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# Land-use change conflict arising from plantation forestry expansion: Views across Australian fence-lines

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## Summary

An annual trade deficit in Australia for forest products of approximately \$2 billion (Aus\$), predominantly in paper, pulp products and sawn timber, makes sound argument for continued support of plantation forestry expansion. Existing government policy promoting afforestation through fiscal tax-based incentives for Managed Investment Scheme (MIS) retail forestry however, has raised many questions regarding the need for performance targets and accountability criteria in response to the collapse of several private plantation companies during the global financial crisis of 2009 and 2010 that had been responsible for managing a large sector of the national estate. This paper reports on the first stage of a social research case study for a sub-tropical rural community in north-eastern NSW, Australia that had been undergoing rapid land use-change to plantation forestry prior to the global financial crisis. Socio-political, economic and environmental concerns of stakeholders are identified through social research methods to provide insights for a follow-up study using participatory modelling. Community concerns raised also help inform debate on the need to reform existing federal retail forestry policy to improve triple-bottom line sustainability<sup>1</sup>.

**Keywords:** Interviews · stakeholder analysis · narrative · policy reform · afforestation

## Introduction

### Growth of the Australian plantation forestry estate

Plantation forestry has expanded rapidly over the previous decade in Australia from an area estimated at 1.3 million hectares in 1998 to 2.0 million hectares in 2009, mainly to hardwood eucalypts (ABARE 2009, APIU 2009). The major driving force behind this expansion has been an increasing domestic and export demand for sawlogs, paper and paperboard products, and woodchips, which has not been able to be met by a declining public forest supply. Currently Australia has a \$2.1 billion annual trade deficit in forest products, including \$450 million in sawnwood and wood based panelling, \$1.9 billion in paper and \$245 million in pulp (ABARE

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<sup>1</sup> Triple bottom line sustainability refers to environmental sustainability, social responsibility and financial viability, used as criteria when judging the overall performance of a company or business entity (Hacking and Guthrie 2008, Vanclay 2006).

2009), thereby providing rationale for continued government support of further afforestation in rural landscapes.

The Government Plantations 2020 Vision (MCFFA 1997) envisaged a strategic partnership between the Commonwealth, State and Territory Governments and the timber growing and processing industry, aimed at enhancing regional wealth creation and international competitiveness through a sustainable increase in Australia's plantation resource. It was initially based on a target of trebling the area of commercial tree crops by 2020 to three (3) million hectares. Further, fiscal incentives in national taxation legislation under Division 394 of the Income Tax Assessment Act 1997 that has allowed full upfront deductions to investors in companies for Managed Investment Schemes (MIS) retail forestry (PJCCFS: Parliamentary Joint Committee 2009) has been the major driving force (Dargusch 2008).

### **Community reaction to rapid plantation forestry expansion**

While Australia has established sound markets for plantation forestry products, with increasing importance being given for production in the sub-tropics and tropical regions (Varmola and Carle 2002), the expansion of the industry has been met with considerable controversy at the local community level. Williams *et al.* (2003, 2008), Schirmer *et al.* (2008), Barlow and Cocklin (2003), Tonts *et al.* (2001) and Tonts and Black (2003) report on the socially contentious nature of changing land-use in temperate regions from traditional agricultural enterprises including dairying, sheep and cattle production, with conflicting perceptions on social, environmental and economic impacts on rural communities and landscapes. A socio-economic impact study by Williams *et al.* (2008) of the Victorian and South Australia plantation region found negative attitudes towards blue gum (*Eucalyptus globulus*) plantations for perceived damage to road infrastructure, loss of business and social involvement in small rural communities, loss of native vegetation, and increased water use and risk of wildfires.

In the state of Victoria alone, 19,000 hectares of plantations were reported to have been lost or severely damaged in the 2009 bushfires (Stewart 2009), considered to be the most devastating bushfires in Australian history for the catastrophic loss of life, and public and private infrastructure (VBRC 2009). Further, Schirmer (2009) reports on major losses to rural populations and a decrease in infrastructure through removal of farm fences, sheds and storage infrastructure under land-use change to plantation forestry from agricultural pursuits. Concerns also emerged from underlying challenges that plantation forestry presents to the rural identity (Barlow and Cocklin 2003, Lochie 2003).

### **Questions over effectiveness of past policy reform in Australia**

Major intergovernmental policy reform was implemented through the introduction of Regional Forest Agreements (RFA) between the years of 1995 and 2000 in Australia in an attempt to help overcome community conflict; however Brown (2002) highlights the lack of success due to insufficient engagement with local stakeholders. Interestingly, Nawir and Santoso (2005) and Niemela *et al.* (2005) report on research from other countries where a lack of effective mechanisms to resolve social conflicts and ineffective governance have also been major constraints to successful plantation forestry development.

Plantation forestry is a long term land-use enterprise with production cycles ranging from 13 to 30 years in Australia. In communities where the plantation estate is in the early to middle stages of the production cycle, anticipated benefits were found to not always be readily assessable or visible, particularly where no harvesting had commenced. Although forestry industry surveys conducted by Schirmer *et al.* (2005) and Schirmer (2008a, b) reported significant increases in the number of people employed in the plantation forestry sector over the previous decade and a greater number of regional based businesses becoming increasingly reliant on customers from the plantation industry, these increases have been reversed by the collapse of major plantation forestry companies during the global financial crisis of 2009-10 (Stewart 2009). To add ‘salt to the wound’, many of the failed plantation forestry companies have been publically accused of over-inflating timber yield predictions to investors well before their collapse (Lawrence 2008, PJCCFS: Parliamentary Joint Committee on Corporations and Financial Services 2009). This prompts a major rethink of policy alternatives for afforestation in Australia.

