally specific guidelines/protocols for:

- *weed and pest control;*
- *fire prevention and control;*
- *catchment management and environmental rehabilitation;*
- *other issues affecting farm management and neighbour relations.*

Recommendation 8

In order to reduce negative attitudes and opposition to farm forestry plantations, timber companies should foster closer economic and social links with rural communities. These might include basing their operations in small communities, patronising local businesses and services, employing local residents, preserving and renting out farmhouses, and sponsoring community events.

Recommendation 9

Regional Plantation Committees should organise regular community workshops that bring together representatives from the timber industry, relevant government agencies, and local farmers, business people and other residents. These workshops should aim to:

- *outline trends and proposed developments in the timber industry;*
- *outline local economic and employment opportunities in the timber industry;*
- *address concerns about any social, economic and environmental impacts;*
- *foster positive relationships between the timber industry and local residents.*

5.7 Impacts Attributable to Various Government and Private Schemes

Over the past two decades, there has been a gradual transition in the types of forestry schemes operating in Australia. During the 1980s and early 1990s, farm forestry schemes tended to take the form of joint ventures between landowners and timber companies or government agencies. These joint ventures generally involved plantings that were integrated with existing farm enterprises and, when implemented successfully, could be quite profitable. The types of schemes range from share farming arrangements, where the farmer is paid an annuity along with a share of the final harvest proceeds commensurate with the value of contribution at planting and throughout the rotation, to straight annuity schemes based on a lease value for the land (see Curtis and Race 1997). As outlined earlier, joint ventures involving integrated farm forestry are widely regarded as providing a number of environmental, economic and social beneficial at the farm, local and regional levels. While some of these types of schemes are still available to landholders, the implementation of the *2020 Vision* since 1996 has contributed to major changes in the nature of farm-based forestry in Australia.

A major plank of this policy was to provide financial incentives to encourage investment in the plantation industry. The formation of plantation investment schemes, which are structured in a way that allows the scheme managers to offer substantial upfront tax deductions to investors, has seen the rapid expansion of plantations since the mid-1990s. The capital raised by these schemes is used to lease or purchase land from farmers in order to establish timber plantations. Rather than establish plantations that are integrated with existing farm enterprises, these companies tend to favour whole farm plantations, since these help to maximise economies of scale. The majority of new plantations are of Tasmanian Bluegum, aimed at the export woodchip market. It is these whole farm plantations, driven by private investment schemes, that have contributed to many of the impacts and community anxieties identified in both the case study regions and other parts of Australia (see Schirmer, 2000; Ray, 2000; O'Brien, 2000; Kelly and Lymon, 2000; Institute of Land and Food Resources, 2000; Houston, 2000).

One of the issues raised in both of the case study areas was the uncertainty surrounding the future market for export woodchips. A number of residents argued that the expansion of farm plantation forestry is being driven purely by the tax incentives on offer to investors, rather than proven market demand for woodchips. It was widely noted that the tax incentives can distort market signals and might contribute to an oversupply of wood. As a consequence, there was a degree of scepticism in some rural communities about the potential long-term benefits and sustainability of the industry. Clearly, the longer-term socio-economic impacts of farm plantation forestry will be closely tied to future markets for wood products, and in particular woodchips.

A recent market analysis by Judy Clark, from the Centre for Resource and Environmental Studies at the Australian National University, suggests that the concerns of some communities about the long-term viability of woodchip markets may be well founded (*The Weekend Australian*, 9/9/2000, p. 34). She claims that, as a result of the expansion of plantations around the world, there is likely to be an oversupply of woodchips in the next few years. Clark argues that greater emphasis needs to be placed on planting trees with the potential for higher value end-uses. In addition to failing to encourage the

production of high quality timber, it is apparent that current investment schemes are concentrating development in high rainfall areas. However, many of the environmental problems that trees are able to address, such as salinity, are at their most serious in medium and lower rainfall regions (Conacher and Conacher 1995). From this perspective, as one Western Australian farmer put it, 'the trees are often going in the wrong places'.

