The introduction of agriculture for wood production in Australia: public policy lessons from the softwood planting program

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February 2002

A thesis submitted for the degree of Doctor of Philosophy
of the Australian National University

Statement

This thesis is the result of my own work, except where indicated otherwise.

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February 2002

Acknowledgements

This thesis has benefited from the willingness of industry and the environment movement to share their information, experiences and considered views about Australia's native forests and wood based industries. There are too many to separately acknowledge; the names of those who were particularly helpful are provided directly in the text.

I thank Ian White, my encouraging and insightful supervisor, and my advisors Libby Robin and Tony Norton for their greatly appreciated advice and support.

Library services have been so important for this thesis and I thank Rowena Crossman from the National Archives of Australia, Shirley O'Reilly from the ANU Department of Forestry library and the librarians at ANU's Hancock and Chifley libraries.

I thank Australian Greens Senator Bob Brown and his advisor, Margaret Blakers, for initiating parliamentary debate about Australia's native forests and the wood based industries, which helped to clarify the issues addressed in this thesis and understand the impediments to problem solving policy options.

The staff and students at the Centre for Resource and Environmental Studies are invigorating - thank you - and a special thank you to Valda Semets, Executive Officer, and Phil Greaves, Administrator, in their unfailing response to my various requests.

My family, Alistair, Andrew and Matthew Clark, in their own very special and appreciated way, helped to see the thesis completed.

Abstract

This thesis investigates Australia's experience in introducing agriculture for wood production. Australia now has a dual wood production system - one based on native forests, managed, it is argued, under multiple use principles, and the other based on an agricultural model (tree crops or plantations). I examine the proposition that because Australia's wood and wood products industry is dominated by commodity production, the multiple use approach to native forest management for wood production is fundamentally flawed and should be replaced by an approach that can explicitly recognise and reconcile ecological and industry goals. The sustainability framework developed by Costanza & Patten (1995) was used to develop a strategic land use approach for native forest conservation and wood production superimposed by a plantation processing industry policy. The approach enabled coherency in ecological and industry policy because the key strategies to maintain native forest ecological integrity and to enhance the competitiveness of a commodity wood and wood products industry were found to be complementary.

Australia's maturing plantation estate offers significant ecological, industrial and socio-economic benefits through substitution of native forest commodity wood and wood products. In 1999/00 Australia sourced slightly more than half its wood from plantations and, although plantation wood supply doubled over the 1990s, native forest wood supply remained unchanged. During the 1990s, the forest and wood industry policy of the Federal Government largely ignored the opportunity to facilitate increased investment to process Australia's maturing plantation resource. The thesis documents and examines institutional constraints to public policy that facilitates the substitution of plantation products for native forest products in commodity markets. This knowledge can be used in policy development where product substitution is identified as an integral part of the approach to reconcile ecological and industry goals.

The 1960s was a fundamental turning point for Australian forestry. The legacy of its softwood plantation policy is now being realised in Australia's increased plantation wood supply. The thesis presents a historical review of the 1960s softwood plantation policy, comprising a reconstruction of the events leading to the policy and an evaluation of its implementation. The review adds to Australia's forest history literature and deepens our understanding of Australia's current plantation wood supply potential.

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Chapter 1

Introduction

1.1 Thesis context

This thesis investigates Australia's experience in introducing agriculture for wood production. Until tree crops (plantations) were planted and matured, Australia relied on native forests for its domestic wood resource. In the early 1950s, plantations supplied only six per cent of Australia's wood - five decades later they supplied 54 per cent and the share continues to increase (Forestry and Timber Bureau 1969; Australian Bureau of Agricultural and Resource Economics 2001a). Today, Australia has a dual wood production system, one based on native forests managed, it is argued, under multiple use principles, and the other based on an agricultural model (National Forest Inventory 1998). The wood from each is highly substitutable and technology, embodied in new products and processes, enhances substitutability in the markets for finished products.

Growing wood as an agricultural crop or by managing native forests requires different approaches and has different implications for environmental management and industry structure. Furthermore, competition between the two parts of the industry can affect regional socio-economies. Since a significant proportion of the land base used in both systems is publicly owned, there is an extra legitimacy to public debate about how Australia's wood needs are met.

During the 1990s, the forest and wood industry policy of the Federal Government largely ignored the opportunity to facilitate increased investment to process Australia's maturing plantation resource (Clark 1999c, 1999d). Instead, policy focussed on encouraging additional tree planting, and creating 'security' for native forest wood supply including the removal of certain Federal Government regulations on the industry. This policy preference was emphasised in the Federal and State Government regional forest (meaning native forests and plantations) agreement (RFA) process aimed at developing internationally competitive forest-based industries that maximise value-adding opportunities and efficient use of resources, as well as protecting forest biodiversity. The forest options presented for public consultation as part of the RFA process excluded the plantation resource. Why the plantation resource was ignored is unclear, yet, as will emerge below, would appear to be a vital omission from a process intended to set a new, sustainable future for the wood and wood products industry in Australia.

On the basis of the research presented in this thesis, I argue that a fundamental aspect of the conflict over Australia's native forests is inter-industry competition. This competition is between an old industry using native forests and a relatively new

industry using plantations - that includes parts of the old. Product substitution in the market underpins this competition. Australia's transition from native forests to plantations is a tangible example of resource saving product and process substitution, as proposed by von Weizsäcker et al. (1997) and Hawken et al. (1999), across a range of industry sectors and consumer items. They argue that increased resource productivity - doing more and better with less - enhances company profitability and global living standards and reduces human environmental impacts. Like Hawken et al. (1999), my thesis extends past a narrow focus on product substitution as being solely for economic efficiency gains. Both pieces of work identify the fundamental ecological and industry goals, and product substitution has been identified as an integral part of the approach to reconcile them.

I examine the proposition that, because Australia's wood and wood products industry is dominated by commodity production, the multiple use approach to native forest management for wood production is fundamentally flawed and should be replaced by an approach that can explicitly recognise and reconcile ecological and industry goals. This is essential where the goals are at odds and existing policy approaches seeking a 'balanced' outcome require major trade-offs. The nature of commodities means that producers compete largely on price and therefore constantly seek cost reduction opportunities to maintain profits (H.A. Simons Ltd. & McLennan Magasanik Associates 1990; Humphreys 1992; Clark 2001a). The price-cost squeeze of commodity production typically forces native forest managers to adopt intensification technologies, similar to those used in agriculture, that threaten the ecological integrity of native forests. Costanza & Patten (1995) developed an approach to sustainability whereby systems deemed in the public interest are identified for protection and strategies developed to enhance their capacity to persist. I used this approach to examine the proposition that Australia should adopt a strategic land use approach superimposed by a plantation processing industry policy. On the basis that 95 per cent of the production of Australia's wood and wood products industry is directed to commodity markets, I propose that the principal land allocation task is largely one of matching the plantation resource to industry production and native forests to the maintenance of ecological integrity. The emphasis on plantation processing is argued on the grounds that a highly integrated domestic industry structure enhances the commercial viability of wood growing over the long-term (and therefore its capacity to persist) and also enhances rural socio-economies through the employment and wealth that manufacturing generates.

Product substitution - from native forest to processed plantation products - is a key element of the approach emerging from the research undertaken in this thesis. That Australia's 1990s native forest and wood industry policy failed to adopt such an approach, despite the then strong and continuing growth in plantation wood supply, warrants examination. Queensland and Western Australia were the exceptions to Australia's 1990s policy in that, towards the end of that decade, they developed and implemented policies to facilitate the transition of their wood based industries to existing plantations. This break from mainstream forest and wood industry policy warrants investigation.

Projections of wood supply from Australia's plantation estate differ markedly (Cameron & Penna 1988; Australian Forestry Council 1989; Resource Assessment Commission 1992a; Clark 1995a; James et al. 1995; National Plantation Inventory 1997; BIS Shrapnel Forestry Group Pty. Ltd. 2000). These differences remained unresolved over the 1990s despite the critical importance of this information for policy. Low wood supply projections relative to Australia's wood consumption support arguments for expansion of the plantation estate and continued use of native forests. This view aligns with Australia's 1990s forest and wood industry policy. Alternatively, projections indicating an adequate plantation resource to meet Australia's wood requirements support arguments for a more immediate industry transition from native forests to plantations. This view aligns with the policies of the Queensland and Western Australian Governments. The lack of clarity over Australia's plantation wood supply potential and the policy implications are investigated in this thesis.

Forestry is characterised by the long lead times needed to grow wood. Most Australian softwood plantations have been managed over rotations of approximately 30 - 35 years (Clark 1995a; Turner & James 1997a). A historical examination of 1960s plantation policy and its implementation is important background to understanding the situation with Australia's plantation wood resource in the 1990s and early 2000s. The 1960s was a fundamental turning point in Australia's forest policy. The Federal Government embarked on a states rights challenge and, using financial arrangements, secured a significant acceleration in state based softwood planting. The significance of the policy is recognised from an array of perspectives (Rule 1967; Carron 1985; Routley & Routley 1974; Dargavel 1995; Frawley 1999), but how the policy was developed has been exposed to little investigation. Government files held in the National Archives of Australia were opened for this thesis under the 30-year rule to help recreate the events and circumstances resulting in 1960s policy.

A key element of 1960s forest policy was the establishment of a national softwood plantation area target based on projections of Australia's wood consumption in 2000 (i.e. when the first plantations established under the 1960s program would mature). The historical review undertaken in this thesis of the planting targets and wood consumption projections helps to clarify the wood supply potential of Australia's softwood plantations from the late 1990s.

1.2 Objectives

The objectives of the thesis are to:

- document and examine Australia's 1960s softwood plantation policy and its implementation to provide the background to Australia's 1990s plantation resource.

- present a framework for sustainability in Australia's wood production system and native forest ecosystems.

- use this framework to evaluate Australia's performance over the 1990s and the Federal Government's 1990s forest and wood industry policy.

- examine Australia's native forest and wood industry policy environment in the 1990s and the information and advice provided by the Australian federal public service.

- explore the nature of impediments to product substitution policies by documenting stakeholder responses to new information for policy and the processes generating such information.

- report on what we can learn from Australia's 1990s native forest and wood industry policy experience.