### **Policy reform that promotes triple bottom-line sustainability**

This paper argues that an improved understanding of the diversity of views held within communities can provide insights for the development of sustainable policy for improving triple-bottom line outcomes, including benefits to regional communities in Australia. Low *et al.* (2010) present alternative afforestation policy arrangements used in other countries, including tax-based levy systems for forest users in Indonesia and Norway that provide capital to generate further investment in plantations. They also discuss support for setting up regional forestry cooperatives in Canada through government grants known as the Cooperative Development Initiative (CDI) and supported by a legal stabilisation mechanism through the Canada Cooperatives Act 1999. Benefits from the CDI scheme are achieved through pooling resources and funds from small grower investors that enhance purchasing and marketing power, provide independence for rural communities and promote sustainable forest production and usage.

A change to the fiscal environment for afforestation schemes in Great Britain in the late 1980’s led to plantation forestry becoming more socially acceptable (Nail 2008). This was firstly a result of the creation of Woodland Grant Schemes (WGS) for farmers that incorporated investment targets with public benefits requiring access, conservation, and protection of biodiversity. Since 2007, the Woodland Grant Scheme was replaced in Scotland by an alternative land management support scheme to simplify grant delivery and access, and promote further forestation based on improved performance and competitiveness while continuing to target social and environmental improvements (DFGS 2006).

England has similarly evolved forestry grant schemes that promote plantation development on agricultural land based on meeting regional targets and sustainability criteria such as further improving public access, biodiversity and heritage conservation, protecting water and soil, and enhancing the landscape for living and working while producing high quality timber (EWGS 2009). Eligible farmers are paid to take agricultural land out of production to establish plantations, and are then paid an annual incentive for maintenance according to performance criteria. This raises the issue of the need for the Australian plantation forestry industry to demonstrate both good performance and form improved alliances in community-based

environmental management, posited as powerful ways to turn opposition into support by Marshall (2008) and Lockwood (2010).

Further, it is argued that by developing insights into the diversity of stakeholder views, rural communities in Australia could be engaged into collaborative processes that explore contentious problems for which there may be unclear knowledge at the outset. However, through the development of shared understanding, community capacity can be developed to challenge existing policy and support necessary industry transformation. This democratic discourse is commonly referred to as devolution in forest policy, and is not new on the international scene (Bryden and Geisler 2007, Sikor and Thanh 2007); however is an innovative consideration on the Australian forest policy scene for providing more than ‘lip service’ to multiple stakeholders. Sikor and Thanh (2007) refer to forestry devolution as policy that aims to include a more diverse set of actors in forest management through the recognition of local customary knowledge and where applicable, land rights by governments. Devolution aims to empower marginalised groups, and improve community livelihoods and conservation of natural resources.

### **Use of social research to inform debate on need for transformative forestry policy**

This paper reports on findings from the first stage of a case study using social research methodology to identify community concerns relating to plantation forestry expansion. This stage was aimed at developing insights on issues of controversy over natural resource management that could then be explored through an innovative experiment with social learning, incorporating participatory modelling as a tool. The study supports the view of Steyaert and Jiggins (2007) that through the use of social learning, alternative management plans can be explored to assist in the transformation of industries for achieving improved social, environmental and economic outcomes to communities. Further, it is viewed that landscape scale adaptation is necessary for promoting resilient rural communities, referred to by Adger *et al.* 2005 as communities that use their capacity to engage social capital and work with new economic resources to develop employment opportunities. It is not the purpose of this paper to explore the second stage of the case study which develops an evaluation framework for mobilising local stakeholders into a social learning process through fostering relationship and capacity building for collaborative problem solving (Muro and Jeffrey 2008), since findings and recommendations can be found at Leys and Vanclay (2010b).

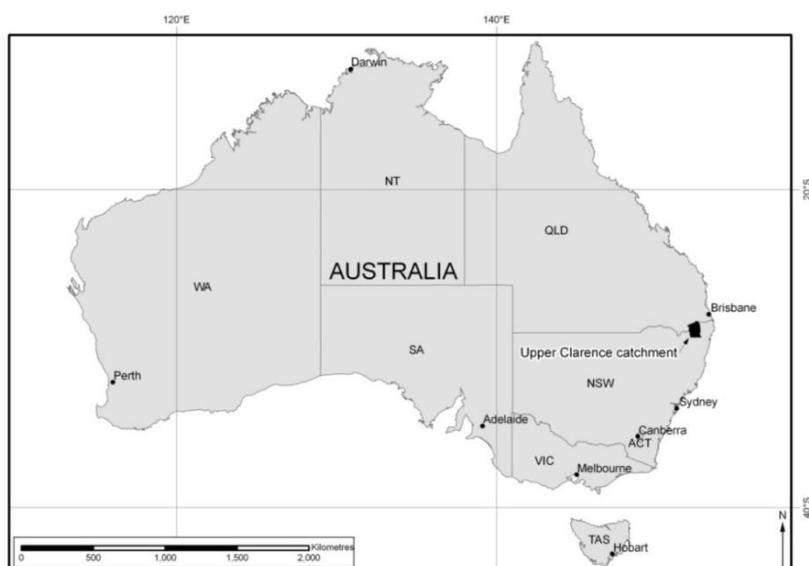
In summary, a case study of the sub-tropical Upper Clarence catchment in north-eastern NSW adds to the literature for increasing understanding on the diversity of perceptions held towards the plantation forestry in Australian rural communities, with comparisons made to previous research findings from temperate zones in Australia. This study adds further insights into issues of controversy to challenge existing policy and inform debate for transformation in Australian afforestation policy. Transformative sustainability refers to a recent global paradigm change towards implementing fundamental changes to social conditions that have led to the immense environmental challenges of climate change and global warming (Rathzel and Uzzell 2009). Recommendations are made for policy mechanisms that could promote transformation to a sustainable plantation forestry industry in Australia.

## Methods

### Scoping for a case study region

A sub-tropical region was investigated to add to findings in literature on social research in rural communities undergoing land-use change to plantation forestry, which in Australia had been limited to temperate zones (Schirmer 2007, Schirmer *et al.* 2008 a,b, Williams *et al.* 2003, 2008, Williams 2008). The Upper Clarence catchment of northern NSW covers an area of approximately 690,500 hectares in eastern Australia (Figure 1). It was selected for a case study after an initial scoping survey (Figure 2) sent through a local government newsletter to all householders, which returned a 10% response rate, identified a diversity of views towards plantation forestry for which a more in-depth social research study would be suitable.

