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National Association of
Forest Industries

SUBMISSION

House of Representatives Inquiry into the role of government in assisting Australian farmers to adapt to the impacts of climate change

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Introduction

The National Association of Forest Industries (NAFI) is the peak representative body for Australia's forest industry. NAFI represents the industry's interests to the public, governments and authorities on matters relating to the national development and use of Australia's forests and wood products.

NAFI believes one of the most important ways government can help agriculture adapt to the impacts of climate change is in its support for forestry as a complementary land use at both regional and farm scales, including joint land use activities such as agroforestry and farm forestry.

In addition to its important role in sequestration of greenhouse gas emissions, forestry can help address some of the forecast adverse physical impacts of climate change in the rural sector, provide offsets to direct agricultural greenhouse gas emissions, offer alternative sources of farm income and help diversify regional economies to better adapt to climate variability.

This submission outlines the forest industry's role in rural sector adaptation and highlights the importance of government policy that recognises the benefits of a comprehensive land use framework. NAFI put many of the points made here to the Senate Standing Committee on Rural and Regional Affairs in its inquiry into climate change and the Australian agricultural sector in February 2008.

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Forestry's role in augmenting the shift toward mitigation and adaptation in the farm sector

Forecast changes in the patterns of rainfall, temperature and frosts could lead to a range of impacts on both agriculture and forestry which have the potential to reduce production levels across both sectors. Managing these impacts will be critical in minimising such adverse effects.

NAFI supports the conclusion of forest policy and scientific experts that mitigation and adaptation can be co-managed for mutually beneficial solutions, as mitigation can promote sustainable forestry and other land management practices and the development of new markets (e.g. biofuels), which in turn, should decrease the vulnerability of regional communities to both the economic and environmental impacts of climate change[1].

Furthermore, agriculture is Australia's second largest emitting sector and the Government intends that it will contribute to Australia's future emissions reduction effort. Forestry, as Australia's only carbon positive sector, has an important role to play in offsetting these emissions. Tree plantations, farm forestry and native forestry need to be considered as valuable components of the agricultural landscape.

In commercial native forests, adaptive management (see Box 1) is an important means of achieving carbon-positive outcomes, particularly when compared with the "passive" approach to managing conservation reserves which is creating a significant risk to Australia's carbon accounts and biodiversity through severe bushfires. Passive management of reserves may lead to a significant build up of fuel loads and an increase in the spread and risk of high intensity wildfires.

Forestry can also complement other forms of agriculture, which may be at greater risk from the effects of climate change. As a long term crop, trees are generally not as susceptible to seasonal and long term climatic variations as certain types of agriculture. Forest production has not declined as greatly as agricultural output in the continuing drought conditions throughout much of southern Australia. However, the industry acknowledges that increased bushfires are a potential risk from climate change which the forestry sector must deal with through its expertise and adaptive management regimes. The forest industry has a long history of experience with forest fire management, including risk management planning, fuel reduction burning, provision of firebreaks and access roads and fire suppression techniques.

[1] Swedish University of Agricultural Sciences (SLU), Food and Agriculture Organization of the United Nations (FAO) and International Union of Forest Research Organisations (IUFRO) 2008. Adaptation of Forests and Forest Management to Changing Climate with Emphasis on Forest Health: A Review of Science, Policies and Practice, Umea, Sweden 25-28 August 2008, Conference Report and Summary Report: Session 10 – Climate Change and Forest Sector Adaptive Capacity.

Box 1 - Forestry's ability to adapt to climate change

Adaptive management has long been a valuable tool in the management of Australia's production forests (i.e. plantations and native forests). Forest managers utilise a wide array of silvicultural management techniques and practices in order to achieve desired outcomes across a range of different forest types and stand structures.

As forests are dynamic systems, it is important that forest managers have a variety of management techniques 'at their disposal' in order to adapt to changing conditions, such as climate. These techniques may include thinning of dense stands, prescribed burning for ecological and timber protection purposes, variations in the timing and pattern of planting, application of fertilisers and pesticides, varying rotation lengths, greater use of diversified plantings and structural diversity (e.g. mixed species, age classes), and tree species selection.

The wide range of management options available to Australia's forest managers provides them with significant flexibility in dealing with anticipated climatic variations and the effects this may have on forest resources.

The ongoing expansion of Australia's plantation resource is providing a range of environmental, social and economic benefits. Plantations can be effective in addressing issues such as land degradation (i.e. salinity and erosion) and enhancing biodiversity, water quality and carbon sequestration (see Box 2).

