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Sustainable forest management: the Australian context

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Contents

List of acronyms.....	v
Background.....	vi
1 Introduction	1
2 History	3
National Forest Policy Statement.....	3
Regional forest agreements	4
Plantations.....	5
National Indigenous Forestry Strategy.....	6
Farm forestry.....	7
Certification.....	8
3 Current situation	9
Forest resources	9
Reporting.....	11
4 Outlook.....	13
Forest resources	13
Climate change and other potential impacts	13
Sustainable forest management	14
Integration of forestry into the ecosystem services agenda	14
Regional and global issues.....	14
5 Forests research capacity	15
6 Key issues.....	17
7 Potential areas for collaboration.....	18
References.....	19

Tables

Table 1 Key forest and land statistics, 2012	2
--	---

Figures

Figure 1 Salvage logging and plantation re-establishment after fire	1
Figure 2 Phases of plantation development in Australia since 1950	6
Figure 3 Scale of plantings and timber production, by planting type	7
Figure 4 Native forest in nature conservation reserves and multiple-use public forests, 1997–2007.....	10
Figure 5 Area and projected area of softwood and hardwood plantations, 1995–2015...	10

Figure 6 Logs harvested by native forest, softwood and hardwood plantation, 1996–97 to 2009–10.....	11
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Maps

Map 1 Locations of comprehensive regional assessment and regional forest agreements, 2012.....	5
--	---

Boxes

Box 1 Montréal Process criteria of sustainable forest management.....	12
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List of acronyms

ABARES	Australian Bureau of Agricultural and Resource Economics and Sciences
ACEDP	Australia China Environment Development Partnership
AFS	Australian Forestry Standard Limited
CRA	Comprehensive Regional Assessment
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DAFF	Australian Government Department of Agriculture, Fisheries and Forestry
FAO	Food and Agriculture Organization of the United Nations
FEDRC	China State Forestry Administration – Forestry Economics and Development Research Center
FSC	Forest Stewardship Council Australia
IPBES	Intergovernmental Platform on Biodiversity and Ecosystem Services
IPCC	Intergovernmental Panel on Climate Change
NFFI	National Farm Forestry Inventory
NFI	National Forest Inventory
NFPS	National Forest Policy Statement
NIFS	National Indigenous Forestry Strategy
REDD+	Reducing emissions from deforestation and forest degradation with additional activities
RFA	Regional Forest Agreement

Background

This paper is one of two background papers prepared as part of a collaborative project between ABARES and the Forestry Economics and Development Research Center (FEDRC) of China's State Forestry Administration. The other paper is *Land use and management: the Australian context* (Lesslie & Mewett 2013).

The Sustainable Land and Forest Management Research Agenda project, funded through AusAID's Australia China Environment Development Partnership (ACEDP) program, is aimed at strengthening technical cooperation in areas of common interest in sustainable forest management and land resources assessment. Through this process, ABARES and FEDRC will identify common areas of interest and potential arrangements for sharing data and skills.

Early drafts of the two background papers were prepared to support deliberations in workshops and discussions held by FEDRC and ABARES (in Beijing in October 2011 and in Canberra in December 2011). The discussions led to agreement on common areas of research interest in sustainable forest management and land resources assessment. Project partners ABARES and FEDRC intend to use the papers as background information to support collaborative engagement, and as reports to the ACEDP managing contractor (GHD Pty Ltd) and AusAID.

1 Introduction

Australia has 147.4 million hectares of native (98.7 per cent) and plantation (1.3 per cent) forest. National policy seeks to ensure Australia's forests are managed to protect and enhance their considerable economic, environmental and social value. A wide ranging system of legal, policy and program measures are in place at the local, state/territory and national levels to support these broader policy objectives (Howell et al. 2011).

Sustainable forest management principles are integral to state and territory forest management legislation and codes of practice, and to forest certification systems implemented in Australia (Montréal Process Implementation Group for Australia 2008). Sustainable forest management and competitive and profitable forest industries require a sound and comprehensive scientific knowledge of the forest resource and an understanding of their many values. Key forest and land statistics for Australia are provided in Table 1.

Forest management in Australia aims to meet multiple environmental, social and economic objectives in a mix of native and planted forests. Wildfires are one of the many issues forest managers must consider in their forest management planning. Figure 1 shows the resulting impact of wildfire in a region with both native forest and plantations near Tumut in New South Wales.

Figure 1 Salvage logging and plantation re-establishment after fire



Source: Tim Clancy 2009

Table 1 Key forest and land statistics, 2012

Total land area	769.2 million hectares
Total forest area	149.4 million hectares
Forest as a proportion of land area	19 per cent
Native forest area	147.4 million hectares
Forest area in nature conservation reserves	23.0 million hectares
Public native forests where timber production is permitted (gross area)	9.4 million hectares
Total carbon stored in forests	>12 billion tonnes
Plantation forest area	2.0 million hectares
Total logs harvested (2010-11)	26.5 million cubic metres
Total imports of wood products (2010-11)	\$4.4 billion
Total exports of wood products (2010-11)	\$2.5 billion
Major wood product imports (2010-11)	
Paper and paperboard	\$2 223 million
Manufactured paper products	\$557 million
Sawn wood	\$473 million
Panels	\$289 million
Major wood product exports (2010-11)	
Woodchips	\$884 million
Paper and paperboard	\$747 million
Sawn wood	\$115 million
Panels	\$98 million
No. employed in Australian Bureau of Statistics categories forestry, logging and wood manufacturing (2010-11)	66 000 people
Value of turnover in forest product industries (2009-10)	\$22.3 billion
Forestry and forest products industries contribution to GDP (2009-10)	0.6 per cent

Source: ABARES 2012

2 History

Human impacts on Australian forest communities probably began when people first arrived some 50 000 years ago. The main changes initially were to fire regimes (Brook & Bowman 2006; Hassell & Dodson 2002). Fire, whether natural (lightning strikes) or caused by humans, has played a significant role in Australian forests over millennia. Many eucalypt species now require fire/smoke for regeneration or have adapted to reshoot from lignotubers after being burnt (Attiwill 1994).