1.3 Contributions to knowledge

This thesis is developed on the understanding that the nature of commodity production is fundamental to identifying the problem manifested in Australia's native forest conflict. Without this understanding it may not be possible to develop a policy framework to reconcile ecological and industry goals. Several analysts (e.g. Sedjo & Lyon 1990; Humphreys 1992) have reported on the power of commodity production to drive change in the system of wood production and implementation of wood-saving technologies. The contribution my thesis attempts to make is in presenting a framework that enables coherency in ecological and industry policy.

The thesis also attempts to contribute to forest and wood industry knowledge and understanding in its documentation and examination of institutional constraints to public policy that facilitates product substitution (i.e. plantation products for native forest products in commodity markets).

The recreation of the events and circumstances resulting in Australia's 1960s softwood plantation program, using Federal Government recently opened files under the 30-year rule, adds to Australia's forest history literature.

1.4 Thesis outline

The thesis covers a wide field commencing with a historical account of the challenges facing Australia's early foresters in the 19th century through to institutional behaviour at the turn of the 20th century. It combines history with industry economics, forestry, ecology, institutional analysis, and government policy analysis. All investigation needs boundaries and for this thesis they are as follows. The study focuses on the Australian experience. Although it refers to the New Zealand plantation program, its purpose is not to provide an inter-country comparison. The focus is on softwood plantations because they dominated Australia's plantation supply during the 1990s - eucalypt

plantations therefore receive less attention although the issues are similar. The policy analysis focusses on the 1990s, because this was when large areas of Australia's softwood plantations established in the 1960s matured, and focussses on Federal Government policy because this level of government overwhelmingly dominated Australian native forest and wood industry policy.

The ecological issues surrounding Australia's plantations can be separated into those associated with the existing resource, including their potential for immediate native forest conservation gains, and future wood growing systems. This thesis focusses on issues surrounding Australia's existing plantation resource although the framework on which the analysis is based can accommodate future wood growing issues.

This thesis considers the industrial sector, namely the use of wood for paper, sawn timber and wood panels, and in so doing focusses on the wood resource from plantations and native forests rather than woodlands. Such a separation is becoming less tenable for Australia with native forest wood used for charcoal production and proposals for new charcoal plants and biomass-fed power production using native forest and plantation wood. Incorporating fuel wood and charcoal extends the analysis to include Australia's woodlands because they supply most of Australia's firewood (Williams et al. in press). The focus on industrial wood and wood products, for time and space reasons, is consistent with the United Nations FAO separation of the wood and wood products industry into its industrial and fuel wood components. Appendix F provides a brief discussion of the fuel wood component of the Australian industry.

Chapter 2 presents the background to the study by documenting how and why agriculture for wood production was introduced into Australia in the late 19th century. The chapter describes the challenges facing Australia's foresters in securing a wood resource to meet the nation's needs and describes the forestry institution building that took place from the mid 19th century to the end of the 1950s. Chapter 3 uses Federal Government files, opened for this thesis by the National Archives of Australia under the 30-year rule, and published sources, to describe how the Federal Government decided in 1966 to finance a major acceleration in Australia's softwood planting. This policy aimed to secure Australia's self-sufficiency in wood by 2000 when the plantations matured after around 30-35 years of growing. Understanding 1960s policy illuminates Australia's current policy environment.

Chapter 4 evaluates the implementation of the 1960s softwood plantation policy. It investigates whether the plantation area target was achieved and whether the consumption projections underpinning the area targets were realised. Through historical examination, this chapter presents an alternative approach to understanding Australia's softwood plantation resource, which avoids the conflict surrounding 1990s plantation wood supply projections. Chapter 5 presents a framework for sustainability in Australia's wood production system and native forest ecosystems. Indicators are derived and used to evaluate Australia's wood and wood products industry performance in the 1990s. Chapter 6 examines the Federal Government's forest and wood industry policy in the 1990s and the factors influencing the policy. It evaluates this policy

against the indicators developed in chapter 5 and describes alternative policy approaches recently adopted by the Queensland and Western Australian Governments.

Chapter 7 explores the nature of constraints to product substitution policies by documenting stakeholder and public service responses to new information for policy and the processes generating such information.

In synthesis, chapter 8 reports on what can be learnt from Australia's 1990s native forest and wood industry policy experience. The thesis incorporates appendices that present information and quantitative data to support the analysis.

Chapter 2

The introduction of agriculture for wood production in Australia

2.1 Introduction

In the mid 1960s the Federal Government announced its decision to finance a significant acceleration in public softwood planting (chapter 3). The planting target was largely achieved (chapter 4) and by 2000 softwood plantations provided around 75 per cent of the wood processed into sawn timber, wood panels and paper in Australia. Native forests provided 25 per cent (chapter 6).

It is difficult to gain from Australia's forest histories a sense of the competition brought to the wood and wood products industry by local plantation wood-growing. The written histories in the 1960s (notably Rule 1967) were too close to the events to evaluate the competition. Time is needed for planted seedlings to grow into merchantable wood, and wood supply from the earlier plantings was relatively small. Plantations accounted for 15 per cent of Australia's wood supply in the mid 1960s (Forestry and Timber Bureau 1969, p. 11). Furthermore, in the 1960s, softwood plantations were not considered a threat to Australia's native forest based hardwood industry because the plantings were largely perceived and promoted as a replacement to imported softwoods (chapter 3). With time, however, it became clear that increasing wood supply from Australia's maturing softwood plantations was generating significant structural change in the Australian wood and wood products industry (Resource Assessment Commission 1992a; Clark 1995a; Stafford et al. 2000). I discuss the proposition that forest histories written well after the events of the 1960s, whilst not ignoring plantations, may have presented an incomplete assessment of the competitive relationships between the plantation and native forest parts of the Australian wood and wood products industry. Understanding inter-industry competition - underpinned by substitutability between plantation and native forest wood in commodity markets (appendix F) - is essential for coherent native forest and wood industry policy (chapter 5).

One reason for forest histories underplaying inter-industry competition is that as the plantation and native forest based parts of the industry united against the perceived common threat of the emerging environment movement, it had the effect of masking industry competition. Significant forest environmental activism was triggered in the late 1960s and early 1970s by the coinciding events of the softwood planting program, with its widespread clearing of native forests to provide tree cropping land, and the introduction of native forest export woodchipping. Australia's forest histories have emphasised the competition between environmentalists and industry over native forest land use rather than the competition between the plantation and native forests parts of

the industry for market share (see, for example, Carron 1985; Dargavel 1995; Watson 1990).

Another related explanation is that forest terminology makes it difficult to distinguish clearly the plantation/native forest industry divide. Australia inevitably adopted the European forestry words 'silviculture', 'forest' and 'afforestation'. These words applied irrespective of whether the system related to native forests or plantations.

Australia's early foresters wanted native forests to be managed as a tree cropping system. As environmental consciousness has grown, ecologically based regulations developed for native forests as a wood production system have helped to clarify Australia's dual wood production system - one using native forests as a self-regenerating ecosystem and the other using an agricultural cropping system (chapter 5). The duality of Australia's wood production system may be concealed by the widespread use of the word 'forest' to describe the collection of trees in both systems. Forests are contemporarily defined as plant communities dominated by trees meeting specific height or canopy criteria (for definitions see, for example, Resource Assessment Commission 1992a; National Forest Inventory 1998).[1] Today there is greater government sensitivity to the 'masking' problem embedded in the word 'forest'. Few meaningful advances have been made, however, in separately identifying the economic wealth and employment generated by the native forest and plantation parts of the 'forest' industries. A recent example was provided in the Federal Government's brochure *Australia's Forests – the Path for Sustainability*:

> '*Our forests and plantations also provide the basis for Australia's forest industries employing about 80 000 people. The annual turnover is more than $12.2 billion. Employment and wealth flow directly from the wood products derived from the forests.*' (Commonwealth of Australia 2001, p. 5).

The word 'afforestation' - the action or result of converting into a forest - has been inappropriately used in Australia. Australia broadened the meaning of 'afforestation' to include the clearing of native forest land and its replacement with plantations. Until the 1980s, most of Australia's plantations were established like other agricultural crops by clearing native vegetation (Cadman 1990; Cadman et al. 1991). The practice was described as afforestation although it was not a conversion of land to forests. Rather, it was a replacement of one type of forest - native forests - with another type of forest - plantations. Afforestation, in the true sense, has been a relatively recent development in Australia (see, for example, Wood et al. 2001, p. 146 for time series land use data for south east Queensland).

In providing the background to Australia's 1960s softwood planting program, this chapter aims to answer questions about Australia's early plantation experience. When,

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[1] The Oxford dictionary defines forest as the outside wood - i.e. that lying outside the walls of the park, not fenced in; extensive tract of land covered with trees and undergrowth usually belonging to the king, set aside for hunting; a wide uncultivated waste, a wilderness; also the trees collectively of a forest.

how and why was agriculture for wood production introduced to Australia? Why did exotic softwood plantations dominate the plantings? When did plantation processing begin and how did this industry develop?

My investigation covers 170 years, from the experiences of the first fleeters until the eve of the 1960s softwood-planting decision. The events and challenges of this period shaped the forestry institutions in Australia, and they, in turn, shape future events and policy (chapter 3). I describe Australia's first stage (1800s-1959) in forestry institution building and aim to clarify the relationship between these institutions and Australia's plantation policies. What was the stimulus for establishing state forest agencies? What wood supply challenges did they inherit and what role did they map out for plantations in resolving them and why? How did the Federal Government establish its stake in the wood and wood products industry and how did it contribute to Australia's plantation development?

Non-government organisations were also formed in the first half of the 20th century. These organisations addressed a plethora of issues concerning industry, foresters, workers, conservation and the environment in the wood and wood products industry. How did they promote Australia's plantation effort in the period leading up to the 1960s plantation decision?

The overview presented here of the challenges, events and institution building in Australia's wood and wood products industry provides background to the 1960s policy of accelerating Australia's softwood planting. With a focus on the plantation part of Australia's early forest history, the chapter also provides background to later discussions about the struggle to change the misperceptions underpinned by the notion of a single 'forest' industry to a fuller understanding of the duality in Australia's wood and wood products industries.

2.2 Australia's first plantings for wood

The pressure to settle and make Australia an agricultural economy meant that large areas of native forest were quickly cleared. Governor Phillip's land grants to emancipated convicts for cultivation began the process, which continued with the introduction of land sales in the 1820s followed by the 1860s Land Acts. Lands Departments were established in the state colonies to administer land privatisation and settlement (Clark M. 1995).