Successfully integrating plantations with other forms of agricultural production provides a comprehensive land use framework which is less exposed to climatic variations and, coupled with the wide array of management options available to plantation managers to cope with these variations, plantation forestry can be a valuable adaptation tool (refer Box 1).

Australia's forestry sector is already providing a range of climate change mitigation activities and has significant potential to expand these efforts. Mitigation options for the forestry sector broadly include forests as carbon sinks, renewable carbon storing wood products and wood waste as a source of renewable energy (refer Box 2).

Box 2 - Benefits of forestry in the agricultural landscape

Carbon sinks - Australia's production forests, comprising commercial native forests and plantations, currently remove a net 44 million tonnes of CO2e from the atmosphere (comprising 22.5 million tonnes of CO2e by commercial native forests and 21.9 million tonnes of CO2e by plantations).[2]

Expanding plantations in line with the *Plantations for Australia: 2020 Vision* target – 3 million hectares of plantations by 2020 – could deliver around 50 million tonnes of CO2e sequestration per annum by 2020.

Biodiversity - Agricultural landscapes with a variety of land uses and vegetation cover, such as those with patches of plantations and native forests, have greater biodiversity opportunities, than simpler landscapes devoid of a forest component. All forests, be they commercial plantations or native forests, provide a range of habitats for conserving and enhancing biodiversity[3].

Water quality - The strategic placement of plantations on farms can lower saline water tables to limit salt loading into watercourses, as well as to filter and absorb excess nutrients from other agricultural activities (i.e. dairying and cropping) prior to entering waterways. The deep rooted nature of plantations established in appropriate locations on the farming landscape, is a key tool in managing stream water quality.

Carbon storing wood products - Timber is far less emissions-intensive in its production compared with alternative building materials such as concrete, steel and aluminium. Recent research indicates that, by choosing wood products wherever possible in house construction, greenhouse gas emissions, equivalent to more than 25 tonnes of CO2e, could be saved per house.[4]

Wood waste for renewable energy - There is enough wood waste available from existing forest industry activities in Australia to produce 3 million megawatt hours of electricity per annum. The net benefit of using this wood waste would be a permanent reduction in Australia's greenhouse gas emissions of up to 3 million tonnes of CO2e per year. Renewable energy from wood waste reduces CO2e emissions by 95-99% for each MWh of electricity generated when compared to coal-fired electricity generation.[5]

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[2] AGO (2006). Forestry Sector Greenhouse Gas Emissions Projections 2006.
[3] ENSIS (2006). 'Commercial Environmental Forestry: Integrating trees into landscapes for multiple benefits'. http://www.ensisjv.com/portals/0/CEFTechReportScreenFINAL.pdf.
[4] www.greenhouse.crc.org.au/counting_carbon/wood.cfm
[5] NAFI (2006). The environmental benefits of using wood waste for renewable energy, www.nafi.com.au/bioenergy_factsheets/WWFS03.pdf.

A complementary range of forestry and farming activities

It is important to acknowledge that agriculture and forestry are not necessarily mutually exclusive and there exists a continuum of tree planting and forestry activities across the landscape at a range of scales and tree densities (refer Figure 1). These activities are undertaken for a range of production and environmental purposes, such as salinity and riparian plantings through to farm woodlots and plantations used primarily for wood production.

Where forestry and agricultural outputs are jointly produced from the same unit of land, agroforestry can take many forms such as tree belts, alleys and widespread tree plantings. Livestock grazing, for example, is commonly practised within plantations following seedling establishment and initial tree maturity.