As of 2009, 31,650 hectares were under plantation forestry (4.6% of the land area) with 87% of this comprised of hardwood eucalypts. In the early 1990's the only plantation forestry in the catchment were state owned softwood radiata pines. Rapid expansion has occurred mainly since the early to mid 2000's by private plantation companies. They have used tax-based incentives for up-front deductions on plantation establishment costs through managed investment scheme (MIS) retail forestry policy as their main vehicle for expansion (M-C Pelletier, Hurford Hardwoods, and Rod Stanford and Mike O'Shea, Forest Enterprises Australia, 2009, pers. comm.).

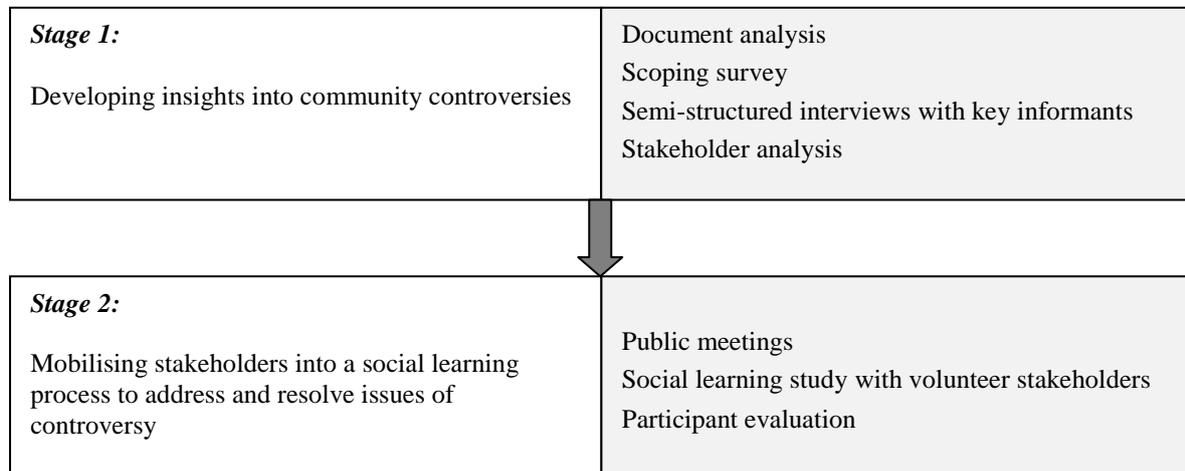


**Figure 1** Location map of the sub-tropical Upper Clarence catchment in north-eastern NSW, Australia (Map produced by Greg Luker, GIS Lab SCU, 1/12/2009)

### Action research as a reflexive and iterative methodology

Action research (AR) was used for offering a reflective and emergent methodology to achieve an improved understanding on community issues of controversy (Dick 1990). Semi-structured interviews were conducted with key informants to collect qualitative data using the snowballing technique. This involved participants identifying themselves and others for interviewing based on perceptions of being well informed and leaders in the community (Chevalier 2001, Varvasovszky and Brugha 2000). A process of convergent interviewing was undertaken where the interviewing

process was continued until no new information was forthcoming (Dick 1990). A total of 28 one-on-one interviews with key informants were completed, taking on average 1 ½ to 2 hours each. These interviews involved questions to elicit information under social, ecological and economic themes to encompass a multi-disciplinary and holistic research approach (Table 1), and were explored in-depth to allow for hidden or emerging concerns.



**Figure 2** *Research methodologies used to explore the social dimensions of plantation forestry expansion in a case study of the Upper Clarence catchment*

**Table 1** *Major themes and areas of questioning explored in semi-structured interviews with key-informants from the Upper Clarence catchment*

Theme	Areas of questioning
Social	Demographical changes Sense of place in community Change in support networks Power to contribute to decision making Health and well-being Professional networks; quality and access
Ecological	Changes in water quality, soil stability, biodiversity Weed incidence and control measures Policy effectiveness in conservation
Economic	Business and employment opportunities Enterprise financial viability Land values Technology use and access in business

## Stakeholder analysis based on thematic coding of interview transcripts

Through the use of the qualitative analysis software NVivo (QSR International) to code interview data into themes, five major stakeholder groups were identified that typically represented consistent views. The five groups selected were from various industry and interest groups and continued to be used throughout the study for further stakeholder analysis (Table 2).

**Table 2** Stakeholder groups used in Upper Clarence case study

Stakeholder group	Representatives from the following industry and interest groups
1. Cattle and mixed farming	Graziers, crop and dairy farmers
2. Forestry	Private plantation companies, state forestry and private native forestry sectors
3. Environmental, urban, recreation and tourism	Environmental lobby groups, local town citizens, business identities, and eco-tourism ventures
4. Governing authority	Legislating and compliance bodies from state and local government
5. Science and education	Research scientists and teachers

Thematic coding initially involved separating all references (narrative quotes) relating to a singular view-point from individual participants. The most important issue for each theme was identified by having the most references to it from the 28 key stakeholders. This analysis was conducted to improve understanding of the diversity of views held in the community and to gauge the level of conflict over land-use change. Further, it assisted in rating the relative importance of issues for planning the second stage of the study that involved the implementation of a social learning study with a volunteer participatory advisory committee. Some comparisons were made to other case study regions in Australia to gain a national scale picture of impacts from plantation forestry expansion; while some interpretation on issues was deemed necessary due to the different methods used in these studies, as data was obtained through mixed qualitative and quantitative means including community and industry surveys and focus groups. It is important to note that the interviews were conducted in 2008 and findings from comparative studies were all conducted prior to the global financial crisis and collapse of major plantation companies in Australia.

## Results

### NRM issues for the sub-tropical Upper Clarence catchment

The major natural resource management issues for each stakeholder grouping used in the case study of the Upper Clarence catchment are summarised in Figure 3. These were the issues repeatedly raised by stakeholders as issues of concern in direct response to plantation forestry expansion and used to follow-up in deliberations over perceived effectiveness of existing forestry policy in Australia in relation to triple bottom-line deliverables. Narrative from key-informant interviews is provided to help develop further insights into local perspectives, and is presented under ecological and socio-economic themes, taking into account the inter-connectedness of social and economic issues.