Forest removal was considered a private necessity and a public good (Griffiths 1992, p. 17). The axe, plough and fire used to clear Australia's forests were later joined by more efficient equipment in a process that continues today (National Forest Inventory 2001). It is difficult to determine accurately Australia's native forest loss since 1788 because the area of native forest before European arrival can only be estimated. With this qualification, Australia's *State of the Forests Report* published in 1998 considers that about 45 per cent of Australia's pre-European open and closed forests were cleared for agriculture by 1980. Clearing rates vary, with Victoria (59 per cent loss), New South

Wales (58 per cent loss) and South Australia (51 per cent loss) recording the greatest percentage reductions (National Forest Inventory 1998, p. 69).

Forest clearing was encouraged by the various governments, the gum tree was widely despised (Bonyhady 2000, p. 163), and wood was perceived as superabundant. The scale and intensity of Victoria's 1860s gold rush was the first brake on this perception. Wood used for building, mining timbers and firewood surged with Victoria's migration-boosted population (Carron 1985, p. 179). Dargavel describes the Victorian gold fields as places of:

> '*The grossest assaults on the forests*' … '*where people cut almost every tree around them. What was not used was wasted or burnt.*' (Dargavel 1995, p. 60).

The Colonial Government imposed little constraint. Its view was that wood should be available at virtually no cost to the thousands of people eking a living in the gold fields (Carron 1985, p. 179).

A community increasingly concerned about unnecessary forest destruction and its effects on water supply challenged this laissez-faire policy. Their voice was the *Argus* and *Australasian* newspapers (Bonyhady 2000, pp. 163-4). The 1864 drought deepened community fears that forest clearing and timber getting would dry out the continent even more. The *Argus* argued for preserving native forests as an interim measure whilst exotic trees more suited for cropping were established – specifically, evergreens from countries with similar climates to Australia's, such as Italian stone pines. The weekly *Australasian* argued that tree felling reduced ground moisture and demanded that unnecessary felling by timber-getters be stopped so Victoria would not become another Sahara. Bonyhady (2000, p. 165) identified George Perkins Marsh's *Man and Nature,* which reached Victoria in 1865, as something that underscored the view that deforestation would result in wood shortages, erosion, floods, climate change and loss of plants and animals. Marsh's influence was immediately apparent in the 1865 *Report on the Advisableness of Establishing State Forests,* by Victoria's Surveyor General, the Assistant Commissioner of Lands and Survey and the Secretary for Mines, warning of an imminent shortage of wood unless forests were reserved and waste reduced. The report recommended plantations of eucalypts and exotic species for wood supply and other services. They also suggested that 'overgrown' trees in native forests be replaced with deciduous trees and high quality wood-producing softwoods (Carron 1985, pp. 179-80; Bonyhady 2000, p. 165). The report appears to be Australia's first official proposal to plant trees for wood. Whilst the Government quickly reserved more native forests (Bonyhady 2000, p. 165), commercial tree planting did not commence in Victoria until 1880 (Carron 1985, p. 198).

Agriculture for wood production in Australia started tentatively in 1873. The South

Australian Government introduced subsidies for private farmers to plant trees because of a fear of wood shortages. Lewis[2] (1975, p. 7) observed that the State's indigenous wood supply was constrained by its small forest and woodland cover and by only 1.1 per cent of the state receiving over 635 mm of rain per year. By the 1860s, concerns about the rate of forest clearing were being expressed within the South Australian parliament and bureaucracy.

In 1870 George Woodroffe Goyder, South Australia's Surveyor-General, alerted F.E.H.W. Krichauff, Member of the South Australian House of Assembly, to the possibility of a future wood supply problem. In September 1970, Krichauff advised the House of Assembly about the need for forest reservation, preserving native trees for wood and planting or replanting the reserves as permanent state forests with valuable indigenous or exotic trees for wood supply (Lewis 1975, p. 14).

In response, Goyder and Dr Richard Schomburgk, Director of the Adelaide Botanic Gardens, prepared a report recommending the forest areas to be reserved (Jacobs 1972, p. 9). Krichauff presented the Forest Trees Planting Encouragement Bill that resulted in the South Australian *Forest Trees Act No. 26* of 1873 (Jacobs 1972, p. 9). The Act encouraged tree planting through a financial bonus, by issuing a Land Order valued at £2 for planted areas exceeding five acres. The bonus could be used to buy crown land or pay interest on already purchased land (Lewis 1975, p. 14). Advice on what species to plant and where was provided by the Adelaide Botanic Gardens. Private landowner response was minimal. Only four applications were received and only one approved (Lewis 1975, p. 14). The scheme was superseded in 1881 by a free tree scheme that lasted to 1924. Over the four decades (1881 to 1924), 11 million trees were distributed to more than 63 000 landholders (Lewis 1975, p. 14).

In this embryonic period, tree planting was perceived as the joint responsibility of private landowners and government. The role of private landowners diminished as South Australia began building its public forestry institutions. The Forest Board was established in 1875 - the first government forest management organisation in the then British Empire (Institute of Foresters of Australia 2000). Goyder was appointed Chairman, a position he held from 1875 to 1882 (Jacobs 1972, p. 9). Before the arrival in 1878 of the first Conservator of Forests in South Australia, John Ednie Brown, Goyder drew up prescriptions for the establishment of plantations and implemented them. Nurseries were established at Bundaleer Springs, Wirrabara and Mt Gambier. The first public plantings - of pines and eucalypts - were undertaken at Bundaleer in 1876 (Lewis 1975, p. 15). These plantings effectively began agriculture for wood production in Australia. Lewis described the event:

> '*In February 1876, Nurseryman Curnow and two men began the clearing of a thousand acres for what was to become Plantation A.*' (Lewis 1975, p. 15).

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[2] Norman Benjamin Lewis entered the South Australian Woods and Forests Department as a cadet forester in 1938 and later headed the Forest Management Division, playing a pivotal role in advancing radiata pine plantations (Borschmann 1999, p. 183).

Under Goyder's command it took only a year for 132 756 trees to be propagated at the Bundaleer nursery. There was much trial and error in propagation and planting but by 1881 regular annual plantings were being undertaken at Bundaleer, Wirrabara, Mount Burr, Mount Gambier and Mount Muirhead Flat (Lewis 1975, pp. 15-6).

Plantation establishment in the other Australian states effectively commenced in the early 20th century. In northern New South Wales a nursery was established at Tuncurry in 1911, and 73 000 trees had been planted with prison labour by 1914 (Carron 1985, p. 48). Planting over the next four decades in New South Wales was sporadic (Forestry and Timber Bureau 1969, p. 142). Planting rates and plantation productivity was affected by fire, poor tree growth due largely to the low quality of land used for planting, public concerns about clearing native forests for softwood plantations and World War II (Carron 1985, pp. 48-9).

Softwood plantings in Tasmania commenced in the 1920s on the plains of the north west and west coast (Carron 1985, p. 89). The failure of these early plantings - due to soil nutrient deficiencies - encouraged the forest agency to purchase higher quality derelict agricultural land previously covered with eucalypt forests for planting (Carron 1985, p. 89). Softwood planting was confined largely to abandoned agricultural land through to the 1960s.

Queensland commenced experimental plantings of native and exotic tree species before World War I (Meyer 1985, p. 18; Carron 1985, p. 115). Queensland's first commercial plantations (80 per cent indigenous hoop pine (*Araucaria cunninghamii*) and bunya pine (*Araucaria bidwillii*)) were established in the early 1920s in the Mary Valley, Fraser Island and at Atherton (James, Young and Clark 1995, p. 181). Carron (1985, pp. 116-7) observed that the policy gradually developed to plant hoop pine on rainforest sites that had been cleared after the extraction of commercial wood for sawing, and faster growing exotic species, mainly slash pine (*Pinus elliotti*), on the coastal lowlands closer to the Brisbane market.

Western Australia's trial plantings of radiata pine in the late 19th century on coastal sandy soils near Bunbury were a failure (Western Australian Forests Department 1969). Research over the next 40 years solved the silvicultural problems of the early planting experiences that ranged from mycorrhizal fungi to soil trace element and nutrient deficiencies (Morris and Clark 1995, p. 221). Radiata pine was planted on degraded agricultural land in the south west of the state (purchased because of the insufficiency of appropriate quality reserved native forest land) and *Pinus pinaster* (pinaster pine, maritime pine) was planted on the coastal sands closer to the Perth market (Carron 1985, pp. 162-3).

Section 2.10 discusses the planting performance of each of the states as the 1950s drew to a close.

2.3 Focus on softwood

Australia's unfamiliar eucalypts did not appeal immediately to the first fleet sawyers and carpenters. The 18th century European technology they brought, in tools and practices, was shaped by centuries of using northern hemisphere conifers, oaks and beech. Governor Phillip wrote to Lord Sydney, Britain's Secretary of State for the Home Department, expressing the frustration:

> '*The timber of the site is well described in Captain Cook's voyage but unfortunately it has one very bad quality which puts us to very great inconvenience: I mean the large gum-tree which splits and warps in such a manner when used green, to which necessity obliged us, that a storehouse boarded up with this wood is rendered useless.*' (quoted from Carron 1985, p. 1).

After six weeks in Australia, Surgeon-General White wrote of Australia's wood:

> '*...the timber of this country is very unfit for the purpose of building: nor do I know of any purpose for which it will answer except for firewood and for that it is excellent; but in other respects it is the worst wood that any country or climate ever produced.*' (quoted from Carron 1985, p. 2).

The colonists were not completely dependent on the unfamiliar eucalypts. Indigenous softwoods were soon discovered. Sydney, Hobart and Brisbane - the British colony's first main settlements - were all in close proximity to coastal softwood species. Red cedar (*Toona australis* syn. *Cedrela australis*) was discovered on the Hawkesbury River in 1790 and Huon pine (*Dacrydium franklinii*) in the Macquarie Harbour catchment by 1815 (Dargavel 1995, p. 18). These logs float, a property that enabled relatively easy transport to Port Jackson and Hobart Town. Hoop pine was sighted by Surveyor General Oxley when he sailed up the Brisbane River in 1823. It was a valuable resource for the early settlement of Brisbane (Holzworth 1999, p. 15).