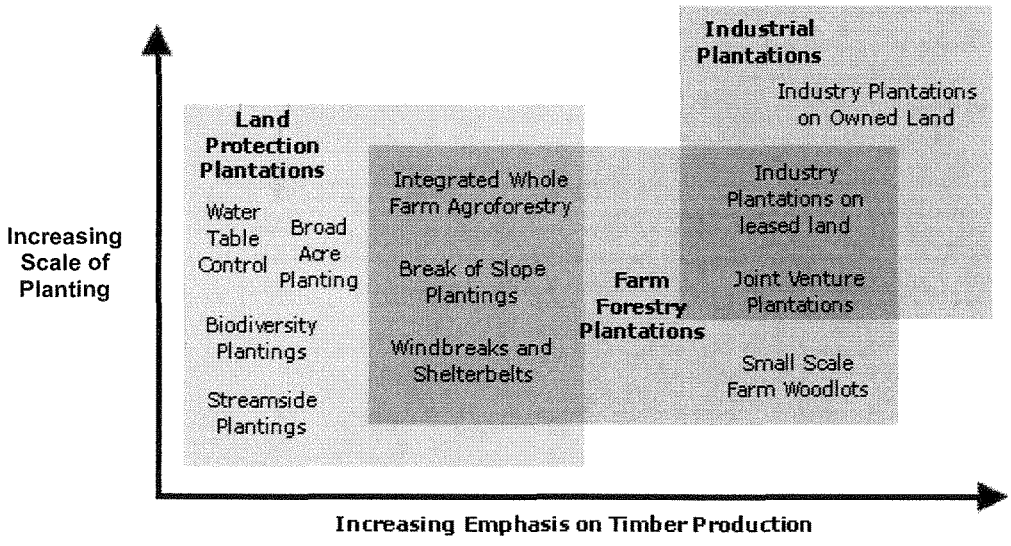

Figure 1: Continuum of farm-forestry and forestry activities

The ability to incorporate a range of tree planting and forestry activities as part of whole farm planning provides important adaptive capacity for farmers to respond to climate change. This is particularly relevant given previous tree clearing and land use practices that have resulted in land degradation at a range of national and regional scales, including dry land salinity, invasive weeds, soil erosion and water quality reduction. The direct biophysical processes by which trees used for shelter can enhance pasture and plant production are well documented and include:

- reducing water loss, as a result of reducing wind speed and/or shading, which can also prolong pasture growth and improve water use efficiency;
- protecting plants from frost;
- promoting mineralisation of soil nitrogen as a result of shading pasture or soil;
- contributing to soil organic matter (leaf and twig litter forming humus) and improved soil moisture retention; and
- trapping or recycling nutrients over time (i.e. nutrient cycling).

Trees used strategically in the landscape also provide direct benefits for animal production through provision of shade and shelter, particularly during periods of climatic stress and calving. Trees and forestry activities used effectively may affect animals in the following ways:

- by providing additional leaf foliage or fruit as a supplement to pasture, particularly in times of drought;
- by reducing livestock maintenance requirements due to shelter, as energy expended is increased by excessive heat or cold;
- by reducing climatic stress due to shelter and improving numbers of calves and intervals between calves;
- by increasing provision of shade and survival rates of newborns, particularly in hot and humid conditions[6].

The potential for forestry to help farmers adapt to climate change is therefore considered significant and may actually enhance agricultural productivity and food production in addition to providing greater resilience against climatic events.

Carbon sink forests and agriculture

The emergence of carbon sink forest projects provides tangible evidence as to the ability of landowners and farmers to respond to emerging market signals and diversify their activities in response to climate change. Furthermore, while carbon sink forest projects have the potential for direct voluntary offset payments to farmers from other parties (e.g. net greenhouse gas emitters from fossil fuel-based sectors), forestry activities would also help reduce on-farm emissions. This on-farm component may be equally important should a broader range of agricultural activities, such as livestock emissions, be included in any future carbon trading scheme[7].

Carbon sink forest projects in Australia have typically been permanent mallee tree plantings integrated into traditional broad acre grazing/annual cropping properties, in low-medium rainfall zones, notably the Western Australian wheat-belt and Central West of New South Wales (refer Figure 2).

This land is generally not suitable for timber production and minimal private investment in forestry development has occurred in these areas prior to the establishment of carbon sink forest projects.

The vast majority of carbon sink forests are located on land types where agricultural productivity is low or where present agricultural value can be enhanced by trees. NAFI believes this trend will continue with appropriate taxation and policy arrangements and provides tangible evidence of adaptation strategies already taking place in the rural landscape.

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[6] Bird PR, Bicknell D, Bulman PA, Burke SJA, Leys JF, Parker JN, Van Der Sommen FJ and Voller P (1992). The role of shelter in Australia for protecting soils, plants and livestock. *Agroforestry Systems*, 20: 59-86.

[7] Stephens ML and Stunzner A 2008. Small scale forestry management in Central Queensland, Australia: an emerging model of public-private partnerships. In: Buttoud G (Ed.) Small-scale Rural Forest Use and Management: Global Policies versus Local Knowledge, IUFRO International Symposium, Gerardmer, France, 23-27 June 2008, Pre-Conference Proceedings, pp. 215-222.

The majority of existing carbon sink forests are successfully integrated into existing agricultural systems, and are also delivering improved sustainability and productivity of farm land through salinity prevention, erosion control, and the provision of shelter belts for crops and livestock.