### *Ecological issues explored*

The Upper Clarence catchment case study presented controversy surrounding invasive weed problems in plantations. Several participants claimed that the introduced weed *Sporobolus fertilis* (giant Parramatta grass) was well adapted to the region and spreading rapidly. It was suggested by many participants that herbicide control was expensive and application time consuming, and the weed had no grazing value due its sharp hard leaves. *Ligustrum lucidum* (broad-leaved privet), *Macfadyena unguis-cati* (cat's claw creeper), *Lantana camara* (lantana) and *Cinnamomum camphora* (camphor laurel) were other problematic weeds mentioned as prolific around creeks and gullies on plantation forestry properties in this sub-tropical region. The issue of invasive weeds was found to be unique to higher rainfall zones, as it was found eucalypt plantations in temperate regions develop closed canopies that largely limit potential for invasive weed problems.

The woody weed Lantana was claimed to provide habitat for the *Manorina melanophrys* (bell miner) which contributed to dieback disease in Eucalypt plantations (Wardell-Johnson *et al.* 2007). The Environmental Urban Tourism and Recreation stakeholder group felt strongly about the lack of maintenance of retained vegetation within plantations in relation to biodiversity conservation (Figure 3). They also felt there was a lack of legislation in NSW governing this area and insufficient information on management, an issue not reported from other regions of Australia. A quote from an Environmental stakeholder follows.

“Riparian zones that are left alone in plantations for what is considered natural regeneration are degrading in that they are becoming choked by weeds. These are key areas for biodiversity preservation and therefore need active management”

The lack of species diversity in plantations was reported by most stakeholder groups, who suggested plantation companies should look towards planting mixed species including ones that had higher potential timber values than the most prominent species *Eucalyptus dunnii* (Dunn's white gum). Other plantation regions in Australia are dominated by *E. saligna* (Sydney blue gum). This view was supported by Law and Chidel (2006), who found that monoculture plantings reduced the diversity of animal species when compared to mixed species vegetation.

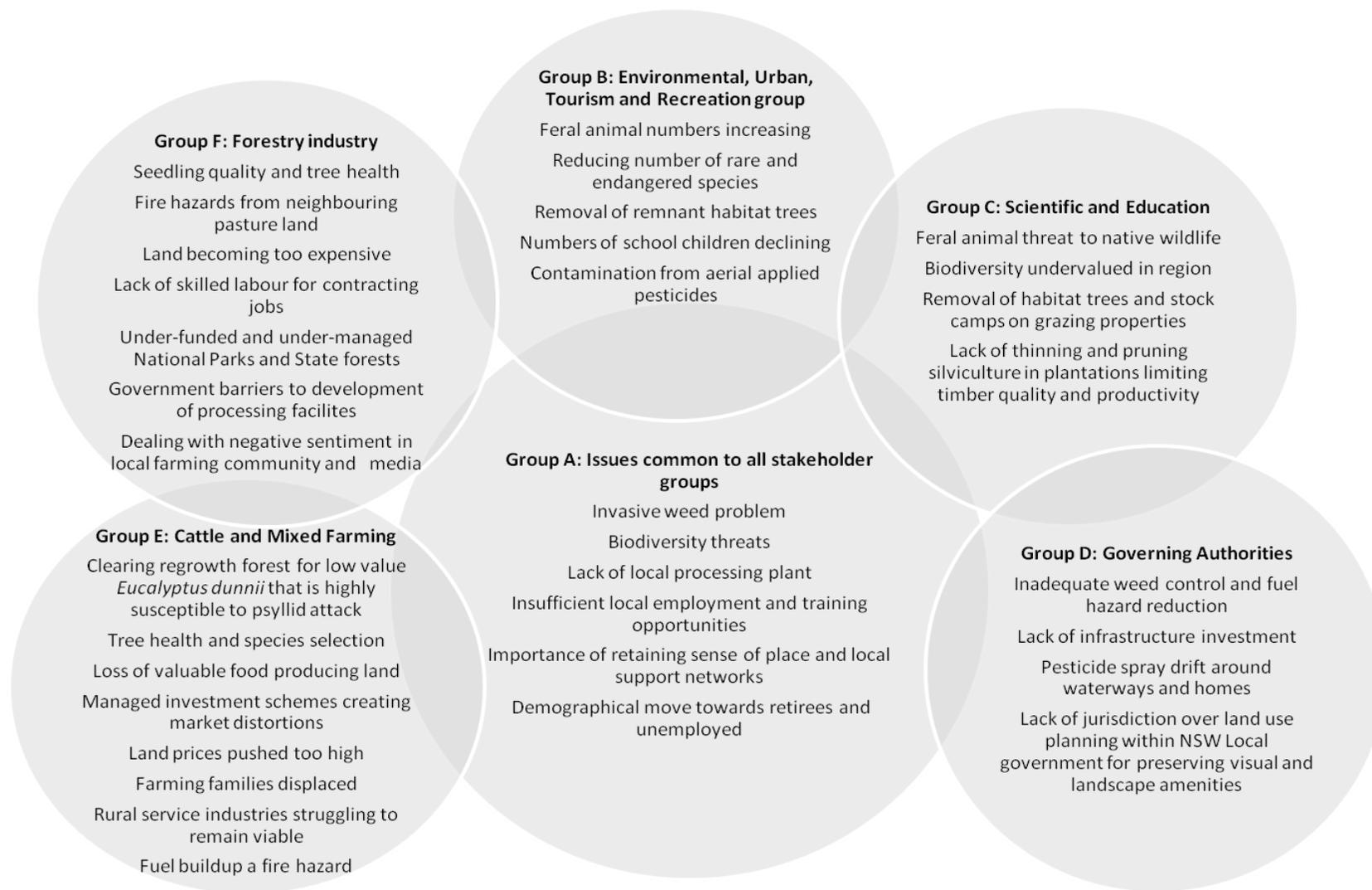
Several participants viewed the removal of old remnant trees from land being prepared for plantation establishment as a lack of recognition by plantation companies for local ecological values. One participant reported competition between *Ninox novaeseelandiae* (boobook owls), *Platycercus eximius* (eastern rosellas), *Pseudocheirus peregrinus* (ringtail possums), *Corvus coronoides* (ravens), *Cacatua roseicapilla* (galahs) and *Ptiloris paradiseus* (paradise rifle birds) for nesting sites in one hollow habitat tree in front of his homestead and neighbouring a plantation forest, a view supported by research (Goldingay and Stevens 2009). Quotes from stakeholders follow.