Australia's relatively limited indigenous softwood forests were vulnerable and quickly over-exploited for building (Carron 1985, p. 99; Morrison 1999, p. 263; Holzworth 1999, p. 20). Not all the colonists had access to cedar, huon and hoop pine and a trial and error process of sawing Australia's unfamiliar trees was necessary. She-oaks (*Casuarina spp.*) provided framing poles, roof shingles and weather boards, cabbage tree palms provided slab cladding and numerous species of eucalypts were also used for building (Dargavel 1988, pp. 3-5).

As settlers became familiar with indigenous trees, detailed accounts of the uses for Australian wood were produced. In 1910, the Technological Museum of New South Wales published *A Research of Pines of Australia*, followed in 1919 with *The Hardwoods of Australia and their Economics* (Baker & Smith 1910; Baker 1919).

Swain,[3] the Chairman of the Queensland Forestry Board and early promoter of cropping indigenous hoop,[4] produced a remarkably detailed work describing 200 indigenous hardwood and softwood tree species in Queensland and their potential uses (Swain 1928a). Swain was keen to have the less-used tree species, particularly of the mixed subtropical forests, used more widely. This book was the culmination of decade-long research by the Wood Technological Branch (Carron 1985, p. 105).

Despite the species diversity, accessible information on their commercial application and processing innovation, Australian hardwoods have not been able to secure and maintain a position of importance in the Australian sawn timber market. Rather, the Australian sawn timber industry conformed to the softwood standard of northern hemisphere developed countries. Grenning[5] wrote in the late 1920s that Australia had never seriously departed from the 'softwood standard' (Grenning 1928). H.R. Gray, a lecturer in Forest Management at the Australian Forestry School, writing after World War I observed:

> '*The very rapid increase of softwood importations in the boom years following the war is an indication that consumers' preference for softwoods was not seriously weakened by their experience of the use of native hardwoods during the war.*' (Gray 1935, p. 6).

Exotic species - radiata pine

Planting exotic trees for wood sits uneasily with today's ecological consciousness but was very much the practice under British Colonial Government. Improvement, not just of the land but of individuals and society, was on the agenda. Gillbank explained this dominant view:

> '*In the mid-nineteenth century Nature was appreciated for its generous provision of a grand diversity of biological resources around the world. However, it was widely argued that the distribution of those resources could and should be improved. To enhance human survival and comfort, exotic plants should be introduced into regions not adequately blessed by Nature.*' (Gillbank 1993, p. 4).

Acclimatisation societies sprang up in Australia in the 1860s (Griffiths 1992, p. 15) to introduce and disperse exotic plants and animals throughout the colony as well as promote the protection of native forests (Taylor 1994, p. 48). They were motivated by a desire to enrich the country and also to provide colonists with fond memories of home. Respected citizens supported acclimatisation societies, notably botanist Dr Ferdinand

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[3] Edward Harold Fulcher Swain, born in Sydney in 1883, was Director of Forests Queensland (1918-24), Chairman of the Queensland Forestry Board (1924-32), consultant to Australian Paper Manufacturers Ltd. (1933-34), Commissioner for Forests in New South Wales (1935-48) and United Nations forestry consultant to Ethiopia (1951-55) (Meyer 1985, p. 26).

[4] Swain later moderated his view about exotic species and introduced Southern (USA) pines to Queensland.

[5] V.A. Grenning joined the Queensland Forest Service in 1922 becoming Director in 1932, a position he held until 1964 (Carron 1985, pp. 102, 108).

Mueller (later Baron) who became Victoria's first Government Botanist in 1853. Noting that Victoria's '*forests are devoid of the larger coniferous trees*', Mueller pressed for their enrichment with desirable exotic plants that nature had not managed to incorporate into them (Gillbank 1993, p. 7). Mueller was keen to introduce a wide range of pines to Victoria's alps, mentioning Norway spruce, silver fir, larch, Weymouth fir, Douglas pine and the pitch pines of North America, as evidenced in his highly circulated 1871 Industrial and Technology Museum Lecture '*Forest Culture in its Relation to Industrial Pursuits*'. The lecture was illustrated with pictures of Californian and Himalayan pines and other species that he recommended for cultivation and samples of their timber presented (Gillbank 1993, p. 7). Mueller's focus on pines did not mean he saw no value in Australia's eucalypts. In his lecture, Mueller also called for careful management of native forests. He prolifically catalogued Victoria's indigenous plant species and their uses and expressed concern about forest loss and annihilation, arguing that forests supplied commodities and wider environmental values. Mueller's views were those of mainstream 19th century Australian society that was more familiar with exotic trees and regarded softwoods as traditionally appropriate for meeting their building needs.

The exotic softwood species that rose to prominence was radiata pine (*Pinus radiata* D. Don). It is one of the 80 northern hemisphere species in the genus *Pinus* and one of the more than 300 species in the conifer family (Thomas 2000, p. 5; Scott 1960, p. 5). Radiata pine is native to three small areas on the Californian coast - Swanton, Cambria and Monterey. Native stands of radiata pine were estimated to cover less than 4 000 hectares in those areas in 1931 (Scott 1960, p. 12).[6] Grown in its native habitat, radiata pine was considered insignificant as a tree and unimpressive for its wood (Lindsay 1937, p. 5; Scott 1960, p. 1 & 26).

South from Vancouver Island in lowland British Columbia, and particularly around other parts of California, radiata pine was planted as an ornamental tree more extensively than any other pine (Lindsay 1937, p. 44). Lindsay observed that radiata pine was planted in areas devoid of trees and it was radiata pine's rapid growth and '*fresh foliage*' that made it attractive as an ornamental (Lindsay 1937, p. 44). Its appeal was enhanced by the ease of collecting large volumes of seed that maintained their viability over long periods. Radiata pine belongs to a group of 16 species named the *Insignes* (Scott 1960, p. 5)[7] that are characterised by retention of the cones on the tree for a number of years with periodic opening and closing of the cone scales to release viable seed. Radiata pine seed is easy to propagate, plant and grow (Scott 1960, p. 83). Human selection initially for ornamental reasons shifted radiata pine from is position of relative obscurity in its natural environment to prominence.

Radiata pine reached Australia in the mid 1850s. The first authenticated date of its arrival is 1857 with the recorded receipt by the Director of the Sydney Botanic Gardens in a '*List of Plants and Seeds received during 1857*' of '*1 pinus insignis per ship*'

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[6] This excludes the two-needled form (*P. radiata var. binata*) that occurs in Mexico on Guadalupe Island.

[7] Included in this group is *Pinus pinaster* – another species planted on a commercially viable scale in Australia.

(Fielding 1957, p. 15; Lewis 1975, p. 17). Fielding considers that von Mueller probably received a radiata pine tree at a similar time because his records list radiata growing in Victoria in his '*Report of the Government Botanist to Parliament, 1858*'. It has been suggested that radiata pine seeds came in ballast dumped at Newcastle by ships carrying coal to California or with gold miners travelling from California in the 1850s (Rule 1967, p. 117; Entrican 1963, p. 4). If true, this would mean that radiata pine reached Australia a few years before 1857.

von Mueller recognised his role in distributing radiata pine in Australia. In a copy of his 1891 '*Select Extra Tropical Plants Readily Eligible for Industrial Cultivation or Naturalization with Indications of their Native Country and some of their Uses*', Mueller made his handwritten comment:

> '*Most extensively distributed through the Colony of Victoria and also some other parts of Australia since 1859 by the author of this work.*' (Fielding 1957, p.15. acknowledging J.H. Willis).

von Mueller is acknowledged by Walter Gill, South Australia's Conservator of Forests (1890 to 1923), for introducing radiata pine to South Australia (Fielding 1957, p. 15). By around 1866, radiata pine was familiar to South Australian arboriculturalists with the pine growing in town environments and an avenue of radiata pine planted in the Botanic Gardens. Not surprisingly, radiata pine was included in South Australia's plantation trials. The recommendation to include radiata pine in the early planting trials came from a Scottish nurseryman, Edwin Smith, Goyder's brother in law (Lewis 1975, p. 17).

It was initially hoped that South Australia, through tree cropping, could supply the better timbers of species grown interstate, namely eucalypts, and also its own sugar gum (Lewis 1957a, p. 15; Lewis 1975, p. 16).[8] South Australia's early tree plantings were largely eucalypts (South Australian sugar gum was widely planted but also blue gum, red gum, and manna gum) as well as European hardwoods (oak, elm, ash, sycamore, walnut, poplar and willow) and various European and North American pines (Lewis 1975, p. 16). About 30 softwood and 80 hardwood species were trialed in plantations in South Australia after 1876 (Lewis 1957b). Lewis reported:

> '*...the planting of Eucalypts has not been very successful and the original hopes of providing a local supply of the better timbers of species grown interstate have not materialized.*' (Lewis 1957a, p. 15).

The poor growth rates of eucalypt species potentially suitable for plantation growing meant that it was unlikely they could compete commercially with native forests of the other states or with preservative-treated softwood (Lewis 1957a, p. 15). Of the pines

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[8] Lewis was writing in 1957, well before the environment controversy surrounding radiata pine plantations and therefore free of any desire to defend the decision to focus plantings on radiata pine.

trialed five showed '*major promise*' - radiata, pinaster, Aleppo, Corsican pines and the Canary Island pine. Lewis enthusiastically wrote:

> '*Of these, radiata pine was, and has remained, outstanding. It proved singularly adaptable to most soils and sites within the better rainfall areas of South Australia and soon showed itself destined to become the tree from which the State's man-made forest resource would be built.*' (Lewis 1975, p. 21)

The decision to concentrate the state's plantings to radiata pine had been made by the late 1890s. Lewis wrote:

> '*The unqualified adaptability of Pinus radiata to South Australian conditions was early evident, and afforestation with this species, particularly in the South East, has been primary policy for nearly 60 years following the initial emphasis on Eucalypts.*' (Lewis 1957b).

The decision to concentrate planting to predominantly radiata pine was made on its observed superior growth relative to numerous other species in trial plantings. No mention was made of any published quantitative assessment work. As for food crops, observation and experience not scientifically framed and reported investigation determined the initial selection of radiata pine by South Australians.

Scientific work on radiata pine's growth performance in Australia effectively commenced in the 1950s (Cromer et al. 1955; Cromer & Carron 1956; Cromer & Brown 1956; Lewis 1957a, 1957b; Cromer & Pawsey 1957; Cromer 1961). As plantations matured, foresters needed yield tables to know what volumes could be committed to processors. Research was further motivated at this time by the pulp and paper industry's interest in small, cheaper logs, which raised the then contentious management issue of thinning plantations. Because the aim of the research was to guide management decision making for an already established radiata pine crop, studies were generally not concerned with its growth performance relative to other species.