5.8 Impacts of Farm Forestry Versus Other Strategies for Structural Adjustment

Farm forestry is widely regarded as an important strategy for structural adjustment. As outlined above, farm forestry projects that integrate commercial trees with existing farm enterprises have the potential to diversify farm incomes, can have a synergising effect on crops and pastures, and can be used to counter some environmental problems. A recent report by Campbell White & Associates and Black (1999) provides detailed whole farm case studies of the benefits of integrated farm forestry. Other structural adjustment strategies that have been adopted by farmers include changing the production mix (e.g. from livestock to cropping), utilising new technologies, increasing economies of scale by purchasing or leasing land, establishing alternative 'niche' enterprises (e.g. farm tourism or aquaculture), and leaving the industry. These strategies can have a range of social and economic impacts at farm, community and regional levels. Furthermore, the various structural adjustment strategies adopted by farmers are often closely connected. For example, the ability of some farmers to increase economies of scale is dependent on the availability of land for purchase or lease. This depends upon some farmers deciding to leave the industry and sell or lease out their properties.

The decision of some farmers to leave the industry has, in many respects, been a critical element in the development of whole farm plantations. Some of the economic difficulties facing farmers, particularly in the livestock industry, together with the emergence of plantation investment schemes, has seen the transfer of agricultural land to a more profitable use. In other words, some farmers have been willing to cash in the accumulated value of their land, and move to other agricultural areas, or leave the industry altogether. While this form of structural adjustment can bring benefits for both the plantation company and the farmer selling the property, it can hamper the adjustment strategies of remaining farmers. This is because the rising agricultural land values as a result of farm plantation forestry can make it difficult for farmers to expand their properties in the pursuit of greater economies of scale. Furthermore, the tendency for plantation companies to bypass the local/regional real estate agents and negotiate directly with farmers for the purchase of land has meant that remaining landholders looking to expand are sometimes denied the opportunity to compete for the available land.

At the local and regional levels, processes of structural adjustment have had significant consequences for the wellbeing of rural communities. The changing structure and financial performance of agriculture contributes to a long-term process of economic, social and demographic adjustment in many rural communities (Tonts 2000). This adjustment can include:

- a reduction in farm labour;
- a contraction of local economies;
- outmigration and depopulation;
- the collapse of social networks and institutions;
- the closure or rationalisation of businesses and public services.

This research has indicated that farm plantation forestry can be an important component in this type of restructuring. By changing the nature of local economic and social structures, farm plantation forestry can contribute to some of these potentially negative aspects of structural adjustment at the local and regional levels. However, it is also important to note that farm plantation forestry is as much a symptom of structural adjustment as a cause of it. Arguably, if farming were more profitable, fewer farmers would be willing to leave the industry and sell their properties to plantation companies. The main impact of farm plantation forestry is that it appears to be accelerating processes of structural

adjustment. Farm plantation forestry also appears to have the greatest negative social outcomes at a local community level in those areas that are already suffering adverse consequences of rural decline.

Resolving the problem of rural social, economic and demographic decline has been given considerable recent attention (see Black *et al.* 2000; Pritchard and McManus 2000). In some communities, such as Bridgetown-Greenbushes, attributes such as scenic landscapes, heritage architecture and tourism developments have contributed to a reversal of longstanding patterns of economic and social decline (Greive and Tonts 1996). In others, the emergence of new industries as a result of climatic and landscape attributes can help to abate or reverse decline. One example is the Penola district in South Australia, which has benefited from the development of viticulture and winemaking industries. For many communities, however, there is a risk of ongoing social, economic and population decline. In those areas that are experiencing the rapid expansion of farm plantation forestry, this decline might have occurred despite the emergence of the industry.

There are, however, a growing number of rural communities across Australia that have reversed, or at least abated, decline through successful revitalisation schemes. These have included main street beautification and revitalisation projects, local rate subsidies for new businesses, the provision of free land for new industries and households, and the development and promotion of local tourism and recreation ventures. When environmentally appropriate and economically successful, these types of projects are more likely to have positive social benefits for smaller centres than is farm plantation forestry. However, such ventures might also have some negative social consequences. For example, an increase in tourism may in some cases be accompanied by more crime or by additional pressures on the environment. On the other hand, farm forestry that is integrated with existing farm enterprises has the capacity to contribute to a number of desirable economic and social outcomes. By improving farm productivity and profitability, and retaining farmers on the land, this type of forestry can help to maintain local economic activity, demographic structures, and social networks. When combined with successful local revitalisation strategies, integrated farm forestry is likely to be more beneficial to small rural communities than is the development of whole farm plantations.