“Plantation monoculture provides no replacement for habitats. Animals like sugar gliders need lots of mixed timber corridors... The black cockatoo, which is protected under the Native Vegetation Act, use the forest black oak as a habitat tree and banksia's. Why plantation companies can cut these down and farmers can't doesn't make sense. Unfair legislation! Farmers would be prosecuted.”

“The [NSW] Plantations and Reafforestation Act that is under review is too liberal compared to the Native Vegetation Act. You can clear steep areas and lots of timber including old growth cattle camps left for shelter on grazing properties including many old iron barks and red mahogany trees. They burn the timber rather than sell it locally to farmers for firewood and fencing materials. There should be protocol for salvaging this old growth timber or change legislation to prevent clearing it at all due to its high conservation and biodiversity values.”

One of the plantation forestry participants expressed a conflicting view:

“The Plantations and Reafforestation Act is too restrictive in what recumbent trees are retained as potential nesting trees for use as hollows. Often the NSW Industry and Investment plantation assessment officers request that poor quality angophoras are kept because at a static point in time they have hollows and look like they will provide habitats. However, experience has shown that these decompose very quickly and are not sound habitat trees to be kept in plantations. Better quality eucalypt trees which have better long term qualities should be kept. Greater flexibility is needed within the Code which allows for dynamic assessment of trees.”



**Figure 3** Major issues found for each stakeholder grouping directly relating to plantation forestry in the Upper Clarence catchment

The issue of loss of habitat trees had been reported in other plantation regions of Australia and reflected diversity in understanding within the community regarding legislation on the State and Territory Codes of Practice such as the NSW Plantations and Reafforestation Act and Code of Practice. Several participants representing views for the plantation forestry industry claimed all their operations were strictly regulated and followed allowable guidelines regulated in by the State of NSW. These conflicting views suggest that there are shortfalls in policy that could be improved through increased stakeholder input into devolved afforestation policy that could improve local ecological outcomes. A participant from the Recreation and Tourism group suggested:

“There is misinformation around the community about plantation forestry. Also lack of communication.”

A different view was presented by a Forestry participant:

“Open communication from our company is available. Problem is, not everyone accesses this.”

The sub-tropical region presented unique findings on tree health and timber quality, even from the forestry stakeholder group. The psyllid insect *Creiis lituratus* was reported to be prevalent across the catchment, with plantations of *E. dunnii* particularly susceptible to damage from this phloem feeding insect. Further, various chrysomelid beetle species including *Chrysophtharta* sp., *Paropsisterna* sp. and *Paropsis* sp. also presented challenges, with plantations needing to be aerially sprayed with insecticides such as dimethoate, which many participants viewed as a highly toxic organophosphate chemical.

“Plantation companies could be more sustainable if they planted trees in strips with natives that provide habitat for natural enemies of pests including psyllids, and habitats for wildlife and flora preservation. For example 100m strips. This preventative approach to protecting biodiversity would be much more acceptable in the community.”

“There are health issues for the community from aerial spraying pesticides. Some people ... have been sick. Many residents have noticed smell drifting over town when plantations have been sprayed near the town boundary. Also contamination of waterways and creeks. This is pollution.”

“Contamination of the town drinking water source has occurred ... through aerial spraying dimethoate in nearby plantations.”

“Chemicals contaminate my honey and kill my bees. I relied on organic honey for my income. I can't anymore. Spraying occurs in the next door plantation without notifying me.”

Another participant provided an opposing view on the source of the chemical smell:

“The smell over town was from 2,4-D ground spraying for weeds in grazing paddocks. I should know as I was contracted to do it!”

To help minimise future problems with tree health, it was recommended by some forestry representatives and local farmers that other endemic species such as *E. pilularis* (blackbutt) and *Corymbia maculata* (spotted gum), together with others suggested in following quotes, offered potential for more widespread use in plantations due to their better insect resistance and wood qualities compared to *E. dunnii*. Limitations to further species selection were reported by plantation forestry stakeholders, whereby they guaranteed returns to investors in MIS schemes ranging from 13 to 15 years from planting. This provides further qualitative evidence of the need for policy reform as current mechanisms are promoting planting of the fastest growing species rather than species with the best timber qualities suited to the region.

“I would like to see more mixed species plantings in the catchment to include endemic species such as spotted gum, iron bark and tallowwood.”

“Gympie messmate (*E. cloeziana*) offers potential as a plantation species as I have seen good growth ... and it is endemic to the area.”

“*E. dunnii* has some superior properties to other species including better frost tolerance and rapid growth. That is why we have used it so extensively.”

Another feature of the case study reported by the Scientific and Education stakeholder group was the lack of thinning and pruning operations in plantations that could potentially maximise future saw log quality and increase the value of the timber resource in the catchment. A couple of the reasons given for the lack of silvicultural operations in plantations was that there were no local or regional processing facilities for small-diameter plantation timber, and the nearest export facility for woodchips was approximately 200 km's away making chipping unprofitable due to the high cost of transport. A private farmer and forester provided the following suggestions.

“There is an urgent need for thinning plantations to ensure the future quality of sawlogs and viability of the industry. Thin when stand is dense, tall, and straight, and growth is slowing down in response to competition for space, light and nutrients...Thinning operations would help create local employment opportunities, and help keep a local mill going.”

“As plantation forests close up there is not much ground cover left for grazing. Forests should be thinned to allow grazing to continue. This multiple land-use option would be much more socially acceptable.”