Radiata pine's observed rapid growth in the South Australian planting trials was largely due to favourable moisture conditions and the absence of pests and diseases in its new environment. The climate for radiata pine in its natural habitat is characterised by mild winters and dry summers with humidity from sea fogs or mists enabling it to survive summer droughts (Lindsay 1937, pp. 12-21). Swain explained radiata pine's success in South Australia as a combination of the region's soil and moisture conditions:

> '*...the South East of South Australia was a homoclime of Monterey, save for its mean annual rainfall was more than double that of its native habitat, and the growth response to added moisture was enormous in the sandy hollows.*' (Swain 1969, p. 6).[9]

[9] Swain was highly critical of radiata pine describing it as a 'gross and gawky tree' (Carron 1985, p. 104).

The competitive and sometimes collaborative relationship between softwood plantation enthusiasts in Australia and New Zealand further encouraged radiata pine planting. Leon McIntosh Ellis was appointed Director of the New Zealand Forest Service in 1919 and forcefully proposed a wide-ranging policy overhaul. Flush with the confidence of reinforced views after observing North American softwood forestry practices whilst attending the 1923 British Empire Forestry Conference in Canada, Ellis secured government support for the goal of increasing New Zealand's softwood plantation estate from 10 000 acres (4 000 hectares) to 300 000 acres (121 000 hectares) by 1935. The goal was exceeded - partly because planting was used as an unemployment relief measure during the depression (Kirkland & Berg 1997, pp. 45-54; see also figure 3.1 for a historical comparison of New Zealand and Australian softwood planting). Swain wrote that New Zealand's 1920s radiata pine planting profoundly influenced South Australia's Conservator of Forests:

> '*He had been thunderstruck at the sight of the New Zealand Radiata plantations extending in immense areas of plantations. He immediately multiplied the South Australian plantings in the South East and was the author of its present prosperity.*' (Swain 1969, p. 6).

New Zealand's 1960s planning for a second planting wave triggered alarm bells amongst Australian foresters and was instrumental in focussing State Governments on the 'imperative' to plant softwoods.

Softwood plantation processing

The first recorded processing of radiata pine was in 1902 when a 20 year old tree from South Australia's Wirrabara plantation was sawn to make 28 apple cases for export (Lewis 1975, p. 23). This event marks the beginning of a new and more visible competition in the Australian wood products industry. Most sawn timber processing is undertaken by many private companies who compete in the marketplace for sales. Competition between suppliers of native forest and plantation wood has been less visible because State Governments own most of Australia's native forests used for wood production and, until recently, undertook most tree planting (chapter 3; Wood et al. 2001). This more visible, processing-based competition has helped to clarify and therefore distinguish Australia's dual wood production system.

It is simplistic to view the relationship between wood grower and processor as a clear public and private sector separation. The South Australian Woods and Forests Department acted to ensure that its softwood planting program did not fail at a most vulnerable point - when mature wood came onto the market. Initially, radiata pine was poorly received by a building industry used to imports of high-grade mature Baltic pine and Oregon sawn timber from old-growth forests of the northern hemisphere (Lewis 1999, p. 183). Walter Gill developed a two-pronged strategy to deal with radiata pine's poor market reception (Carron 1985; Lewis 1975). The first was marketing. He worked to convince a doubtful industry, elements within other state forest agencies and the public of the utility of plantation softwoods by displaying a wide range of products

made from radiata pine (Carron 1985, p. 219). The second strategy was to put processing under the direct control of the Department of Woods and Forests. The Department partly blamed private industry's poor processing standards for radiata pine's poor market reception, although it was inevitable that there would be teething problems in sawing and drying the unfamiliar and young trees. The larger South Australian plantation sawlogs that were coming on stream were failing to attract buyers, and unsatisfactory product standards among private sawmillers using the cheaper thinnings logs stimulated the Department to invest in processing. The first South Australian Government sawmill was built in 1903 to make sawn timber for apple cases and building. Further sawmills were built, purchased or upgraded to produce sawn timber for building, flooring, weather boards, mouldings and cases (Lewis 1975, p. 23-8). By the mid 1930s there was widespread acceptance of radiata pine for building and other applications (Lewis 1957b).

The wisdom of South Australia's early tree planting was proved by the late 1950s when the plantations were supplying wood of a sufficient volume to attract major private sector investment. Coreboard Ltd. (a subsidiary of Softwood Holdings) began particleboard production at Mt Gambier in 1957, South Australia Perpetual Forests (SAPFOR) opened a large sawmill at Tarpeena in 1958, APCEL Ltd. (a joint venture between APM Ltd. and Cellulose Aust. Ltd.) began making tissue paper near Snuggery in 1960, Panelboard Pty. Ltd. began production of flakeboard in 1960 and a further particleboard plant was opened by Softwood Holdings in 1967 (Lewis 1975, p. 37).

Max Jacobs, a key architect of Australia's 1960s softwood plantation program (chapter 3), drew on South Australian achievements:

> '*South Australia has been transformed between 1870 and 1970 from a Colony without a significant forest resource to the State having the largest sawmills in Australia.*' (Jacobs 1972, p. 10).

Because of South Australia's early planting history, the state played a crucial role in demonstrating the considerable processing-based employment and industry development benefits at a time when the Federal Government was considering a major financial stimulus for softwood planting Australia wide. Jacobs' use of the word 'forest' masks the agricultural model underpinning this initiative.

2.4 State forest agencies

Other Australian states followed South Australia's lead in establishing their forest agencies in the first two decades of the 20th century (Carron 1985; table 2.1). Initially, most forest agencies were branches within land departments - a strategy the government used to clip their power and protect the settlement program.[10] Rivalry between foresters and lands department bureaucrats stimulated foresters to gain their

[10] The Western Australian forest agency was responsible to the Minister for Mines and the Queensland forest agency remained in the Lands Department until 1960 (Carron 1985, p. 109, 144).

bureaucratic independence through legislation to become directly accountable to parliament via a minister for forests (Carron 1985; Frawley 1999).

Table 2.1 Establishment of major forestry institutions and events* in Australia (1857-1959). *Events of relevance to the plantation sector of the industry. Environment movement and worker union organisations are not included. Source: Fielding (1957); Jacobs (1972); Lewis (1975); Carron (1985); Dargavel (1995); Pine Australia (2001).

c 1857	Radiata pine arrives in Australia
1865	First official report recommending planting trees for wood -Victoria
1873	First government encouragement of commercial tree planting - South Australia
1875	Forest Act South Australia
1876	First public tree planting for wood - South Australia
1895	Timber Merchants and Mill Owners' Association established - Western Australia
1902	First recorded processing of plantation wood - South Australia
1905	Associated Country Sawmillers established - New South Wales
1908	Forest Act Victoria
1910	Creswick Forestry School (Victoria) commences operation (officially opened in 1913)
1911	First Interstate Forestry Conference - Sydney Australia's first professional (university based) forestry school - South Australia
1912	Second Interstate Forestry Conference - Melbourne
1913	Sawmillers' Association established - Western Australia
1916	Third Interstate Forestry Conference - Adelaide Forest Act New South Wales
1917	Fourth Interstate Forestry Conference - Perth
1919	Forest products laboratory established by the Federal Government in Perth (three year life) Forest Act Western Australia
1920	Fifth Interstate Forestry Conference - Hobart
1921	Forest Act Tasmania
1922	Sixth Interstate Forestry Conference - Brisbane Empire Forestry Association formed
1924	Seventh Interstate Forestry Conference - Sydney Forest Act Queensland
1927	Commonwealth Forestry Bureau established - Australian Forestry School established as a Division of the Bureau and located in Canberra
1928	Division of Forest Products established within the Council for Scientific and Industrial Research Tasmanian Timber Organisation established
1935	Institute of Foresters of Australia established
1938	Queensland Timber Industry Stabilisation Board established
1943	Eastern States Timber Industry Stabilisation (ESTIS) conference established
1945	Tasmanian Timber Association (from Tasmanian Timber Organisation) established
1946	Commonwealth Forestry and Timber Bureau - revamped Commonwealth Forestry Bureau with additional powers and responsibilities
1947	Country Sawmillers' Association established - Victoria
1949	Interstate forestry conferences recommenced after 25 years
1951	Associated Sawmillers' and Timber Merchants' Association (from Sawmillers Association) established - Western Australia
1957	Victorian Sawmillers Association (from Country Sawmillers' Association) established
1959	Radiata Pine Association of Australia established Australian Timber Industry Stabilisation (AUSTIS) conference established

Frawley (1999, p. 38) argued that the massive changes taking place in sawmill technology with the advent of steam power also drove forest agency establishment. These technologies enabled larger sawmills and required a secure log supply to justify the investment. The tramways, which could cost as much as a sawmill, being used to open up the forests added to the desire for resource certainty (Dargavel 1995, p. 26).

Conflicts between sawmillers over the best patches of forest also contributed to resource uncertainty (Dargavel 1995, p. 26). To protect their investment, sawmillers directly lobbied State Governments to intervene and reserve forests against the steady march of land clearing and wood waste, to allocate resources to mills and make a start on regenerating forests (Frawley 1999, p. 38).

State forest agencies saw their role as protecting and managing forests to meet the community's wood needs for housing and infrastructure. Their foresters faced a huge task securing the protection of Australia's forests from the land clearers and unregulated logging. They inherited a legacy of forest exploitation, cosy arrangements between government and industry and practically no administration of logging regulations by lands department bureaucrats (Frawley 1999, p. 37). Added to this was the vacuum of knowledge about Australia's forests and the growth characteristics of its tree species.

The role of British Empire forestry in shaping the early Australian foresters' response to their challenges is a common theme in forest histories (Carron 1985; Griffiths 1992; Dargavel 1995; Frawley 1999). Visits by Empire forestry experts and British Empire Forestry Conferences provided policy directions to the colonies. Conferences were held in Australia and New Zealand in 1928 and 1957. Empire forestry was based on centuries of European forestry experience and more recent colonial forestry experience in India and Africa. Frawley (1999) argued that European forestry had crystalised over the centuries into what was considered a venerable profession concerned with the protection, cultivation and harvesting of trees. Australia's early foresters decided that the nation's indigenous forests should also be similarly managed to provide a crop of young, healthy, straight trees bearing high quality timber to replace the 'over mature', disorderly forests they had inherited. It is difficult to envisage how the early foresters could have acted differently.