Government involvement in forest management in Australia began in the early 1800s. In 1803 the Governor of New South Wales prohibited the cutting of trees on the banks of the Hawkesbury River because of concerns about erosion and flood damage (Carron 1985). Fire exclusion and suppression were actively pursued around settlements. Periodic extensive wildfire has been a major influence on forest ecology in Australia and, since colonisation, on forestry management and social attitudes to forests, especially in the southern tall forests of south-west Western Australia; eastern New South Wales; south, central and eastern Victoria; and Tasmania.

Under the Australian Constitution, management of land and natural resources, including forests, is largely the responsibility of state and territory governments. Since federation in 1901 each state has passed a forest Act (Dargavel 2005). Forest services were established in each state to be the custodians of publicly owned forested land. These services were responsible for forest management activities on public lands, particularly the production of timber for use by people of the state.

The goal of early forest services in Australia was to bring local forests under systematic and planned management, in accordance with European principles of sustained yield (Dargavel 2005). A further responsibility for state forestry departments was the opening up of the bush with roads for logging and trails for fire protection. This was a vital task that not only supported the growth of the timber industry and other industries but also provided some protection from bushfire to towns and suburban areas that adjoined forests.

National Forest Policy Statement

The National Forest Policy Statement (NFPS), first published in 1992 and revised in 1995 (Commonwealth of Australia 1995), represents a major milestone in the management of forests and was signed by all state/territory jurisdictions and the Australian Government. It embodied many parallel and non-forest specific sustainability strategies, including the National Strategy for Ecologically Sustainable Development (1992), the Intergovernmental Agreement on the Environment (1992), the *Endangered Species Protection Act 1992*, the National Greenhouse Response Strategy (1992), and the United Nations Conference on Environment and Development (1992 Rio Earth Summit). The Earth Summit focused world attention on environmental issues and produced the Rio Declaration on Environment and Development, Agenda 21, a statement of principles on forests, United Nations Framework Convention on Climate Change, and the Convention on Biological Diversity.

The NFPS aims to ensure the ecologically sustainable development of a commercial timber industry in conjunction with the identification and retention of nature conservation reserves and wilderness areas. It comprises 11 broad national goals and a range of policy measures aimed at increasing the competitiveness of forest industries and reducing conflict over the use of Australia's forests.

The NFPS goals are to:

- maintain an extensive and permanent native forest estate and manage it in an ecologically sustainable manner for the full range of forest values
- develop internationally competitive forest-based industries that maximise value-adding opportunities within Australia
- streamline land use decisions and improve state–Commonwealth interaction
- encourage the retention and better management of private native forests, both for resource and conservation reasons
- expand commercial plantation development on cleared private land, both to provide additional timber resources and help address land degradation problems on farmland
- ensure the protection of water supply and catchment values
- give greater recognition to the value of forests for tourism and ensure this use does not lead to a decline in these values
- expand employment opportunities and the skill base of people working in forest management and forest-based industries
- foster community understanding of sustainable forest management and participation in decision-making
- increase Australia’s forest research effort and ensure it is well coordinated and directed toward appropriate goals
- promote nature conservation and sustainable use of forests outside Australia and ensure Australia fulfils its obligations under international agreements (Commonwealth of Australia 1995).

During the drafting of the NFPS in the early 1990s, regional agreements on forests were seen as a means to establish a framework for balanced management and use of native forests in key regions of Australia.