There was considerable concern among participants in the Upper Clarence catchment regarding potential fire threat from plantation forests to local communities due to fuel build-up on forest floors where in close proximity to towns and villages. Forest estates other than

plantations were also considered to pose potential bushfire risks to communities, and it was recommended that plantation companies should work collaboratively with all other forest tenures to establish sound fire management and response plans.

“Plantations mainly use stock grazing for weed management. Where they are not grazed or grazed effectively along fire breaks and gullies, weeds and timber regrowth are potential fire hazards.”

“Not enough collective action is being taken between the plantation industry, state forests and national parks for fire hazard reduction, putting communities at risk from potential bushfires in dry seasons.”

“Should be controlled low intensity burns of all local forests to mimic mother-nature from naturally occurring fires started from lightning strikes and aboriginal land-use practices.”

A long time resident in the catchment and worker in the timber milling industry commented:

“Fire hazard reduction measures were used in the past where forests were pre-burnt prior to logging. This worked well in reducing fuel and litter build up....The hardwood eucalypts are very hardy and would respond to low intensity burns with regrowth soon afterwards. Now fuel and litter loads are high and potentially dangerous to surrounding communities. The potential high intensity fires under these circumstances are too hot and kill wildlife... With this change there will be big fires every 15 to 20 years, which could be devastating.”

Another forester suggested:

“State forests used to be grazed to help keep the forest floor clean. Now many forests have been converted to national parks, most in the mid 1990’s, and they are undergoing successional ecological change to more rainforest species, and thicker tangled wilderness stands. This succession is not natural, having been induced by man due to change in land management practices whereby the use of fire has largely been eliminated and invasive weeds have got beyond control.”

### *Socio-economic issues explored*

Representatives from the Cattle and Mixed farming stakeholder group reported concerns relating to the loss of prime agricultural land to tree crops, shown in Figure 4. This issue was commonly reported from other regions of Australia by Schirmer *et al.* (2008) and Williams *et al.* (2003, 2008) and Williams (2008), as were perceptions of a rapidly expanding plantation forestry industry artificially inflating rural land prices. It was further suggested that a major implication of higher land prices would be an increase in the cost of food in Australia, providing further evidence to closely examine the social and market distortions of current afforestation policy.

“Plantation forestry in the region has been the greatest single land-use change since white settlement... Squatters once had large holdings ... From the early 1900’s there was a wave

of subdivision into grazing and dairying. Dairies were around 400 acres in size... Dairying was then put under pressure from deregulation. Now you need 5,000 acres for cattle grazing to be viable, or a little smaller if you have some cropping. Grazing is now put under pressure from forestry expansion, whereby it is being phased out rapidly. It has been estimated to date 25,000 to 30,000 breeder cattle have been displaced in the catchment to tree plantations.”

“Locking up potential food producing land in trees will come at a cost to the consumer. They will end up paying a lot more for food in the next 5 years. Impact appears not so obvious to political leaders to date.”



**Figure 4** *Eucalypt plantation established on land previously grazed by cattle*

Land prices were reported to have doubled over the previous five year period for the Upper Clarence catchment to \$7,000/hectare (Rod Stanford, Forest Enterprises Australia, 2009, pers. comm.). One Mixed Farmer participant suggested that based on current market prices for cattle that land prices over \$4,900 /ha were unviable for cattle industry expansion based on a carrying capacity of 1.2 breeder units per hectare (equivalent to 1 breeder / 3 acres). This same participant suggested that plantation timber crops should not be put into the higher rainfall zones that were suitable for reliable food growing, suggesting they should only be grown on poorer soils in the lower rainfall zones of Australia.

“Aging farmers in the region can’t afford generational succession and retire as well. The average age of Australian farmers is 59 years. Young farmers can’t afford to buy land in the catchment as it is now too dear and not viable for a return on capital at current prices ... Where are the next generation of farmers going to come from as they can’t even afford to pay interest on loans to purchase properties?”

An alternative view was provided by a plantation representative of the Forestry stakeholder group:

“Land prices are very high as a result of real estate values going up Australia wide. This is a problem for us when needing to raise capital to purchase more land. Our company have set a range of prices they will pay, and will negotiate with landholders. The high land prices are an issue in the community.”

A farmer held a view not consistent with most other farmers interviewed:

“The timber industry is helping create a financially viable community. Unless farming becomes more viable in the future, plantations will keep expanding.”

There was a lack of overall support for forestry Managed Investment Scheme (MIS) taxation legislation among most stakeholder groups, consistent with findings from Dargusch (2008) where questions were raised regarding environmental and social benefits. Quotes from representatives for the Cattle and Mixed Farming stakeholder group illustrate the lack of support for the MIS legislation in Australia:

“I don’t support the MIS plantations scheme .... The whole structure is inequitable, creating a superior land-use all to support the governments 2020 Vision to increase land planted to timber. I would like to see rights under the NSW Plantations and Reafforestation Act brought closer to the Native Vegetation Act to put all land users on a more even par.”

“The MIS plantation companies are large corporations and are not community based. Profits go outside the region to investors.”

Whilst all stakeholder groups in the Upper Clarence case study suggested an urgent need for a processing plant in the region to help create employment opportunities and address the high unemployment rate, a representative from a local plantation forestry company claimed plans for a local processing plant within the next three years, however delayed a year due to the global financial crisis. A skill shortage in the region was identified as an issue for the forestry industry. Findings by Schirmer *et al.* (2005, 2008a, b) and Schirmer (2008a, b) from other plantation regions in Australia showed once harvesting commenced that employment opportunities increased significantly, as did local business trade, however before the global financial crisis started in 2009 and incomparable with the Upper Clarence case where there were currently no processing or value-adding facilities for plantation timber, a view shared in research by Tonts *et al.* (2001). Some diverse views from participants from the Upper Clarence:

“I question the economic benefit of the plantation forestry industry to the local community. There is currently no processing in the region. We need a local mill that can process small diameter timber and value adding manufacturing if plantations are to be of any benefit to the community.”

“There are few permanent employment opportunities in plantations. Most are in casual or temporary labour, and then on unemployment benefits.”