The foresters were well networked, overcoming the distances that separated them through interstate forestry conferences and shifting their employment around the forest agencies (see footnotes accompanying the introduction of each leading forester). Interstate forestry conferences commenced in 1911, and seven conferences were held up to 1924 (table 2.1). In 1924, the conferences ceased for 25 years, collapsing under the weight of intense interstate rivalry and personal antagonisms (Carron 1985, p. 303; Meyer 1985).

The interstate forestry conference agenda comprised three main items - reserving native forests for wood production, planting trees and gaining administrative control over reserved forests. The prime recommendation of the first interstate forestry conference (Sydney 1911) was for '*special enactments in all states to provide for the conservation, maintenance and planting of forests, the creation of permanent and inalienable reserves, and the appointment of permanent authorities with statutory power for administrative control.*' (Jacobs 1972, p. 13). Tree planting was incorporated into Australia's forestry agenda from the beginning.

During the 1920s, the forest agencies defined why and how 'forests' would be managed. The first qualified (Oxford) Australian forester, Norman William Jolly,[11] argued that:

> '*Forest management aims above all at continuity of supplies and the permanence of the industries dependent on the forest...*' (Jolly, as quoted in Lane Poole[12] 1928, p. 98).

Foresters perceived a future sawlog deficit, no doubt emphasised by the then high economic growth. Readily accessible native forests were heavily over-cut because of inadequate government control over logging in the early years, and supply to mills could not be maintained (Lane Poole 1928, p. 98). Obviously the early forester's first priority was to protect forests for wood production.

In a paper titled *Forest reservations necessary for Australia*, Jolly presented his national target for reservation - 24.5 million acres (9.9 million hectares) - at the fourth Interstate Forestry Conference held in Perth in 1917. The conference decided against setting a target but recommended that *'all prime forest areas should be permanently reserved'* and that the state agencies request the issue be considered at the next Premier's Conference (Jacobs 1972, p. 14-5). The national forest reserve issue was deferred at the Premier's Conference held in Sydney in May 1917, and was left in the hands of the Premier of New South Wales to confer with other Premiers. At the next (fifth) Interstate Forestry Conference, held in Hobart in 1920, Swain argued for a forest reserve of 37.5 million acres (15.2 million hectares). Swain's colleagues rejected the proposal, reluctant to move from Jolly's target, which had been used in briefings to their Premiers. The conference formally adopted Jolly's 24.5 million acres (9.9 million hectares) as an 'indigenous forest' target and recommended that it be considered at the Premier's Conference in May 1920 (Jacobs 1972, p. 15). The Premiers endorsed the target.

The proceedings of the fifth Interstate Forestry Conference also presented a specific plantation area target in a note that stated:

> '*At the instance (sic) of the Premier of N.S.W. the importance of ultimately appropriating a national forest area of about 30,000,000 acres for the whole Commonwealth, to comprise about 25,000,000 acres of indigenous forest country, and about 5,000,000 acres of coniferous plantations, is being urged for Commonwealth and the States' consideration.*' (as quoted in Jacobs 1972, p. 16).

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[11] Norman William Jolly was Director of Forests Queensland (1911-18), Forestry Commissioner in New South Wales (1918-25), Professor of Forestry at Adelaide University (1925-26), Forestry Commissioner in New South Wales (1926-33) and forestry consultant (1933-54) (Meyer 1985, p. 16).

[12] Charles Edward Lane Poole was Conservator of Forests in Western Australia (1916-21), Forest Advisor to the Federal Government (1925-27), Acting Principal of the Australian Forestry School (1927-44) and Inspector General of Forests, Commonwealth Forestry Bureau (1927-45) (Meyer 1985, p. 2).

The note suggests that the plantation target was not a direct outcome of the conference. Jolly, the proponent of the 9.9 million hectare 'forest' target, was Forestry Commissioner in New South Wales and a softwood plantation enthusiast (Carron 1985). Swain, with his higher target, was also a tree-cropping enthusiast. The solution to the problem of changing the target after already briefing the Premiers was to establish two targets - the original target specifically for native forests (9.9 million hectares) and another target for the more productive plantations (2 million hectares).

Jolly and Swain based their area targets on their expectations of future wood consumption. Jolly assumed a population of 25 million people by around 1980-1990, consuming 23.6 million m^3 of wood for sawn timber per annum (Jacobs 1972, p. 14).[13] Australia's 17.1 million people in 1990 consumed wood products (sawn timber, panels, paper and other products) requiring 17.9 million m^3 of wood to make (Australian Bureau of Agricultural and Resource Economics 1999a, p. 127). Jolly over-estimated Australia's wood consumption in 1990 by 32 per cent.[14] Swain's 15 million hectare area target was based on an assumed 3 000 super feet (7.08 m^3) of wood consumed per person (Carron 1985, pp. 242-3) - nearly eight times the then per capita consumption. Australia's per capita consumption of wood in 1990 was 1.03 m^3 per person (Australian Bureau of Agricultural and Resource Economics 1999a, p. 127).

I draw three points from this discussion as important background for later chapters, namely:

- the national plantation area target was established together with the native forest reserve target as one of the first priorities of the state forest agencies,
- the targets were based on high consumption projections, and
- defining an area target followed by government endorsement underpinned the approach to securing future wood supply.

The state forest agencies met the 9.9 million hectare native forest target by the mid 1960s (Dargavel 1995, p. 68).[15]

The early foresters faced the daunting task of aligning the sawlog cut to industry's requirements. The perception that over-logging was occurring was widely held in forestry circles. Lane Poole's preference was to close the inefficient mills (Lane Poole 1928, pp. 98-100). Jolly argued that forest agencies should avoid such intervention:

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[13] Consumption projections converted to metrics: 100 super feet = 0.235973 m^3.

[14] I have compared Jolly's projection of Australia's wood requirements with Australia's consumption of wood for all uses. Jolly's projection was limited to Australian consumption of sawn timber and sleepers, leaving out paper and wood panels. In 1990, Australia's consumption of sawn timber and railway sleepers required 12.5 million m^3 of logs to make - half the figure Jolly had expected.

[15] The target was not undermined by subsequent allocation of public native forest land to nature conservation reserves. Australia had 11.9 million hectares of publicly owned multiple use native forests available for wood production in June 2001 (National Forest Inventory 2001) - exceeding Jolly's target by 20 per cent.

> '*It is an invidious and thankless task for the Forestry Commission to attempt the necessary discrimination in this matter, and it would be more satisfactory to all concerned if the members of the trade would undertake this unpleasant and difficult work.*' (Jolly, as quoted in Lane Poole 1928, p. 100).

Swain considered that the pioneering of forestry in Queensland was much the same as in other countries, stating that addressing over-cutting reduced to an issue of expediency (Swain 1928b, pp. 775, 785). Swain estimated that Queensland had lost almost three-quarters of its original 113 million m^3 of hoop, bunya and kauri pine through clearing, and that, by 1925, there would be only ten years of supply left if logging continued at the then rate of 2.8 million m^3 per annum. The state's softwood shortage up to 1955 was estimated to total 78 million m^3, the import cost of which was £40 million (Swain 1928b, p. 774).[16] Queensland decided to run down its native forest resource, before supply from 'tree crops' came on stream, in such a way that there would be a continuous if declining industry. Similarly, the Victorian Forest Commission decided not to reduce the native forest cut, but rather to accommodate Victoria's booming sawmilling industry. The Commission argued for permanent reservation of all vacant crown land with good timber, management control to maximise productivity, strict controls on grazing in forests and softwood planting (Lane Poole 1928, p. 130).

As the 1920s drew to a close, the state forest agencies had broadly settled on a strategy of continuing the unsustainable logging of native forests they had inherited and establishing relatively high productivity plantations to fill the perceived wood deficit. They chose not to use the pricing mechanism to address the over-cutting problem because of the negative effects for their client industry. Jolly spoke of the persistent complaints from sawmillers about high stumpages (the price of the log still standing) and explained the sawmiller's exposure to competition from cheap imported softwoods, steel, concrete and various wall and partition compositions. He considered that native forest hardwoods were of lesser market value to softwood sawn timber:

> '*...so long as Sydney remains the chief market for the hardwood scantlings produced by country mills, ordinary hardwood mill logs will always be of low value in the forest.*' (Jolly, quoted by Lane Poole 1928, p. 101).

H.R. Gray, one of the first lecturers appointed at the Australian Forestry School (Carron 1985, p. 263-4), was emphatic that cheap wood was essential to keep the market share of sawn timber up against 'the common enemy', namely competing non-wood products. Gray argued that foresters and sawmillers had a common interest in the maximum use of sawn timber and that:

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[16] Monetary units are reported as those at the time, i.e. £ until the introduction of decimal currency in 1966, because it enables a more precise reporting of plantation establishment costs and wood prices in chapter 3.

> '*...speculations as to the monetary "profits" to be derived from forestry are futile, and are born of incomplete understanding of the role of forests in the economy of a country. From time immemorial it has been pointed out that forests and forest products are essential to man's well being. A civilization without them, even if it could exist, is not of a kind that one would like to live in. So forests are desirable, and timber is a national necessity. Wise government should ensure that supplies are abundant and cheap, so that the country's development may not be hampered.*' (Gray 1928a, p. 637).

Gray's writing demonstrates a clarity about the market realities of commodity production:

> '*Timber is a commodity which is likely to maintain its general use in human economy only if supplies are assured, abundant and cheap.*' (Gray 1936, p. 47).

In contrast to Jolly and Gray, Swain forcefully argued that forestry should be a commercial business in its own right. Unlike other early foresters with their European forestry training, Swain received his forestry training in the United States (Meyer 1985, p. 26) where presumably the business ethic rubbed off. Swain argued that:

> '*Forestry was helpless before the early tide of timber cheapness.*' (Swain 1928b, p. 774).

The badly over-logged native forest areas bequeathed to them were loaded with an expensive regeneration liability in the form of unmarketable trees to be removed before the new crops could be established. Swain understood that '[f]*orestry by itself stands at the mercy of its markets'* but, in contrast to other foresters, he argued that they '*must master the market-place in order to achieve its crowning triumph in the silvical arena.*' (Swain 1928b, p. 773).