In larger regional centres, farm plantation forestry does have the capacity to contribute to a positive process of structural adjustment. For example, the decision of some plantation companies to base themselves in regional centres such as Hamilton in Victoria or Mt Gambier in South Australia provides positive economic and demographic outcomes. It was also evident from the case studies that plantation companies tended to utilise services (e.g. mechanical repairers and earthmoving contractors) located in these centres, thereby contributing to further flow-on benefits. These outcomes are likely to be further consolidated by the potential development of downstream processing facilities in larger centres. However, the successful establishment of downstream processing in these inland centres (rather than larger coastal cities such as Bunbury) is likely to require at least some targeted investment from State and/or Federal governments.

5.9 Implications for Medium to Low Rainfall Areas

The nature of farm forestry in medium and lower rainfall areas (400-650 mm) is likely to be somewhat different from that in higher rainfall areas. One of the driving forces behind the emergence of whole farm plantations of species such as Tasmanian Bluegum in high rainfall areas is the prospect of harvesting timber and returning a profit within 12 years of initial planting. In medium to lower rainfall areas, faster growing species such as Bluegums are often inappropriate, or take longer to reach maturity. This tends to make such enterprises relatively unattractive to investment capital. There is, however, evidence that alternative tree species could have the capacity to generate commercial returns in medium to lower rainfall regions (Zorzetto and Chudleigh 1999). While far from exhaustive, the following provides a brief review of some of the opportunities for commercial timber production in lower rainfall areas:

- **Maritime pine** (*Pinus pinaster*) is currently being grown in various medium to low rainfall areas in Australia, particularly the Western Australian wheatbelt. Maritime Pine is used for saw-logs and timber for medium density fibreboard, veneer, posts, poles, furniture and paper. Trees are thinned at roughly 12, 20 and 26 years, with clear-felling occurring at about 32 years. In Western

Australia, the Department of Conservation and Land Management (CALM) instituted sharefarming arrangements with a number of farmers in the wheatbelt. The first 700 hectares of Maritime Pine tree crops were planted on farms in 1996, with another 2,000 hectares planted in 1997, and nearly 2,500 hectares in 1998. Recently, the commercial activities of CALM have been transferred to the newly created Forest Products Commission, which aims *inter alia* to plant 150,000 hectares of Maritime Pine in partnership with private owners over the next 10 years. Other drought resistant varieties of conifer being trialled in lower rainfall areas across Australia include Aleppo pine (*Pinus halepensis*), Canary Island Pine (*P. carariensis*), Brutian pine (*P. brutia*), and Eldar pine (*P. eldarica*).

- **High quality timber.** A number of tree species that can be successfully grown in medium to low rainfall areas can yield high quality appearance grade timber. Examples include Sugar Gums (*Eucalyptus cladocalx*), Swamp Yate (*E. occidentalis*), Brown Mallet (*E. astrigen*), and Yellow Gum (*E. leucoxyton*). In addition, Maritime Pine and Tasmanian Bluegum (with longer rotation and different management to those planted in higher rainfall areas) have the potential to be used for laminated flooring. To date, however, there has been relatively little investment in trees aimed at producing high quality wood in medium to low rainfall (and other) areas. The reasons for this include the long rotation period and a lack of adequate financial incentives for farmers and other investors.
- **Mallee systems.** During the second half of the 1990s, more than nine million oil mallee trees were planted in the Western Australian wheatbelt (Joint Venture Agroforestry Program 2000b). These shrubs are also suited to a wide range of other medium to low rainfall areas across Australia (Bartle 1999). To date, oil mallees have been integrated with existing farm enterprises, playing an important role in salinity control. However, the shrubs also have the potential to provide farmers with an important source of additional income and, at a wider level, may have a role in regional economic development through downstream processing. Oil mallees can be used to produce electricity, activated carbon, and eucalyptus oil. While there is still a need for further research on processing and marketing, a demonstration downstream processing plant is currently being establishing in the town of Narrogin, south-east of Perth.
- **Sandalwood** (*Santalum spicatum*) has the potential to develop into a significant industry in the medium to lower rainfall areas (Henschke 2000). The key market for sandalwood is Asia, where the powder derived from the timber is used to produce incense. Sandalwood oil is also extracted from the timber for the production of perfumes, cosmetics and medicine. Some farmers in the medium to low rainfall areas are now experimenting with sandalwood production, though the 20 year rotation makes growing the species a long-term proposition. While sandalwood currently offers the prospects of strong financial returns, there is a need for further research on the economics of growing the timber, and on the long-term market outlook for sandalwood products, especially if large numbers of farmers adopted this option.
- **Phase farming** involves farmers in low to medium rainfall areas planting woodlots of fast growing trees suited to high rainfall areas (e.g. Tasmanian Bluegums). Within three to five years, these trees extract excess water that has accumulated in the soil profile during a previous cropping phase. This extraction process reduces the risk of waterlogging and dryland salinity. The trees are then harvested for woodchips, and the land returned to cropping. Planting trees in this way is part of an integrated farm management approach. There are, however, questions about the profitability of this strategy and the difficulties in returning the land to cropping after tree harvesting (see Harper *et al.* 2000).