“Why are there no mills to process plantation timber? 90% of trees planted are for pulp and we have no pulp mill, and it is uneconomical to take to the port of Brisbane. It is only the tax advantage these companies are interested in!”

“There are potentially 350 to 400 jobs from processing plantation timber from our company alone. We have a five to six year plan. We will need harvesting and transport contractors that can be put on five year contracts. We currently employ 157 people, although some are based outside the catchment at larger regional centres, and have already spent \$13.5 million on capital. We are aiming to get locals for employment, as they need to be close to the resource to keep costs down. Our company plan is to produce 100,000 tonnes of timber per year initially, and then up to 1 million tonnes per year by 2014 which we believe is a sustainable figure. We would also like to develop other value-adding processing including bio-fuel production using residues and waste trees. Our business is vertically integrated and we use the MIS as a vehicle to build the process. ”

Declining business viability was reported as a social issue affecting local communities in several regions across Australia. In the sub-tropical Upper Clarence the Farming group were particularly concerned about rural service businesses losing trade as plantation forests expanded. These views were confirmed for only some types of businesses through a local survey, and are reported in Leys and Vanclay (2010b).

“Trees are displacing local families off farms.... Large property ... has been bought by a plantation company ...1,600 of the 2,600 acres under trees.... Was improved pasture country carrying 600 beef breeders.... No longer repairs to machinery, no school children, no labour for stock and fencing, no local shopping, no electricity, lost two homes, and two full time jobs, lost livestock carrier work, and lost rural supplies.... Has huge social cost through diminishing work and produce to and from the property.”

“Loss of farming families from the district is having a social impact on local schools and services such as the mechanic and local grocer.”

“Plantation forestry expansion has had a detrimental flow on effect for the cattle industry. Carrying capacities of cattle have been drastically reduced. Local meatworks have had to source cattle from a wider collection area increasing costs for transport... Profits are reduced, making the industry more difficult to operate in and creating long term business uncertainty.”

An alternative view was provided by a Forestry stakeholder:

“Plantation buy outs can result in farmers being displaced without immediate employment. There is a window with a phase of discomfort where impacts seem great. However experience has shown that these displaced famers tend to get employment back in the farming industry. This is one of the dynamics of the timber industry.”

A key concern has been that processing and value-adding facilities are often located in larger regional centres in plantation areas across Australia. Preliminary findings from Tonts *et al.* (2001) presented a hypothesis that socio-economic benefits through the generation of local employment were only possible when processing facilities were located within local communities. Further, Kelly and Lymon (2003) reported community concerns over timber companies employing contractors from outside plantation communities for ground preparation, planting and harvesting. However Tonts *et al.* (2001) suggested that although timber processing facilities were highly mechanised, and local employment would only be for low skill and low paid positions, wider flow benefits were likely due to the need for additional infrastructure and services that would complement a processing facility including electricity, water, waste management, housing for employees, and essential services of health and education. The following quotes were provided by participants from the Governing Authority stakeholder group:

“There is an urgent need for developing other processing and value-adding manufacturing for residues and waste trees such as bio-fuel production.”

“Woodenbong (largest town in catchment with population around 330) has an electricity shortage. A co-generation plant set up by local plantation companies would be a viable value-adding industry to use wastes and thinnings, and would be carbon neutral. They could sell the extra electricity back to the state government into the electricity grid.”

Evidence from quantitative studies by Schirmer (2008a, 2008b, 2009) and Schirmer *et al.* (2005) did report a decline in local business trade in goods and services for many small rural towns and villages in temperate regions of Australia, however an increase in larger regional centres, although this was prior to the global financial crisis.

Several participants raised the issue of a lack of planning authority and legislative control by NSW local government for protecting local towns, villages and entrances to tourist amenities including national parks. The loss of visual amenity due to physical barriers from tree plantations was considered a social problem, as many participants felt plantation trees were consuming local landscapes leading to a decline in the visual appeal of the Upper Clarence catchment. Governing Authorities again blamed this on the lack of power in local government over plantation authorisation and land-use planning, a situation unique to NSW. Participants in interviews were provided with a variety of landscape photographs and asked to comment:

“Grazing land looks more productive than timber stands. Food can be produced off it to support the population.”

“Monoculture plantations are visually unappealing. Mixed landscapes demonstrate useful amenities and are more visually appealing for the variation.”

Williams (2008) reported similar findings from Western Australia and Tasmania, in that many people perceived the change of land-use from agriculture to plantation tree cropping as a loss of visual amenity. Further, Tonts *et al.* (2001) and Kelly and Lymon

(2003) reported the loss of visual amenity of agricultural landscapes as reducing the attractiveness to new residents into these communities for lifestyle change and hobby farming. Noise pollution from heavy forestry machinery, chipping mills, and passing trucks were perceived to threaten the quiet country lifestyle for some local residents and the developing tourist industry in Western Australian plantation communities (Kelly and Lymon 2003).

“Monoculture used in plantation forestry is unappealing to people coming to the region. It may end up limiting tourism prospects for the region.”

All except the Forestry Industry stakeholder group provided views on the importance of retaining social support networks and a strong sense of place within the local community for contributing to their feelings of self worth and happiness.

“I love living in the community as it is very active in community work, friendly and polite. Very supportive of each other, and each has their own identity. Some of the local groups include Lions, Landcare, Hall committee, Show Society, and Volunteer Rural Fire Service. People are moving into town as housing is affordable particularly for pensioners and those with disabilities. We have an adult disability centre that also runs a nursery and care centre which employs a few people. We want to retain this lifestyle.”

Plantations were found to be more socially acceptable in the Upper Clarence when grown on country leased by plantation companies from local farming families as opposed to outright property purchase. Several Farming participants suggested this helped retain farming families within communities who supported local social networks, particularly volunteer organisations. This has implications for policy reform towards incentives for farm forestry as opposed to tax-based incentives for large companies.

“I support mixed farming with forestry joint venture leasing arrangements, as they can provide long term investment returns which can be very useful when a lot of farmers never had superannuation.”