To do this, Swain advocated forestry as a business, in opposition to the teachings of English born or influenced foresters that were:

> '*based on mediaeval European silviculture on the estates of nobility unconcerned for profit and loss'* (Swain 1969).

The historical writings of the forester's debate emphasise the personal antagonisms and the 25-year cessation of the Interstate Forestry Conferences after 1924 (Carron 1985, p. 303; Meyer 1985, p. 33). At its heart were the difficulties foresters, as managers of a public resource, faced in defining and controlling their relationship with a cost sensitive private sector commodity industry.

The forest agencies, after ruling out the use of the price mechanism and resource withdrawal to align the native forest log cut to a 'sustainable level', had to decide how Australia's forests would be managed for perpetual wood supply. The issue was

worked through using the third British Empire Forestry Conference held in Australia and New Zealand in 1928. The outcome was a policy to regenerate large areas of Australia's native forests with relatively fast-growing softwoods. Foresters were primarily concerned with tree growth for sawlog supply and also satisfying the market preference for softwood sawn timber.

Foresters reported negatively on the regeneration of Australia's eucalypt forests:

> '[The] *inherent trouble in the genus Eucalyptus of which no species is entirely free* [is that] *the eucalypts grow fastest for the first twenty to thirty years, and the wood formed in this period is generally very poor quality and does not make duramen. By the time the tree has reached an age to make heartwood the inner core is usually attacked by fungus disease or insect pests. No eucalypts are free from this trouble though some show it to a worse degree than others.*' (Lane Poole 1928, p. 102)

Jolly spoke of the unfortunate characteristic of the eucalypts whose reproduction is frequently '*much denser in fact than a wheat crop.*' (Jolly 1928a, p. 506). Jolly argued that the rapid growth caused by competition for light means:

> '*the forest assumes the appearance of a dense array of inverted feather dusters, entirely lacking in vigour, the effect being so rapid that in the course of five years a healthy crop may change into an unhealthy and weedy crowd of spindles. What is perhaps more important still is that the stems so developed, having no rigidity, sway tremendously in the wind, the threshing of the crowns thus preventing one another's expansion – even if the stems were strong enough to carry larger heads. With planted forests, on the other hand, the wider spacing in early youth not only allows vigorous growth to be maintained for a much longer period, but results also in strong stems with robust crowns, capable of standing in denser stocking than swaying spindles with only a fraction of the head.*' (Jolly 1928a, pp. 506-7).

Jolly mused about putting greater effort into searching for markets for inferior wood from Australia's native forests to pay for the cost of thinning (Jolly 1928a, p. 512). As discussed below, Australian researchers made the technological breakthrough in pulping eucalypts in the early 1920s. However, the outlet for thinnings remained uncertain because a pulpmill investment was required, the market prospects for paper made from eucalypt pulp remained to be tested, and establishing pulpmills in every native forest wood supply region was unrealistic.

It was sensible for foresters to remain focussed on sawlog production because this was the main product demanded by the industry. Sawn timber accounted for 73 per cent of the wood products (expressed in roundwood equivalent units) consumed in Australia in 1935/36 (Forestry and Timber Bureau 1969, p. 4).[17] Consumers also preferred

[17] This is the earliest available national wood and wood products consumption data.

softwoods in most sawn timber applications (Grenning 1928; Gray 1935). Non-durable eucalypts (such as the stringybarks and mountain ash) were considered inferior to softwoods for general purpose uses. This contrasted with Australia's durable hardwoods (e.g. jarrah) that were in high demand domestically and overseas, particularly for infrastructure development such as railway sleepers (Gray 1928a).

Jolly concluded that:

> '*Australian silviculture should concentrate primarily upon the growth of durable hardwoods for special purposes and of the "bread and butter" softwoods which constitute the bulk of the world's requirements, and which cannot be replaced satisfactorily by the miscellaneous species characteristic of rainforests.*' (Jolly 1928a, p. 516).

Lane Poole concurred:

> '*Mr Jolly, in his Handbook on Forestry in New South Wales, has voiced what many of us have held for sometime, viz., that the non durable fast-growing hardwood forests should be converted to more valuable conifer plantations.*' (Lane Poole 1928, p. 103).

Gray advised delegates to the third British Forestry Conference of the broad agreement for the softwood conversion:

> '*It is considered by the foremost forest authorities in Australia that a large proportion of the indigenous forests composed of the less durable and comparatively light timbers species, will ultimately be converted to conifers, that will produce heavier stands in shorter time, of timbers more suitable for general structural purposes. Regeneration of eucalypt forests will be directed rather to those producing slower-growing durable poles, piles, beams, girders, and sleeper timbers.*' (Gray 1928a, p. 630).

The London Forestry Commission's global softwood supply outlook added a sense of urgency to the softwood conversion. At the 1928 conference, they reported that the world's virgin softwood forests would be exhausted within 38 years given the then consumption growth (Story 1928). This meant that by the time it took to grow a softwood sawlog under a plantation regime in Australia the market would be supplied by inferior softwood timbers (not the high quality sawn timber from North America's virgin forests that Australian consumers were then enjoying) making the plantation option and preservative treatment relatively more attractive. Australia's recent wartime experience of softwood shortages provided further encouragement for the softwood conversion, as did expectations of sawn timber price increases as global demand for sawn timber increased and supply tightened.

Some Australian foresters acknowledged that eucalypts could technically substitute for softwoods in many applications (Grenning 1928, p. 64), but their strategy had to

embrace wider issues, namely their expectations of future, higher levels of sawn timber consumption, the regenerative capacity of Australia's eucalypt dominant native forests and consumer preference for softwood sawn timber. Grenning summed up the view in Australian forestry circles:

> '*There is only one solution - softwood plantations.*' (Grenning 1928, p. 66).

The 1928 British Forestry Conference delegates inspected softwood plantations in South Australia. By this time, South Australia had half a century of experience in radiata pine plantations and nearly three decades of processing experience. The conference endorsed the strategy of softwood conversion, although there were apprehensions about radiata pine providing a complete solution to Australia's softwood requirements because of the tree's exacting requirements (especially with regard to soils) and the vulnerability of large areas of monoculture plantings to insect and fungal attacks (Carron 1985, p. 221).

Funding was the key factor constraining plantation establishment. The issue was discussed as early as the first Interstate Forestry Conference in 1911. The Tasmanian delegate, L. Rodway, suggested that 100 000 acres (40 500 hectares) per annum needed to be planted to meet Australia's wood needs and that Federal Government assistance might be required. At the next interstate conference (1912), H.R. Mackay, the Victorian Conservator of Forests, expressed concerns about State Government neglect of planting, and by 1920 the conference was calling for the Federal Government to subsidise state forestry operations and in addition provide adequate loan funds. At the seventh interstate conference in 1924, L.G. Irby, the Tasmanian Conservator of Forests, argued for increased 'afforestation' and suggested a cooperative scheme with State Governments leasing suitable areas to the Federal Government and supervising the necessary operations with the Federal Government providing the finance (Jacobs 1972, p. 16; Carron 1985, pp. 241-4). Federal Government funding remained elusive until the 1960s (chapter 3).

2.5 The Federal Government

Federation saw a split in government powers affecting the Australian wood and wood products industry. The states retained their colonial responsibility for stewardship of crown lands and therefore large tracts of native forest. The Federal Government was granted wide powers affecting industry. The wood and wood products industry complex was not considered in the conventions preceding Federation (Jacobs 1972). The Royal Commission on the Constitution held between 1927-1929 investigated the issue of Federal Government responsibility for wood supply. All witnesses giving evidence to the Commission on forestry sought greater Federal Government participation (Jacobs 1972, p. 3).

The constitution was not amended, but the Commission clarified the relationship between the State and Federal Governments on wood and wood products industry

matters. It advised that the Federal Government had no power to make laws with respect to forestry for the whole of the Commonwealth but that it could influence state forest policy by making loans for forestry, providing assistance and advice and by establishing a school of forestry that could be attended by students from the states. It also noted that if a council was established to control forestry in Australia and the Federal Government was represented (having responsibility over forests in the territories) it was likely the states in developing their forest policy would give greater attention to the needs of Australia and that there would be less danger of forest lands being sacrificed for settlement. (Jacobs 1972, p. 2). These clarifications guided the Federal Government in its forestry institution building. This commenced with the establishment of the Commonwealth Forestry Bureau in 1927 and continued to the mid 1960s with the formation of the Australian Forestry Council (table 2.1; chapter 3).

Commonwealth Forestry Bureau (later Commonwealth Forestry and Timber Bureau)

In his 1919 article *A forest policy for Australia,* Lane Poole argued that a national forest policy was required to address the problems of forest exploitation and limited State Government funds for silvicultural work. Lane Poole listed the issues the policy should cover: land classification and forest reservation, development of working plans by professional foresters, a single professional forestry school, training for professional staff, research institutes for wood and wood products, and an extensive publicity campaign (Carron 1985, p. 243). This was a direct blow to Victoria's Creswick Forestry School, and Lane Poole was regarded by Sam Wadham, Professor of Agriculture at the University of Melbourne, and others, as 'the enemy' of Melbourne forestry (J.S. Turner, in an interview with Robin as documented in Robin 1993, p. 381). As discussed in chapter 3, Victoria was unenthusiastic about a national forest policy and associated institutions. Swain extended the national forest policy concept, writing in 1920 of the need for a federal secretariat of forestry. Swain's proposal included the establishment of a federal forestry fund using the revenue from a tariff on timber imports, the transferring of the Interstate Forestry Conferences into a Commonwealth advisory board on forestry and the provision of loans from the Commonwealth to the states for forestry (Jacobs 1972).

In 1924, the Federal Government appointed Lane Poole as its forest advisor to, amongst other things, report on the forest situation in Australia and propose a national forest policy (Carron 1985, pp. 244-5). Included in Lane Poole's recommendations were plans for a national forestry bureau and a national forestry school. The Federal Government announced its intention to establish the bureau in 1925, following on the heels of state forest agency establishment (table 2.1). The Bureau was formed in 1927 with Lane Poole appointed Inspector-General of Forests. The Bureau was to collect information and undertake research with the aim of Australia becoming self-sufficient in wood and to do so in co-operation with the states. Swain's proposals for Federal Government funding were conspicuously absent from any decisions.