Regional forest agreements

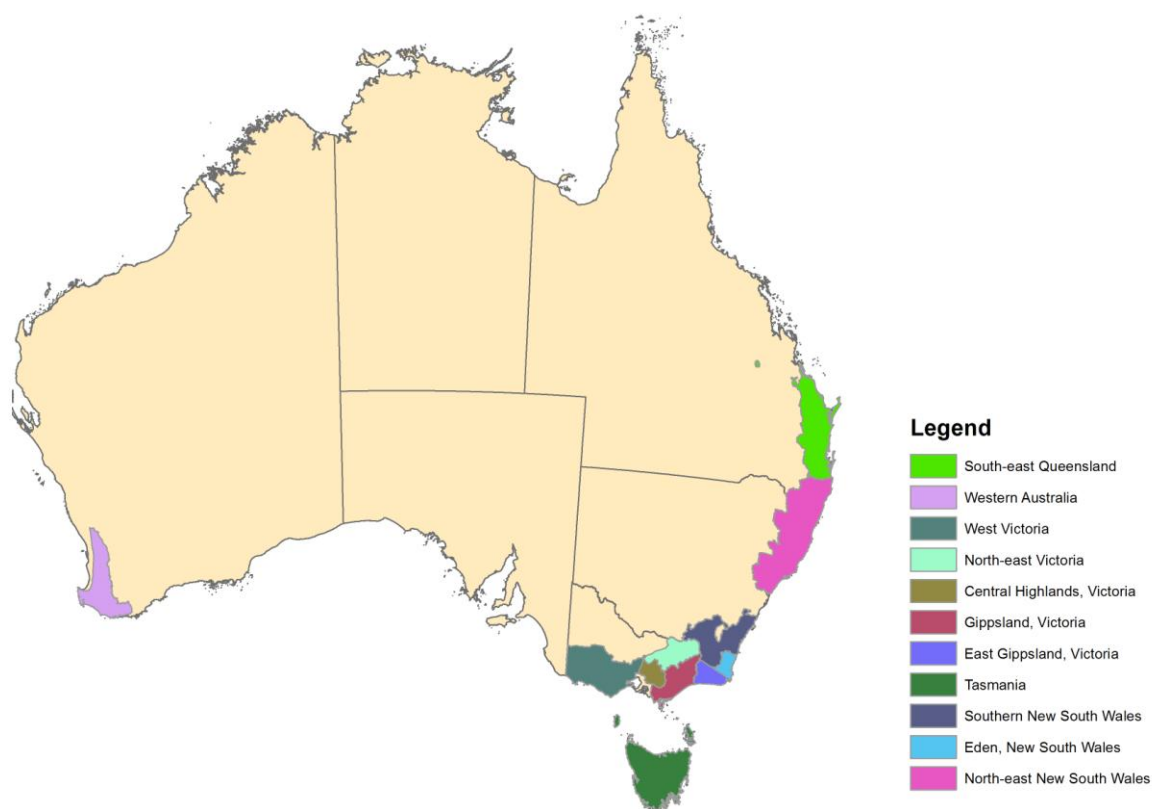
In major native forest areas in New South Wales, Victoria, Western Australia and Tasmania, regional forest agreements (RFAs) were developed in the late-1990s and early 2000s, following a comprehensive regional assessment (CRA) process for each region. RFA forestry operations must adhere to ecologically sustainable forest management (SFM) principles, including the application of management strategies and management prescriptions to protect rare and threatened flora and fauna.

The RFA process was initiated with scoping agreements to identify key government obligations, regional objectives and interests, and broad forest uses. Criteria for a comprehensive, representative and adequate reserve system were nationally agreed. This was followed by CRAs of forest values and uses, including identifying areas of old growth forest, and involved wide stakeholder consultation.

This process culminated in the Australian Government negotiating a framework for the conservation and sustainable use of Australia’s native forests. Between 1997 and 2001 the Commonwealth signed ten 20-year RFAs with the state governments of New South Wales,

Victoria, Western Australia and Tasmania; a CRA undertaken in south-east Queensland did not progress to a formal RFA (Map 1).

Map 1 Locations of comprehensive regional assessment and regional forest agreements, 2012



Note: Shaded areas represent the location of regional forest agreements in New South Wales, Victoria, Western Australia and Tasmania, and the comprehensive regional assessment region in south-east Queensland.

Source: ABARES

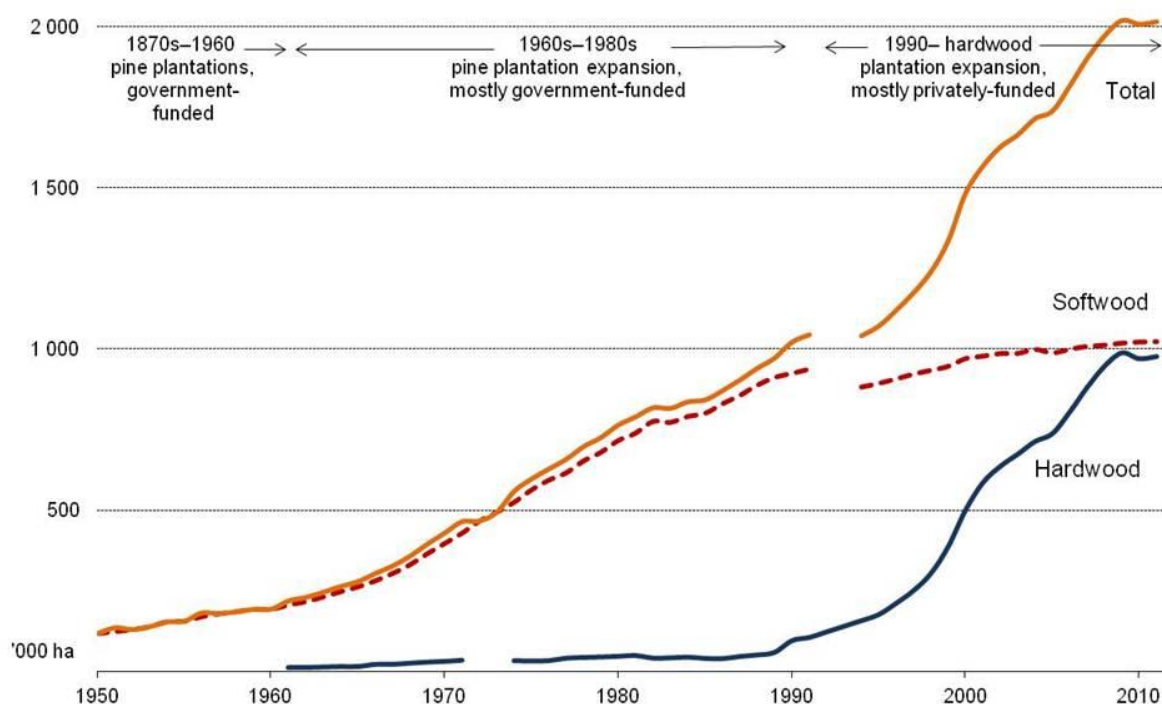
Implementation of the RFAs was intended to help provide certainty to native forest based industries. All RFAs have five-year review processes as part of the agreements. RFA reviews assess the parties' implementation of milestones, obligations and commitments as outlined in the RFAs, and provide information against agreed state sustainability indicators. See the DAFF website for [RFA annual reports and five-year reviews, by state](#) (2011).