“I have a joint forestry venture with the Tokyo Electricity Power Company as a carbon offset plantation. I couldn't be happier with the lease annuities to support my farming enterprise.”

A shift in the type of occupancy for dwellings on properties bought by plantation companies from owner occupied to renters was perceived to be having detrimental impacts on local communities. Further changes to the local demographics were reported:

“Often the homes rented out go to unemployed who contribute nothing back to the community. Dope growers who add to the drug culture. They provide no social capital or prosperity, job creation or wealth to the community.”

“There has been an increase in itinerant workers in the area. This is changing the social makeup of the local community.”

“There is a threat in losing community to the aged and under privileged that don’t or can’t contribute back to the community. It is also difficult for the community to provide for them due to lack of resources and services.”

Plantations were also perceived to be having a negative impact by some participants on the local indigenous population not mentioned in other plantation communities:

“There is a negative impact on local Aborigines: Their landscape has been changed, trees have been planted too close to cultural sites, and water flow in local waterways has slowed down.”

“Assessments done by the NSW Industry and Investment for authorising plantations to comply don’t consult adequately with local cultural groups in regards to planning considerations on cultural heritage. They only use their database for listings of cultural sites, however many of which are not listed as they [the Aboriginal community] don’t want the public to know about them. This needs to be addressed at the local level in the future with tribal Elders in the community.”

Contrary to this view, a quote is provided from a representative for one of the several plantation forestry companies operating within the catchment:

“Our business has chosen voluntary standards as part of our business plan including the Environmental Management System (EMS) which is third party audited. Also the Australian Forestry Management Standard (AFMS 478) which covers community engagement, indigenous rights, and regionalisation initiatives.”

At the time of interviews, all participants anticipated the continued expansion of plantation forestry within the Upper Clarence catchment due to the poor outlook for the beef cattle industry, making selling properties or leasing partial properties to plantation companies viable alternatives. This situation however halted with the subsequent collapse of the MIS plantation timber industry in Australia.

## **Discussion and conclusions**

Narratives from a case study of the sub-tropical Upper Clarence catchment in eastern Australia have provided valuable insights on perceived impacts of plantation forestry expansion on communities and regional landscapes in Australia. These insights were gained through semi-structured interviews with key stakeholders that explored emerging areas of concern relating to social, ecological, economic and political themes. A major concern was the unsustainable expansion of the hardwood *Eucalyptus dunnii* being planted in the catchment to suit short-rotation investment cycles for contractual arrangements for MIS company prospectus. This concern was founded on perceptions of the high susceptibility this species has to insect attack and relatively poor wood quality compared to other endemic species that could be planted. The implications are the increased fire risk defoliated

plantations pose to communities, a view substantiated in research by Fleming *et al.* (2002), and the limited potential for financial returns to investors.

The perceived change in the demographical composition of communities towards an ageing and unemployed population was a major concern to all stakeholder groups, particularly in regards to social implications for providing and funding additional essential services, loss of volunteers to support local organisations, and threats to the sense of rurality and place in community. Overall the lack of investment in any regional infrastructure for processing and value-adding manufacturing of plantation timber was found to be the major socio-economic impediment to local employment prospects and the financial viability of the industry.

These findings, together with comparisons to other case regions from temperate zones, contribute important dialogue to help inform debate of the need for policy reform that supports triple bottom-line sustainability to overcome shortfalls in existing Managed Investment Scheme (MIS) retail forestry policy in Australia. Transformative sustainability has been referred to in this study as policy that supports fundamental changes to the social conditions that have led to current environmental challenges of climate change and global warming (Rathzel and Uzzell 2009), and deemed necessary for consideration by Australian policy makers to respond out of a moral and social responsibility to the environment and future generations.

An exploration of literature highlighted the various policy mechanisms used in other countries for supporting afforestation through targeting performance and productivity criteria, while maximising social and environmental outcomes to regional communities. A couple of mechanisms identified for their potential use in Australia include firstly an incentive-based scheme for farmers where they are paid to take agricultural land out of production to grow plantations on their properties, complemented by further annuities for maintaining them according to performance criteria. This includes achieving performance tiers in biodiversity, soils, water, and landscape protection while maximising timber productivity through active management. These schemes have been successfully implemented in Great Britain (EWGS 2009, DFSGS 2006, Nail 2008), and are likely to be supported in Australia as they keep farmers on properties and in rural communities, a view supported in research by Schirmer (2007).

Secondly, government assistance for the development of regional forestry cooperatives is further recommended to support a farmer afforestation scheme that could maximise regional economies of scales through collective action of small producers. Low *et al.* (2010) suggest legal support can further assist in the formation of regional cooperatives through legislated 'cooperative acts', such as the case in Canada for the support of the Cooperative Development Initiative (CDI). Regional forestry cooperatives are likely to be attractive in Australian rural communities for developing greater self-reliance and empowering local stakeholders in decision-making, particularly towards market prices as farmers have notoriously been price-takers, a view shared by Botterill (2006).

There is further potential for cooperatives to develop a carbon offset trading market based on institutional benefits and synergies by combining forestry with agricultural sinks. ANGA (2009) reported Australian national greenhouse gas emission's at an estimated 541 million tonnes CO<sup>-2</sup> per annum in 2007, however when adjusted for land-use change and

forestry activities, increased to 597 million tonnes. While this increase was claimed by Lewis and Gomer (2008) to be due mainly to the continuation of land clearing, this is a situation that could be avoided through policy amendments for CO<sup>2</sup> sequestration in managed native forests, plantations and perennial pastures.

In conclusion, a current \$2.1 billion (Aus\$) annual trade deficit in Australia for forestry products, together with declining access to native forests, provides evidence that plantation forestry is a significant industry to the nations economy. The failure of supporting regional forestry agreements in the 1990's to address community concerns, and subsequent market failure of the MIS retail forestry scheme (ABC 2010), suggests regulatory reform is urgently required to existing afforestation policy that incorporates stringent performance and accountability criteria. Further, there is a need to explore alternative community-based afforestation policy that could assist in the development of a sustainable plantation forestry industry in Australia.

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