While growing trees on a commercial basis has some potential in low to medium rainfall areas, there are still formidable obstacles to be overcome to prompt the planting of trees on the scale needed to achieve the desired environmental and other outcomes in these areas (Joint Venture Agroforestry Program 2000b). A recent study by Zorzetto and Chudleigh (1999) found that investment into farm forestry in the low rainfall zone is inhibited by a lack of infrastructure and resources, and the time between planting and harvest, which for many species can be anything from 20 to 60 years. These barriers, together with high establishment costs, the lack of a farm forestry culture, and a lack of

confidence and/or information about the long term profitability of the industry, have probably contributed to the slow uptake of commercial tree growing by farmers in lower rainfall areas (Alexandra and Hall 1998). Furthermore, the ongoing concentration of farm plantation forestry in high rainfall areas suggests that investment is currently focused on producing fast growing species that generate a financial return within 10-12 years of initial planting.

Part of the reason for this concentration of activity in high rainfall areas appears to be linked to the nature of the tax benefits available to investors. In many respects, the taxation incentives lack the necessary spatial and temporal sensitivity to encourage investment in low to medium rainfall areas. While it is apparent that favourable taxation rulings have encouraged considerable expansion of commercial timber plantings in higher rainfall areas, the development of a timber industry in other areas will require more sophisticated financial/taxation incentives. These might need to take account of different agro-ecological zones, timber products, and farm business structures.

While taxation incentives can play an important role in promoting forestry activity on farms, there are a number of other prospects for financing commercial tree growing there. Joint ventures between growers and government business enterprises/private sector institutions have some capacity to contribute to the development of a farm forestry sector in medium to low rainfall areas. For example, as outlined above, the Forest Products Commission in Western Australia has joint venture arrangements available for farmers interested in growing maritime pine.

One of the future means of financing farm forestry in medium to low rainfall areas might involve 'environmental services'. In addition to generating products such as wood and oils, planting trees has the capacity to offer environmental services, such as the sequestration of carbon, the conservation of biodiversity, the purification of water, and the maintenance of hydrological balances that prevent dryland salinity. A recent report by Binning *et al.* (2000) provides detailed insights into the potential economic and institutional structure of the environmental services market. A widely discussed means of establishing such a market is a system of tradeable environmental credits. One of the most well-known proposals for such a system is 'carbon credits', which are designed to help meet the greenhouse gas emission standards outlined in the Kyoto Protocol (Shea 1998). While the Protocol has yet to be ratified and may change, the system would involve landowners/forest growers planting trees for sale as 'carbon credits' to companies/governments producing greenhouse gas emissions. In other words, tradeable carbon credits will be offered for carbon dioxide taken up by plantations. Under the Protocol, carbon sequestered in trees must come from new forests that are planted on land that has historically not been covered by forest, or that has been cleared for purposes such as agriculture. Similar environmental services trading schemes are also being considered for salinity mitigation, biodiversity maintenance, and water purification functions (Binning *et al.* 2000). Although there are still many uncertainties about how such trading schemes will operate and who will pay for such services, markets for these may have the potential to provide financial returns for farm forestry in medium to low rainfall areas.