Plantations

The Australian Government has a history of involvement in the plantation sector of the forest industry. In the early 1960s Max Jacobs, Director-General of the then Forestry and Timber Bureau, argued that Australia should become self-sufficient in wood. The Commonwealth began to take more interest in forestry, supporting state government strategies to establish more plantations to cover expected shortages and find pulpwood markets for otherwise unsaleable trees so that native forests could be regenerated as future tree crops (Dargavel 2005). The *Softwood Forestry Agreements Act 1967* and subsequent state initiatives further supported state efforts (Carron 1990: 11–24).

From the 1960s to the 1980s the rate of plantation establishment increased to an average of around 25 000 hectares per year (Figure 2). Over 90 per cent of these plantations were of exotic pines, managed on long 30 to 35-year production periods primarily for sawlog (Parsons, Schirmer, Gavran & Burns 2005).

Figure 2 Phases of plantation development in Australia since 1950



Source: ABARES

From the 1990s the role of the Australian Government in plantation policy has largely involved encouraging private investment in the sector. This policy approach followed the NFPS, RFAs and Plantations for Australia: the 2020 Vision, a partnership agreement between the Australian, state/territory governments and industry. These initiatives remain part of Australian Government forest policy.

National Indigenous Forestry Strategy

The strong regional basis of Australia's forest industries may help achieve policy goals for the economic advancement of Aboriginal and Torres Strait Islanders. The Australian Government developed and released in 2005 the National Indigenous Forestry Strategy (NIFS) to encourage Indigenous land owners to form business partnerships with the forest industry. These partnerships could provide long-term benefits to Indigenous communities, as well as to the forest and wood products industry. The government developed the strategy in consultation with Indigenous communities and the forest industry.

NIFS objectives include:

- improved economic and social outcomes for Indigenous communities through more active involvement in the forest and timber products industry
- increased involvement of Indigenous Australians in the development and management of regional, state and national forest policy and industry activities.

The NIFS identifies elements associated with the implementation of a broader forestry research and development agenda, including:

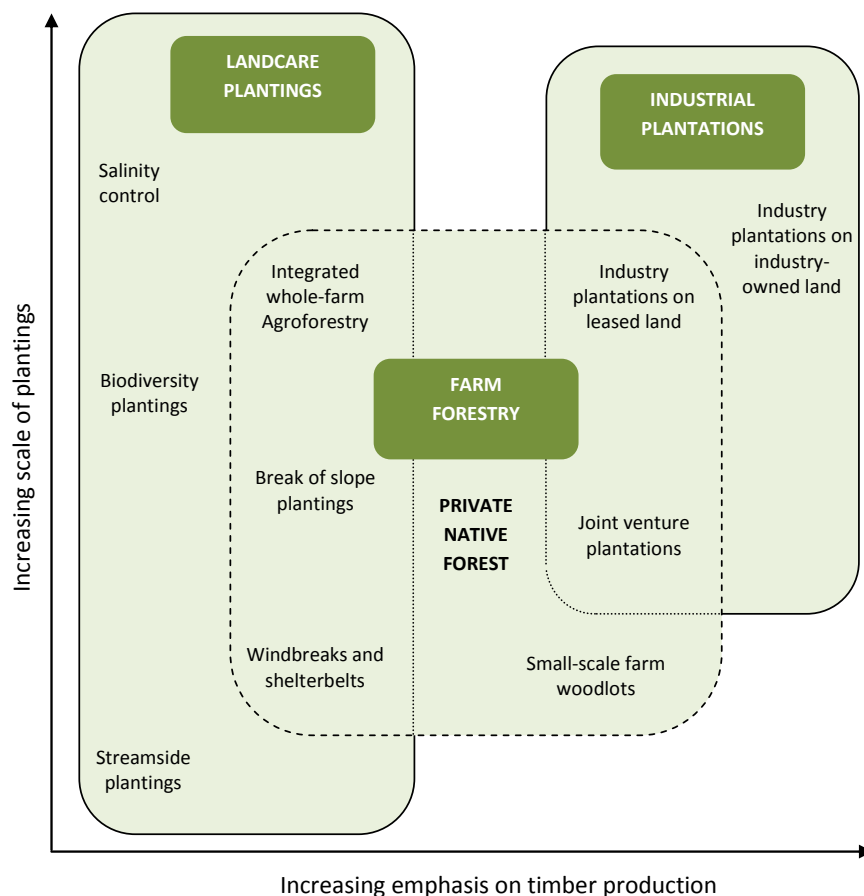
- focusing research and development efforts on the special requirements of Aboriginal and Torres Strait Islander communities in their dealings with the forestry industry
- helping Aboriginal and Torres Strait Islander people incorporate research and development results into their forest management and industry activities
- identifying and harnessing sources of research funding.