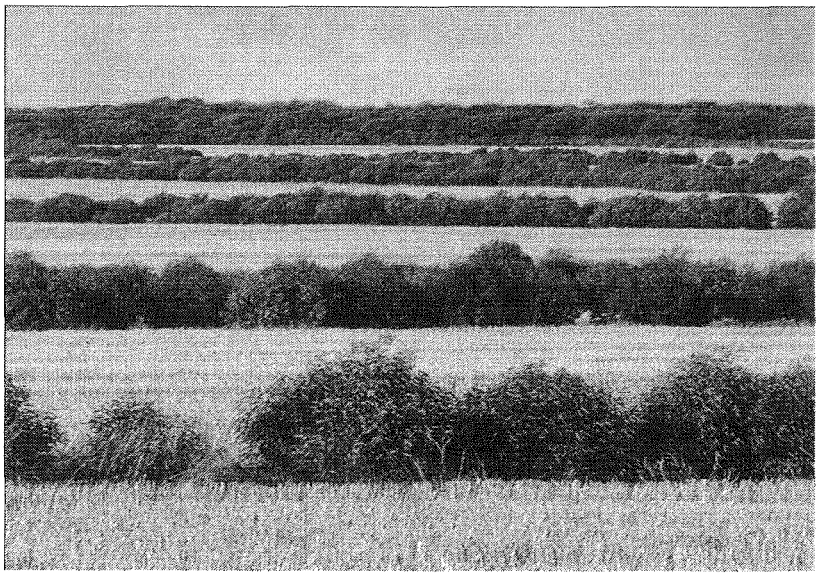

Figure 2: Annual grain cropping integrated with carbon sink mallee plantings in the WA wheat belt

A national strategy for adapting to climate change

NAFI supports the concept of a national strategy to assist Australian agricultural industries to adapt to climate change. This strategy, and any policy development arising from it, should include due recognition of the benefits that forestry can provide in addressing the impacts of climate change in the agricultural landscape.

However, if Australia's forest industry is to deliver on its potential to assist the agricultural sector in addressing the impacts of climate change, stable government policy settings will be required for both commercial native forests and plantations.

For plantations, it is important to ensure that government policy on climate change and other areas (such as taxation policy, water entitlements and land use regulations) reflect the full benefits (including carbon benefits) of plantations and associated wood products.

Australia's forest industry is concerned that water policy in response to the National Water Initiative may unfairly restrict plantation development while failing to recognise other benefits such as the significant role of plantations as carbon sinks. Similarly, the development of inequitable land use regulations poses a threat to the future viability and development of plantation forestry.

New Zealand's forest industry serves as a pertinent example of the potential significant impact of shifting policy on the development and viability of plantation

forestry. Recent policy decisions by the New Zealand Government in areas of climate change and land use regulations have led to considerable uncertainty for future investment in the country's plantation sector. Large scale land use change has occurred whereby harvested plantations have not been replanted and have been replaced by other forms of agricultural production such as dairy farming – resulting in the undesirable outcome of overall net deforestation.

Given the strong land use link between the tree plantation sector and the agricultural sector, it seems logical for plantations to play a major role in offsetting emissions from agriculture. New Zealand's policy settings have failed somewhat in encouraging this to occur.

Clearly, a national strategy for agriculture adapting to climate change should ensure that any policy development does not impact on the forest industry's significant capacity to deliver carbon offsets through its production forests and wood products.

Research and development policies should be concurrently directed to improving climate mitigation and adaptation strategies for the forestry and agricultural sectors as part of broader programs to support farmers in adjusting to climate change. Identified above is a range of opportunities for forestry to enhance the sustainability of rural landscapes and maximise the synergies between forestry and agricultural activities to produce multiple benefits. In addition to investigating soil carbon and other emissions abatement options as part of best practice grazing and cropping systems, research and development should also focus on agroforestry systems, renewable energy from agricultural and wood wastes and carbon storage across growing and processing supply chains for forest products.

Drought implications and assistance

NAFI acknowledges the importance of drought assistance and exceptional circumstances programs to the agricultural sector in dealing with the long term impacts of climate change. The forestry sector's role as a complementary land use can reduce the need for this assistance to some degree.

For instance, both native and plantation forestry can provide a valuable source of income at both the regional and farm level during periods when extreme climatic conditions are causing an economic downturn for other parts of the agricultural sector. This may be critical in supporting regional communities and individual landholders during these periods.