5.9.1 Environmental Services and Whole Farm Plantations

While the ongoing uncertainty about the structure and viability of markets for environmental services makes it difficult to speculate about their likely impacts, it is possible that such markets could contribute to large-scale plantation forestry in medium to low rainfall areas. For example, companies producing significant amounts of greenhouse gases might purchase and/or lease whole farms in order to secure 'carbon credits'. Although individual farmers could, in principle, derive income from 'environmental credits' based on tree plantings integrated with other farming enterprises, there are some indications that the economies of scale required to become involved in the environmental services market, and the enormous technical, financial and institutional risks and uncertainties, may present significant difficulties for small landholders (Bahti 2000). While cooperatives, joint ventures, brokers, and various forms of government incentives may help to address these problems (see Binning *et al.* 2000), it may be that large corporations or prospectus style companies stand to benefit most from an environmental services market. This could result in large-scale corporate plantations similar to

those currently emerging in the higher rainfall areas. Should this situation arise in the lower to medium rainfall areas, then the socio-economic impacts at the local and regional levels are likely to be somewhat similar to those currently being experienced in high rainfall areas.

5.9.2 Integrated Plantings in Medium to Low Rainfall Areas

Although whole farm plantations might emerge as a result of a market in environmental services, much of the available evidence would suggest that whole farm plantation forestry is unlikely to develop in the medium to low rainfall areas, at least in the near future. In part, this is because investment driven plantation companies tend to be focused on species suited to high rainfall areas that yield a return on investment within a relatively short timeframe. Even if there is a change in the nature of taxation incentives for investors, it is likely that the long rotations required for many of the species that can successfully be grown in low to medium rainfall areas will act as a disincentive to the establishment of whole farm plantations there. A more likely scenario is that of commercial trees being integrated with existing farm enterprises as part of a strategy to combine positive economic and environmental outcomes. These outcomes include:

- more sustainable management of natural resources;
- optimising the productivity of crops and pastures;
- providing shade and shelter for stock;
- diversifying and improving farm incomes.

As an example, trees such as maritime pine or oil mallees might be planted to provide both a commercial return and to control soil salinisation or erosion. This type of integration is currently supported by a range of joint venture options between farmers and state governments (see, for example, Department of Conservation and Land Management 2000), as well as through a range of programs and strategies that highlight the benefits of incorporating trees into existing farm operations (see Bartle 1999; Harper *et al.* 2000; National Farm Forestry Roundtable 2000). Notwithstanding comments made in Section 5.9.1, it is also possible that the development of ‘environmental credits’ will contribute to the expansion of integrated farm forestry through joint ventures between farmers on the one hand and financial intermediaries and/or government enterprises on the other.

Integrated farm forestry in low to medium rainfall areas is likely to generate a range of socio-economic impacts, some of which are quite different from, and others are very similar to, those noted for farm plantation forestry in the higher rainfall areas. The key impacts and issues include:

- **Economic and employment impacts.** Integrated farm forestry in medium to low rainfall areas is unlikely to have some of the negative impacts associated with whole farm plantations. It is unlikely to accelerate current processes of farm amalgamation and farm family outmigration, and could even contribute to a stabilisation of farm numbers by improving farm viability and farmer income. Improvements in farm income also have the capacity to stimulate local economic activity and stabilise in-town employment. In the longer term, some communities may benefit from downstream processing. In most cases, as with the higher rainfall areas, this appears likely to be concentrated in larger regional centres.
- **Population and community structure.** The stabilisation of the economic and employment base under a system of integrated farm forestry is likely to lead to a concomitant stabilisation of local and regional population levels. Under such a scenario, planting trees should not cause the same sorts of community anxieties and tensions have been experienced in higher rainfall areas where whole farm plantations have been established. If downstream processing can be attracted to rural communities, then there are prospects for population growth.
- **Services and infrastructure.** Any stabilisation of economic activity and population is likely to reduce the risk of service rationalisation or closure. However, in the longer term, the impacts of farm forestry on local roads could be similar to those forecast for higher rainfall areas. The

transporting of timber following harvest is likely to have significant implications for local roads. It is important that Local, State and Federal governments plan for these longer term impacts.

It is also apparent that if farm forestry is to become established in medium to low rainfall areas, then some attention needs to be given to the infrastructure and service needs of the industry. Accordingly, there is a need to address questions such as access/distance to market, the provision of land and infrastructure for downstream processing, and the provision of extension and advisory services.