To support the NIFS, the Bureau of Rural Sciences (now ABARES) developed the [National Indigenous Forestry Strategy Mapping website](#) (DAFF 2009).

Farm forestry

In the Australian context, farm forestry is the integration of forestry activity with agricultural activities (cropping and or livestock production) at a property scale. The forestry activity is primarily commercial, although other objectives may include shade and shelter for stock or crops, amenity and landscape values, habitat conservation, and natural resource management including soil and water protection. Farm forestry can take many forms, including plantations on farms, woodlots, timber belts, alleys, wide-spaced tree plantings and sustainably managed private native forests. Most farm forestry plantations are smaller than industrial plantations and may have less emphasis on timber or fibre production as primary outputs (Figure 3).

Figure 3 Scale of plantings and timber production, by planting type



Source: ABARES

Farm forestry aims to encourage the incorporation of commercial tree growing and management into farming systems to increase wood and non-wood production, increase agricultural productivity, reduce soil erosion, stabilise water tables and restore wildlife habitats (DAFF 2005).

The National Farm Forest Inventory (NFFI) was established in November 1998 to work with regional, state and other stakeholders in the collection and interpretation of farm forest data. The NFFI collated the first, and only, comprehensive national inventory of farm forests in Australia. The inventory, published in *Plantations of Australia 2001*, reported that by 2001 over 65 000 hectares had been planted in farm forestry activities. The NFFI project did not continue after 2001, but the National Plantation Inventory continues to include data on farm forests where possible. The limited data available to the inventory suggests that the rate of uptake of farm forestry by Australian farmers is low.

Certification

Certification schemes play an important role in sustainable forest management. The Forest Stewardship Council (FSC) Australia and Australian Forestry Standard Limited (AFS) certify forest management practices and forest products in Australia. The Australian Government policy is to support 'all credible, internationally recognised, forest certification schemes and equal recognition of these schemes in the market place' within a market driven/commercial business framework.

Around 10.5 million hectares of Australia's forests are certified, of which 80 per cent is native forest and 20 per cent is plantation. Approximately 85 per cent of Australia's certified forest is publicly owned (ABARES 2012).

3 Current situation

Forest resources

Native forests

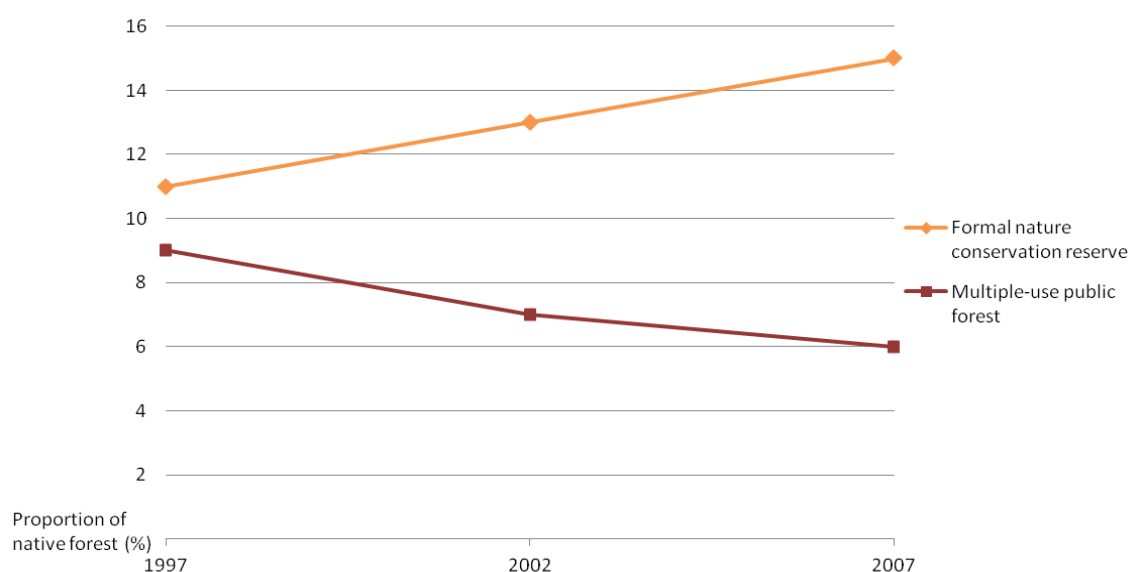
Australia's 147.4 million hectares of native forest includes trees with greater than 20 per cent crown canopy cover when viewed from above, and a minimum height of 2 metres at maturity. These forests are dominated by eucalyptus (78 per cent), followed by acacia (7 per cent), and melaleuca (5 per cent). While callitris is the most extensive softwood forest type, it represents less than 2 per cent of the area of native forest. Australia's forest cover is largely determined by climate, especially rainfall, and soil properties. The majority (just over 65 per cent) of native forests are low-density woodland, comprising trees with a crown canopy cover of between 20 and 50 per cent, and a height of less than 30 metres.

Native forests are distributed across a range of land management tenures, with 70 per cent of forests under private management, on either leasehold land (65.1 million hectares) or private tenure (38 million hectares). Unlike publicly managed forests, investment in forest inventory and reporting is limited and there is little comprehensive data on the private forest estate.