At a regional level, large scale production forestry may assist regional communities deal with droughts through the generation of economic activity and employment opportunities as part of that sector (e.g. harvesting, haulage, processing and wholesaling). At the farm level, landholders may rely on timber production from their forest resource to supplement their income during times of prolonged drought which is causing a reduction in their levels of agricultural production.

It is important that any potential evaluation of, or changes to, drought assistance and exceptional circumstances programs, recognises the value of forestry to regional communities and landholders as a less 'climate sensitive' land use.

Role of research and development

NAFI supports the need for enhanced research and development of strategies to assist farmers adapt to the impacts of climate change. In addition to investigating and developing best management practices for specific agricultural industry sectors (e.g. seasonal forecasting and precision management, livestock genetic breeding, improved crop varieties, soil and water use management practices), there needs to be greater recognition of the broader landscape management aspects of climate change and the inter-connectivity between land uses to enhance adaptability at regional and catchment scales. It is acknowledged that regional land use patterns will be strongly affected by changes in climate and this could mean some contractions and expansions of agricultural activities, including plantation forestry in some areas[8].

NAFI therefore supports further research and development into the significant opportunities provided by the forestry sector and synergies with broadacre agriculture, including mixed farming systems such as agroforestry and the role of forests in enhancing the adaptive capacity of rural landscapes and communities.

As outlined above, mitigation activities can also contribute to adaptation. Key mitigation opportunities for the forest industry include:

- sustainably managed production forests (both native forests and plantations) as carbon sinks;
- wood products which store carbon, as well as providing an alternative to building materials which are more emissions intensive; and
- wood waste from forest industry activities that reduce emissions from fossil fuel based energy (e.g. biofuels).

Additional research is needed in the areas of:

- renewable energy from wood and agricultural wastes;
- better understanding of carbon sequestration across the forest growing and processing sectors including wood products; and
- synergies between forestry and agriculture for carbon storage and enhanced productivity.

It is noted that agricultural productivity benefits from forestry activities are not only restricted to natural resource management functions such as shade and shelter for crops and livestock. Biochar (i.e. the charred by-product from the heating of biomass in the absence of oxygen to capture combustible gases), for example, is an emerging technology for wood waste that may provide multiple benefits. Biochar can be

[8] Stokes CJ and Howden SM (Eds) (2008). An overview of climate change adaptation in Australian primary industries - impacts, options and priorities. Prepared for Land and Water Australia by the CSIRO Climate Adaptation National Research Flagship. CSIRO, Canberra.

incorporated in biofuel production as well as provide an additional carbon sink with potential for increasing the quality and fertility of agricultural soils[9]. Further evaluation of these types of new technologies is warranted.

Finally, NAFI acknowledges that in conjunction with these research priorities there will be fundamental research needs to improve our understanding of the effects of climate change on forestry development and adaptation, including increased levels of atmospheric carbon dioxide and changes in temperature and rainfall on tree growth, changes in the incidence of pests and diseases and the frequency and intensity of bushfires[8].

[9] Sohi S, Lopez-Capel E, Krull E and Bol R (2009). Biochar, climate change and soil: A review to guide future research. CSIRO Land and Water Science Report 05/09, February.

Conclusion and Recommendations

As outlined in this submission, the forestry sector has an important role to play in diversifying the agricultural landscape to deal with the effects of climate change. The integration of production forests (both plantations and native forests) and related forestry activities with other forms of agriculture provides a more flexible and robust land use framework to deal with seasonal and long term climatic variations.

NAFI believes that forestry should be regarded as a complementary component of the rural landscape that can provide a wide range of benefits in a changing climate, including:

- environmental and natural resource management functions (e.g. shade and shelter for heat stressed livestock, improved pasture quality, mitigation of salinity risk, soil stabilisation etc);
- carbon abatement (off-farm as well as on-farm emission offsets); and
- enhanced regional resilience through industry and income diversification.

Therefore, NAFI recommends that a national government strategy to assist agriculture deal with climate change should provide:

- Due recognition of the forestry sector's significant capacity to offset emissions from agriculture through its production forests and wood products;

- Equitable treatment of forestry as a legitimate land use in the agricultural landscape capable of delivering a number of environmental, social and economic benefits to regional Australia;

- Recognition of the value of forestry to regional communities and landholders as a less 'climate sensitive' land use which is not reliant on external assistance resulting from climatic variations; and

- Greater research, development and capacity building to promote the synergies between forestry and agricultural activities, including renewable energy, carbon storage and agroforestry practices, that allow farmers and regions to better adapt to climate change.

NAFI appreciates the opportunity to contribute to this inquiry and is willing to provide additional information or participate in any hearings that the committee may require.