- **Land values.** Unlike the rapid development of whole farm plantations in the higher rainfall areas, integrated farm forestry in medium to low rainfall areas is not likely to result in a rapid increase in land values. However, the general improvement in the quality, productivity and visual amenity of land as a result of planting trees should contribute to a gradual increase in demand (and therefore price) for properties that have incorporated trees into farming systems.
- **Land use planning and local governance.** Integrated farm forestry is unlikely to present significant difficulties for land use planning. However, if the uptake of trees is considerable, then there may be some backlash against the loss of what is perceived to be productive agricultural land. There may even be calls for the planning system to be used to regulate the planting of trees on farms. The long-term impact of farm forestry on roads is also likely to present some challenges for the planning system. The question of who should pay for road upgrades and maintenance is likely to be a recurring issue.
- **Other social, economic and environmental impacts.** Among many of the concerns expressed in high rainfall areas is the impact of large-scale plantations on the environment. These tensions mainly relate to issues such as the destruction of remnant vegetation, the lack of biodiversity associated with large-scale plantations, the effects of chemical spraying, weed invasions, and pest control. Due to the nature of integrated farm forestry, it is less likely that these tensions will arise in medium to low rainfall areas.

Another important issue in higher rainfall areas is a lack of information about the potential size and nature of the industry. There is a danger a similar situation might arise in medium to low rainfall areas. Ensuring that local people remain informed about future changes in land use (and the subsequent outcomes of this) is critical if the benefits of farm forestry are to be maximised.

Recommendation 10

State and Federal governments should continue to promote joint ventures between farmers and government business enterprises/private enterprise to establish integrated farm forestry in medium to low rainfall areas.

Recommendation 11

Local governments, regional development organisations, timber industry representatives, and relevant State and Federal government agencies should begin to consider the long-term potential for downstream processing industries in medium to low rainfall areas. This should include:

- *an analysis of potential industries and their infrastructure and service needs;*
- *the possibility of providing inducements for processing firms willing to establish themselves in country towns;*
- *avenues of government and other funding for infrastructure and development inducements.*

Recommendation 12

Regional Plantation Committees should be established in those medium to low rainfall areas that are experiencing, or likely to experience, an increase in commercial farm forestry. The Committees should play a central role in:

- *monitoring the development of the industry;*
- *providing a source of information to rural communities and other stakeholders about the nature and development of the industry;*
- *monitoring national and international trends in commercial forestry.*

Recommendation 13

As farm forestry develops in medium to low rainfall areas there should be ongoing monitoring of the social and economic impacts of the industry.

6. Communication Strategy

This chapter provides a communication strategy for disseminating the findings and recommendations of this study. The strategy is designed to ensure that this information is widely accessible to various target audiences (see Table 6.1). This will help to raise public awareness about the key findings, including the recommendations on how the positive benefits of farm forestry might be maximised and how the negative impacts can be minimised. The strategy is organised as a series of communication activities.

Table 6.1 Target Audiences for the Communication Strategy

Target	Audience Sectors
Industry	• Plantation companies • Producer organisations (e.g. NFF, Pastoralists and Graziers Association) • Future industry entrants • Processors and manufacturers
Government	• Parliament, Ministers, political parties • Relevant agencies at state and federal levels (e.g. agencies responsible for agriculture, forestry, conservation, regional development, local government, planning, transport, and taxation) • Regional development organisations/boards • Local governments
Non-Government Organisations	• Local government associations • Conservation organisations • Landcare groups
Community	• Residents living in affected regions • Residents of areas with farm forestry potential • Investors • Taxpayers
Researchers	• Other research and development organisations • Corporate sector researchers and consultants • University researchers and students • International research community
Media	• Rural and urban print and electronic media • Internet • Agency publications • Industry publications

6.1 Communication Activity 1

To ensure that the findings of this research are readily accessible to the target audiences, the full report should be published both in hard copy and on the internet by RIRDC. A free 'short report' outlining the key findings and the recommendations should also be published.

Action

Publish the full version of the report both in hard copy and on the RIRDC website. Also provide free copies of a 'short report' based on the executive summary of the present report.