Of the almost 43 million hectares of publicly managed native forest, half are managed as formal nature conservation reserves—just over 22 million hectares, or 15 per cent of total forest. Multiple-use public forests in which timber production is permitted occur in New South Wales, Queensland, Tasmania, Victoria and Western Australia. Together, they represent a quarter of publicly managed forests or 9.4 million hectares (6 per cent of Australia's total forest area). The area in which harvesting is possible is considerably less, due to a lack of suitability or to restrictions, including codes of forest practice. Harvesting from multiple-use public forests is estimated to average around 1.6 per cent of the available forest area each year for the five-year period to 2008–09 (ABARES 2012). These figures are based on data from New South Wales, Tasmania, Victoria and Western Australia.

The most recent figures published by the National Forest Inventory (Montréal Process Implementation Group for Australia 2008) show that from 1997 to 2007 the total area of multiple-use public forest available for timber harvest declined with a corresponding increase in the area of public native forest in nature conservation reserves (Figure 4). More recent changes, including the transfer of red gum forest from multiple-use public forest to nature conservation reserve in New South Wales are yet to be included in Australia's National Forest Inventory.

Figure 4 Native forest in nature conservation reserves and multiple-use public forests, 1997–2007

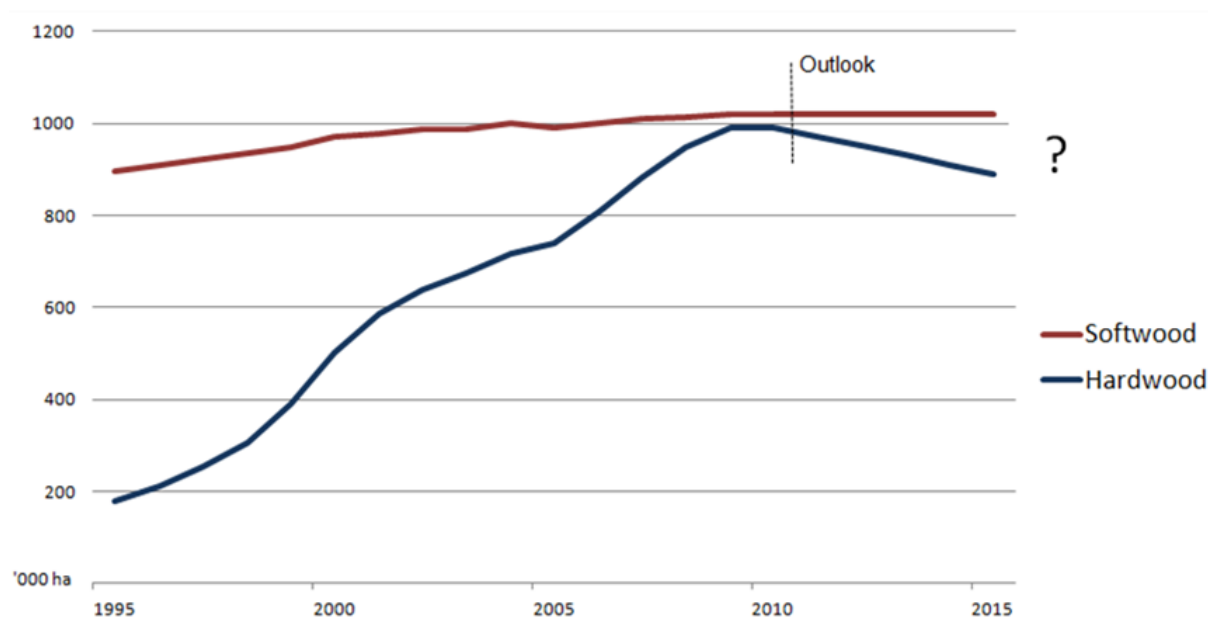


Data source: Montréal Process Implementation Group for Australia 2008

Plantations

Australia's total plantation estate has expanded by about 35 per cent over the past 10 years to a total of 2.0 million hectares, with almost equal proportions of softwood and hardwood species. The rate of increase has been waning since 2007 (Figure 5). The softwood area is expected to stabilise and the hardwood area to decline slightly in the next few years.

Figure 5 Area and projected area of softwood and hardwood plantations, 1995–2015



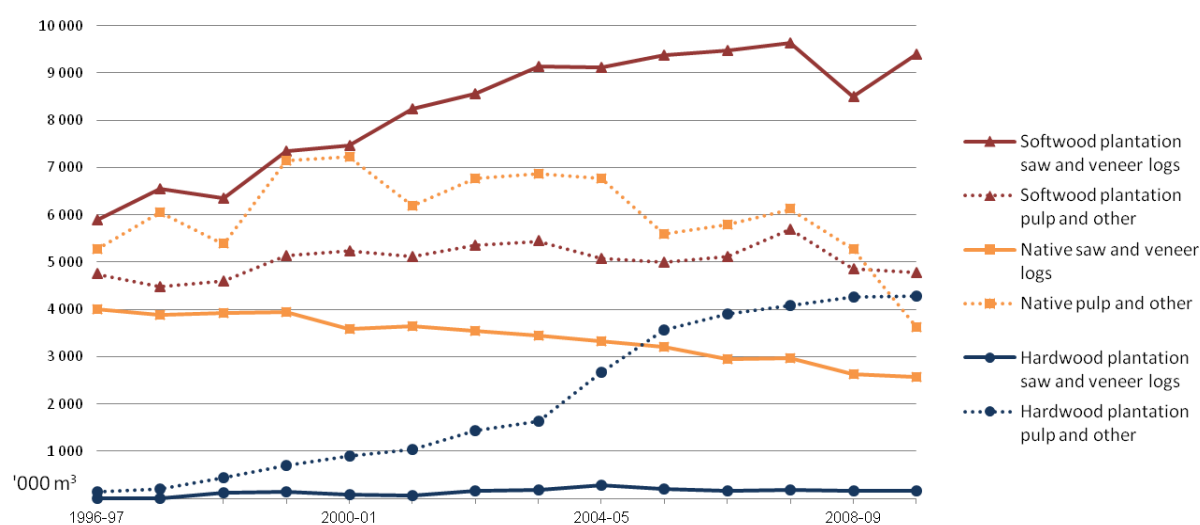
Data source: Howell et al. 2011

The rate of increase in the volume of hardwood plantation pulp harvested since the late 1990s corresponds to the rate of increase in the area of hardwood plantations established since the early 1990s. If the area of hardwood plantation plateaus or declines due to reduced investment