6.2 Communication Activity 2

A highly targeted, though relatively expensive, strategy is to distribute free copies of the full report to key stakeholders and key decision-makers. These include:

- members of parliament with relevant portfolios or who represent electorates experiencing or likely to experience an increase in farm forestry;
- key decision makers in government agencies, including Federal and State government departments responsible for agriculture, forestry, conservation, planning, local government, regional development, and transport;
- relevant non-government organisations, such as the National Farmers Federation, Greening Australia, and the Oil Mallee Association Western Australia.

An alternative strategy would be to provide such persons with a copy of the short report and invite them to obtain a copy of the full report, either in hard copy or from the internet.

Action

Identify key decision-makers and stakeholders. Provide them with free copies of either the full report or the short report.

6.3 Communication Activity 3

An increasingly popular and effective way of drawing attention to new publications is through electronic information networks. These can be used to publicise the report amongst certain sectors of the target audience, such as environmental managers, regional development practitioners, planners, and researchers. These networks include Agri Infonet, FarmLine, Australian and Oceanic Network for Rural Social Research and Community Development, Agriculture and Environment List, Social Impact Assessment List.

Action

Through relevant electronic information networks, publicise the report, its key findings, and its availability.

6.4 Communication Activity 4

One of the most effective means of publicising broad research findings to a large audience, including virtually all of the target audience, is to utilise the electronic and print media in rural and urban areas. This can include:

- Rural weekly papers, such as *The Countryman*, *Elders Weekly* and *The Weekly Times*. These outlets provide opportunities to promote some of the key findings and recommendations through news stories and feature articles.
- Regional and local papers, which provide an opportunity to promote the research in areas that are currently being affected by farm forestry or are likely to experience an increase in the future.
- Daily metropolitan newspapers, which enable the research findings to reach a broader audience, including politicians, policy-makers, community groups and industry.
- Radio, particularly programs such as the ABC's *Country Hour* and *Background Briefing*. Radio news broadcasts, particularly in rural areas, will help to promote some of the key findings and the existence of the report.
- Television, particularly through specialised rural programs, such as *Landline* and *Cross Country*, or through regional news broadcasts.

Action

Actively promote the research findings and recommendations among the various print and electronic media. This will include issuing press releases, providing 'ready made' feature articles to rural and regional newspapers, and actively canvassing relevant journalists and programs.

6.5 Communication Activity 5

While television, radio and newspapers have the capacity to draw widespread attention to the report, it is difficult to use these media to target particular industry groups. One way of ensuring that the report and its recommendations are brought to the attention of groups such as foresters, environmental managers, local government officials, and farm advisers is to use specialist industry magazines and newsletters. These include *Australian Forest Grower*, *NAFI News*, *Agroforestry News*, *Shaping the Future with Farm Forestry*, *Australian Landcare*, *Australian Farm Journal*, and *Local Government News*. One of the additional benefits of utilising these fora is that they can often provide more detailed insights into the findings and recommendations than do newspapers, radio and television.

Action

Promote the research findings and recommendations through specialist industry magazines. This could include approaching magazines and providing these publications with 'ready written' articles.

6.6 Communication Activity 6

Periodicals that are aimed at a professional/practitioner audience are an effective means of targeting people working in areas such as regional development, planning, agriculture, forestry and environmental management. These refereed publications provide an opportunity to submit articles that offer detailed accounts of the findings and the recommendations. Examples of these publications include *Regional Policy and Practice*, *Australian Planner* and *Australian Forestry*.

Action

Submit articles for publication in relevant professional/practitioner oriented journals and periodicals.

6.7 Communication Activity 7

High quality Australian and international academic journals provide an opportunity for conveying the findings of the study to researchers and educators. Such persons are likely to be conduits of information to various policy-makers, as well as to trainee professionals serving agriculture, forestry and related industries. Appropriate journals might include the *Journal of Rural Studies*, *Society and Natural Resources*, *Sociologia Ruralis* and *Applied Geography*.

Action

Prepare papers for publication in high quality refereed Australian and international academic journals.

6.8 Communication Activity 8

Direct contact with stakeholders is another targeted, though expensive, means of publicising key findings and recommendations. This direct contact can include workshops, seminars and meetings with rural communities, government and non-government organisations, and other stakeholders. The cost of these communication activities should be met by those groups requiring the service.

Action

Conduct workshops, seminars and public meetings to disseminate and discuss the findings, recommendations and guidelines emerging from this study.