in the sector and therefore reductions in replanting and new plantings, a corresponding plateau in the volume of hardwood pulp production is likely in the next 10 to 12 years.

The trend in hardwood plantations indicates that the volume of sawlogs from hardwood plantations over the medium term will not match current hardwood sawlog production levels from native forests without substantial restructuring in the plantation industry (Figure 6). If domestic production is to continue to meet future domestic demand, changes in silvicultural management are likely to be required. These changes include pruning and thinning, revised investment arrangements and new product technology, such as composite structural products.

Figure 6 Logs harvested by native forest, softwood and hardwood plantation, 1996–97 to 2009–10



Note: Softwood plantation log volumes include a small proportion (2 per cent) of native cypress pine sawlogs.

Source: Howell et al. 2011

Reporting

Two key reporting requirements underpin Australia's national and international reporting systems:

- the NFPS requirement to produce and publish a national state of the forests review every five years
- the *Regional Forest Agreements Act 2002* requirement that the federal minister for forests 'establish a comprehensive and publicly available source of information for national and regional monitoring and reporting in relation to all of Australia's forests'.

Preparations are underway to compile the fourth *Australia's state of the forests report* (2013), to meet these national reporting requirements. The national report is based on the Montréal Process framework of criteria and indicators to report progress towards sustainable forest management (Box 1). The framework forms the basis of several state forest reporting processes. *Australia's state of the forests report* serves as Australia's country report to the Montréal Process Working Group, which comprises 12 countries, including Australia and China.

Box 1 Montréal Process criteria of sustainable forest management

Criterion	Title
1	Conservation of biological diversity
2	Maintenance of productive capacity of forest ecosystems
3	Maintenance of ecosystem health and vitality
4	Conservation and maintenance of soil and water resources
5	Maintenance of forest contribution to global carbon cycles
6	Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies
7	Legal, institutional and economic framework for forest conservation and sustainable management

4 Outlook

Forest resources

Forest resources available for industry are very much driven by regional considerations, making it difficult to predict future wood supply at a national level. Nevertheless, based on current trends, industry returns, aggregated modelling and expert opinion, some broad statements about future outlooks can be made.

There is likely to be a continual decline, or no significant increase, in native forest resource available for industry, especially in multiple-use public native forests. This may be offset through management-driven productivity improvements and/or increased use of private native resources. In plantations, the softwood resource is expected to remain relatively stable, while declines in the gross area of hardwood plantations are projected. As with the native forest resource, how any plateau or decline in plantation area translates into log production will depend on a range of on-ground management issues.

Climate change and other potential impacts

A significant issue in understanding forest resources availability for industry into the future is the potential impact of climate change, including the role of forest management in mitigation and adaptation programs. In collaboration with CSIRO, ABARES recently looked at the potential impacts of projected changes in climate on production forests; this was to better understand likely impacts on future wood yields and potential socio-economic consequences (ABARES 2011).

This project developed regional climate predictions based on global Intergovernmental Panel on Climate Change (IPCC) models. The models examined the potential impact of future climates in production forestry areas across Australia, using 2030 and 2050 time frames in the absence of future adaptation measures. Six production regions were examined:

- south-west Western Australia
- the Green Triangle region of South Australia and Victoria
- northern Australia
- north-eastern New South Wales/south-east Queensland
- south-eastern New South Wales/eastern Victoria
- Tasmania.

Results indicate that most production areas in Australia are likely to receive lower rainfall compared with 2005, and experience an increase in temperature by 2030 and 2050. The effects of climate change on forest productivity will vary across regions and subregions of Australia. Uncertainty remains about the interaction of high carbon dioxide (carbon dioxide fertilisation) and tree growth (ABARES 2012).

Other factors that will influence resource availability include, issues of water policy, carbon trading environment, bioenergy markets, interplay of international factors and domestic production, community recognition of environmental credentials of sustainably produced

timber products and advances in industry innovation, and uptake of new technologies. The most significant issue into the future is likely to be the capacity to reliably and efficiently supply specific product sets, such as building timber, communication, packaging, sanitary and fuel products.

Sustainable forest management

In the Australian context, it is likely there will be increasing pressure to improve the ability of industries to operate sustainably and, importantly, demonstrate this to the broader community. Certification and labelling of forest products, demonstration of legality through chain of custody tracking and reporting on sustainability against agreed local, national and international reporting frameworks are likely to remain central to future sustainable forest management approaches by governments and industry. Linkages to climate change policies and programs may also be important.

As regional forest agreements approach their 15-year anniversaries (2012–15), the Australian and state governments will need to consider a range of factors before committing to any extensions of these agreements.