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8. Appendix

8.1 Telephone Survey of Residents

Hello my name is: _____

I am doing a survey for Edith Cowan University on the impacts of Farm Forestry and Plantation Forestry in your area. I was hoping you would be able to spare 3 or 4 minutes to answer a few questions on these?

Further info if required: The survey is part of a project looking at the social and economic impacts of farm and plantation forestry in rural communities across Australia. The results will be used to help local governments and rural communities in other areas recognise and plan for the issues associated with expansion of farm and plantation forestry.

Just to be clear about the definitions we are using:

Farm forestry is where farmers plant a portion of their farm to trees, and continue to get most of their income from the farm.

Plantation forestry is where most of the farm is planted to trees and the farmer has usually sold or leased the farm to a plantation company.

1. Both Farm Forestry and Plantation Forestry have increased in your area over the last ten years. In terms of the impact, do you think

- BOTH HAVE HAD A NOTICEABLE IMPACT1
ONLY FARM FORESTRY HAS HAD A NOTICEABLE IMPACT2
ONLY PLANTATION FORESTRY HAS HAD A NOTICEABLE IMPACT3
NEITHER HAS HAD A NOTICEABLE IMPACT4
DON'T KNOW 5 (DON'T READ)

GIVEN YOUR ANSWER TO THE FIRST QUESTION, THE REST OF THE QUESTIONS WILL FOCUS ON:

- A) BOTH
B) FARM FORESTRY ONLY
C) PLANTATION FORESTRY ONLY

2. Would you say that A, B, C, results in:

- MORE JOBS1
LESS JOBS2
NO DIFFERENCE TO THE NUMBER OF JOBS IN YOUR COMMUNITY3
DON'T KNOW 4 (DON'T READ)

3. In terms of the number of people living in your community, do you think that A, B, C results in:

MORE PEOPLE 1
LESS PEOPLE 2
NO DIFFERENCE TO THE NUMBER OF PEOPLE LIVING IN YOUR COMMUNITY 3
DON'T KNOW 4 (DON'T READ)

4. In relation to the level of business in your community, would you say that A, B, C, results in: READ OUT

MORE BUSINESS 1
LESS BUSINESS 2
NO DIFFERENCE TO BUSINESS FOR LOCAL TRADERS 3
DON'T KNOW 4 (DON'T READ)

5. Thinking about community and service groups, would you say that A, B, C, results in: READ OUT

MORE PEOPLE 1
LESS PEOPLE 2
MAKES NO DIFFERENCE TO THE NUMBER OF PEOPLE
IN LOCAL SERVICE AND COMMUNITY GROUPS 3
DON'T KNOW 4 (DON'T READ)

6. In relation to land values, would you say that increasing A, B, C, results in: READ OUT

INCREASED LAND VALUES 1
DECREASED LAND VALUES 2
NO DIFFERENCE TO LAND VALUES 3
DON'T KNOW 4 (DON'T READ)

7. Thinking about services and infrastructure such as schools and roads would you say that increasing A, B, C, results in: READ OUT

BETTER INFRASTRUCTURE 1
POORER INFRASTRUCTURE 2
NO DIFFERENCE TO INFRASTRUCTURE 3
DON'T KNOW 4 (DON'T READ)

8. Overall, would you say that increasing A, B, C, has had: READ OUT

A POSITIVE IMPACT 1
A NEGATIVE IMPACT 2
NO IMPACT ON YOUR COMMUNITY 3
DON'T KNOW 4 (DON'T READ)

9. How strongly would you agree or disagree with the statement that **THE LOCAL GOVERNMENT SHOULD HAVE GREATER CONTROL IN PLANNING FOR FUTURE EXPANSION OF FARM AND PLANTATION FORESTRY. READ OUT**

STRONGLY AGREE 1
 AGREE 2
 NEITHER AGREE NOR DISAGREE 3
 DISAGREE 4
 STRONGLY DISAGREE..... 5
 DON'T KNOW 6 (DON'T READ)

10. Which of the following age groups do you belong to? **READ OUT**

18-24 YEARS..... 1
 25-39 YEARS..... 2
 40-54 YEARS..... 3
 55-64 YEARS..... 4
 65+ YEARS..... 5

11. What is your occupation?

FARMER 1
 OTHER (SPECIFY)_____ 2

THANKYOU FOR YOUR TIME