Integration of forestry into the ecosystem services agenda

The role of forests in landscapes for biodiversity conservation, timber production and catchment protection has been recognised for some time. The Millennium Ecosystem Assessment (2005) assessed the consequences of ecosystem change for human well-being and the rationale for proposed actions to enhance conservation and sustainable use of those systems. The recently established Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) is a mechanism to strengthen the science-policy interface on biodiversity and ecosystem services and promote decision-making on the basis of the best available scientific information. IPBES is likely to focus on forest ecosystems in the conservation and sustainable use of biodiversity and ecosystem services at a global scale.

In the Australian context, an ecosystem services approach will be required to manage the potential conflicts and take opportunities for improvement across economic, environmental and social domains. Consideration will have to be given to inter-related issues such as future carbon plantings, water use/water availability/water quality, agro-forestry, salinity, competition for land (food/fibre/fuel), landscape design and protection, and soil protection.

Regional and global issues

Forest management is a high profile issue regionally and internationally, due largely to concerns about historical over use of the resource and forest management practices. According to the Food and Agriculture Organization of the United Nations (FAO), rapid deforestation and increasing degradation of forests and missed opportunities to contribute to poverty reduction are undermining efforts to promote sustainable forest management in many countries in the Asia-Pacific region (2010). Australia has either a stake or is impacted by actions outside national jurisdiction. Priority issues in the forest and forest industries include illegal logging, Reducing emissions from deforestation and forest degradation (REDD+) and certification/environmental management schemes (Saunders & Reeve 2010).

5 Forests research capacity

ABARES has a national role in providing information, analysis and tools to support policy makers and other stakeholders in development and implementation of evidence-based policies and programs for native forests, plantations and related ecosystem services. ABARES conducts multidisciplinary research and analysis across the agriculture, fisheries, forestry, food, resources and energy sectors.

ABARES coordinates the collection, compilation and reporting of national forest statistics, including Australia's state of the forests reporting. The primary role of the National Forest Inventory (NFI), established in 1998 and housed at ABARES, is to coordinate, compile and report forest-related information on native and plantation forests for the National Plantation Inventory. The inventories provide:

- nationally consistent forest mapping coverage for Australia's major native and plantation forests at a range of scales
- national and international forest reporting using Australia's Montréal Process framework of seven criteria and 44 indicators, including Australia's state of the forests reports, the Forests at a glance series, and international mechanisms including FAO Global Forest Resources Assessments and the Convention on Biological Diversity
- agreed national technical standards and protocols
- national coordination of forest-related information
- information for the development and maintenance of forest web portals that deliver publicly available data, reports, maps and tools (websites include Forests Australia, National Indigenous Forestry Strategy, and Plantation Information Network).

ABARES collects, maintains and publishes a range of important forest industry economic data through its 6-monthly Australian forest and wood products statistics reports. Production, consumption and trade data for main wood products and employment figures are collected from industry and the Australian Bureau of Statistics, compiled in a consistent manner and published with an overview of recent trends and their drivers.

More details of ABARES research capacity are provided in the companion paper to this report, *Land use and management: the Australian context* (Lesslie & Mewett 2013).

Extensive research and development in the forestry area is also led by Forest & Wood Products Australia, Cooperative Research Centres, the CSIRO and several universities. Significant research has focused on resource management and utilisation of both native and planted forests including the development of sustainable practices.

The CSIRO provides research activities across the forest production value chain 'from quantitative genetics, to precision plantation management, to smart paper and wood products of the future' (CSIRO 2012).

The Cooperative Research Centre for Forestry is an Australia-wide joint venture supported by the forestry industry, research organisations, state agencies and the Australian Government.

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National forest research priorities

The national forests Research Priorities and Coordination Committee produced a paper, 'Forest Research Strategic Directions 2008–2011' that identified five broad themes of national importance in future research (Forest and Forest Products Committee 2008):

- the impact of climate change on forest management
- the role of forests in managing Australia's water resources
- managing Australia's forests for multiple objectives
- forest health and biosecurity
- forest products.

The document also defines outcomes required to maintain and improve the performance of the forestry sector in relation to economic, environmental and social benefits for Australia. Research priorities that contribute to the achievement of each outcome are briefly described.

6 Key issues

Using current national data and future outlooks, ABARES and FEDRC have identified a range of important issues where improved information and analyses can deliver longer term management and policy objectives:

- defining Australia's forest cover and forest condition more accurately (in parallel with improved regional/global forest monitoring, assessment and reporting initiatives)
- monitoring climate change adaptation for forests and forestry
- enhancing the role of forests and forestry in mitigation attempts
- enhancing governance of forests, including chain of custody, efficient certification schemes, and tenure reform
- promoting broader acceptance of sustainability credentials
- monitoring biodiversity
- improving biosecurity and forest health, especially in the context of climate change
- dealing with mega-fires and fire management in a landscape matrix
- developing management strategies for long rotation production from plantations
- addressing declining productivity and health of second rotation plantings.

7 Potential areas for collaboration

To guide future discussions between ABARES and FEDRC, the following list of areas for future bilateral collaboration have been identified. The list, which reflects Australian concerns, includes:

- remote sensing, especially accuracy and precision of forest cover estimates at scales suitable for local, national and regional reporting
- forest health surveillance
- ecosystem services, especially managing multiple ecosystem services at landscape level
- fire
- climate change adaptation
- regional research and development collaboration opportunities, especially regional capacity building
- carbon accounting (with the Australian Government Department of Climate Change and Energy Efficiency).

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