Silvicultural research for plantations and native forests was the big challenge facing foresters in the 1920s (Carter[18] 1928, p. 163). The Bureau established ten experimental stations for the study of silviculture, forest management and forest protection - two stations covering rainforests, four on sclerophyll forests and one each on seed testing, water erosion, wind erosion and softwood plantations. The softwood plantation station was established at Mt Burr, South Australia, in collaboration with the state's Woods and Forests Department (Lane Poole 1937, p. 42). Its research program was co-ordinated with the Australian Capital Territory softwood plantations, which enabled the Bureau and the Australian Forestry School in Canberra (see below) to reap the experience and knowledge of Australia's most advanced softwood plantation region.

Bureau officers traveled overseas to investigate species and districts that were of interest to Australian foresters from the point of view of introducing softwoods. Research results and other information were made readily available through pamphlets and bulletins published by the Bureau. These were heavily focussed on softwood plantation issues. By 1946 (the year the Bureau was revamped, as discussed below), the Bureau had published 28 bulletins; 18 covered plantation issues (overwhelmingly softwoods), five covered eucalypt tree issues, and five covered generic issues.

Lane Poole retired as Director of the Bureau in 1944. A post-war review resulted in the Forestry and Timber Bureau Act 1946 with the Bureau's name changed to the Commonwealth Forestry and Timber Bureau and its powers and functions extended to collecting information, undertaking research, providing advice and planning the national production and consumption of wood in co-operation with the states (Carron 1985, p. 254). G.J. Rodger, Conservator of the South Australian Wood and Forests Department, was appointed Director-General, ensuring that softwood plantations would remain a priority. The Bureau continued its research, publishing another eight bulletins by the end of the 1950s, exclusively focussed on softwood plantation issues, namely growing and managing radiata pine and calculating plantation wood yields.

Australian Forestry School

Forestry education and training was undertaken within forest agencies or, for Victorian foresters, at the Creswick Forestry School, which opened in 1910 (table 2.1). Dargavel (1995, p. 73) argued that the imperial model required that the forest agencies be managed by professional (university educated) foresters. Australia's first such forestry school was established at Adelaide University in 1911. South Australia was significantly more advanced than other states in its forestry institution building (table 2.1), so a forestry school could be viewed as a continuation of this infrastructure. A related explanation for South Australia's early start was that professional forestry training comes with the realisation of inadequate areas of high-grade forest (Ovington[19] 1965, pp. 1-2).

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[18] C.E. Carter was recruited by Jolly as one of the first lecturers at the Australian Forestry School in Canberra (Carron 1985, p. 264).

[19] J. D. Ovington was Professor of Forestry at the Australian National University, Canberra, and had a distinguished later career in the federal public service managing National Parks and other environmental portfolios.

Jolly established the forestry course at Adelaide University, becoming Instructor in Forestry in 1910. Shortly after, at the first Interstate Forestry Conference, Jolly suggested that a federal school was necessary, but the proposal was not considered worthy of discussion (Jolly 1928b, p. 677).

In his paper *Forestry Education in Australia* presented to the third British Empire Forestry Conference, Jolly argued that, to be self supporting in softwoods, Australia needed to establish two million acres (0.8 million hectares) of 'coniferous forest' during the next 50 years, which would cost £20 million without allowing for interest. Jolly argued that funding be conditional on professional forestry:

> '*The expenditure of that sum should not rightly be undertaken unless it is definitely laid down that the work is to be controlled and carried out by men trained to their job, and until those in authority realize the blunders and waste of the past and the possibilities for still worse results in the future, it were far better indeed for a halt to be called. Without education in forestry in Australia, real progress simply cannot be made.*' (Jolly 1928b, p. 682).

From its beginnings, forestry education in Australia appeared to be as much about establishing Australia's softwood plantation estate as it was about managing native forests for wood production.

The 1917 Interstate Forestry Conference in Perth revived Jolly's proposal for a national forestry school and agreement was reached to locate the school in a native forest area of New South Wales. Subsequent interstate rivalry about the location of the school meant that the proposal lapsed because the states would not guarantee student numbers sufficient to justify the building investment (Carron 1985, p. 262). The deadlock was broken by Lane Poole, who working previously as Western Australia's Conservator of Forests, had experienced the frustration of trying to obtain trained foresters and understood the importance of a national forestry school (Meyer 1985, p. 10). Lane Poole was now forest advisor to the Federal Government and persuaded it to fund construction of the school in Canberra. Lane Poole commented favourably on the school's location being in easy reach of a wide range of '*managed forests of both hardwoods and softwoods*' (Lane Poole 1937, p. 43). Jolly also supported the Canberra location because it focussed attention on '*one of Australia's big forestry problems, viz., that of conversion from unsuitable to suitable species.*' (Jolly 1928b, p. 678).

Because there was no university in Canberra at the time, the Australian Forestry School was established as a division of the Forestry Bureau from 1927 to 1965, with students undertaking two years of their four year course at an approved Australian university. Lane Poole, as Inspector-General of the Commonwealth Forestry Bureau, became Principal of the school. Funding constraints saw much of the Forestry Bureau's research (with softwood plantations a priority) undertaken by Australian Forestry School staff (Carron 1985, p. 253). In 1965, the Australian Forestry School was shifted to the Australian National University (ANU) to become the Department of Forestry. These institutional arrangements meant that foresters with a solid grounding in

softwood plantation growing issues occupied most of the senior management positions in state forest agencies during the 1960s and 1970s.

Division of Forest Products, Council for Scientific and Industrial Research (CSIR)

The European and North American domination of world pulp and paper production, based on abundant supplies of spruce, fir and hemlock, appears to have stifled research into pulping other plant species. By the early twentieth century, industry concerns about the ongoing supply of these standard pulping species stimulated research into pulp and paper making technologies using other tree species, including Australian eucalypts and radiata pine (Ward 1928). Australia, with its eucalypt-dominated forests, had no wood pulp processing capacity. Desire for greater wealth and the fear of higher import prices encouraged Australia to participate in this research effort (Benjamin 1928, p. 431). Foresters were enthusiastic because a eucalypt pulp mill would provide a commercial market for non-sawlog material from neighbouring native forests.

Tasmania, Victoria and New South Wales investigated the feasibility of pulping eucalypts from 1915 to 1917 without apparent success (Benjamin 1928). Meanwhile, in 1916, the Federal Government, in view of the emergencies of the war, established the Advisory Council of Science and Industry to advise on the application of science to industry. Committees were set up in each state. Western Australia decided to research the commercial potential of small logs from its native forests. Lane Poole, then Western Australia's Conservator for Forests, headed the forest products sub-committee of the Advisory Council. In 1918, it investigated the pulping of young karri and jarrah (thinnings) and sawmill residues (Benjamin 1928). The research findings differed from earlier studies and, showing promise, it was decided to extend the work to include the main eucalypt species of other states (Benjamin 1928).

In 1919, the Federal Government established a forest products laboratory in Perth.[20] This effectively marks the commencement of Federal Government forestry institution building. During its short three-year existence, the laboratory demonstrated the technical feasibility of making many grades of paper, including newsprint, solely from eucalypts (Benjamin 1928, p. 431). Concurrent research was conducted to produce substitutes for imported softwood by preserving wood and seasoning sawn timber using kilns (Carron 1985, p. 276; Frawley 1999, p. 40).

Australian research was boosted when the Bruce Government passed the Science and Industry Act establishing the Council for Scientific and Industrial Research (CSIR) in 1926. A Forest Products Division was established in 1928, and I.A. Boas, a chemistry lecturer at Perth Technical School (Carron 1985, p. 278), was appointed to head the research team. Boas recognised the limitations on state based forestry research. No state was able to afford the necessary research work on silviculture and wood use, there was little co-ordination between the states on silvicultural research, and only one or two

[20] The Western Australian government provided the site within the State's university and a grant to assist construction of the laboratory (Carron 1985, p. 277).

states were undertaking research on wood use (Boas 1936, p. 22). The Federal Government now had two organisations engaged in wood and wood products research and it used the fallen tree as the line of demarcation. Research into wood growing was the responsibility of the Commonwealth Forestry Bureau who undertook forestry education and co-ordinated silvicultural research. The CSIR Division of Forest Products was responsible for research into processing the wood. The research effort was centralised to CSIR's Melbourne office and was assisted with a grant from the Federal Government for new laboratories, donations of wood and sawn timber from industry, and money from Russell Grimwade for equipment (Carron 1985, p. 279).

The Division of Forest Products established the feasibility of kraft pulping using radiata pine (Benjamin 1928, p. 434). This meant that, in the short space of a decade, Australian research established the feasibility of pulping eucalypts and radiata pine.

2.6 Institute of Foresters of Australia

The Institute of Foresters of Australia (IFA) was formed in 1935 by forestry graduates of Australian universities and the Australian Forestry School. Stephen Kessell, the Institute's first president, wanted the Institute to facilitate a closer collaboration between the states and the Federal Government on forest policy. Kessell believed that forestry needed rescuing from state parochialism and the personal antipathies between state foresters (Kessell 1938, p. 89). The threat of permanent closure of the Australian Forestry School was also high on the Institute's agenda. The school was temporarily closed in 1936 because of poor enrolments caused by lack of state support and economic depression (Carron 1985, pp. 265-6).

Frawley (1999, p. 42) and Dargavel (1995, p. 73) described the Institute as the core of the Empire model with trained forestry professionals running government forest agencies. The dangers for the independence of forestry were recognised at the earliest. Kessel in his 1938 retiring presidential address urged the Institute to keep a distance from government:

> '*...if the Institute is to continue its career of usefulness as a professional organisation divorced from State policies and State politics, it must steer clear of any close departmental associations in its Divisions or central organisation.*' (Kessell 1938, p. 93).

The separation was effectively impossible. Kessell was at the time Western Australia's Conservator of Forests and other founding members of the Institute's council occupied senior government positions (Institute of Foresters of Australia 1936, p. i). Strong networks between the Institute and government bureaucracy were inevitable. The Institute lobbied for university forestry education recognising that forestry graduates, its membership core, were highly successful in filling senior positions in forest agencies (for an understanding of the employment prospects see Anon. 1936a, p. 16).

In addition to the Institute linking, through personal networks, state and federal forest agencies and the Australian Forest School, it was also financially supported by industry. The Institute viewed this support as recognition of the value of professionally trained foresters to industry and hoped the bond in sympathy and understanding that was developing during the post-war years between industry and foresters would continue (Anon 1936b, p. 2).

The Institute's journal, *Australian Forestry,* together with its newsletters and conferences, provided additional mechanisms for networking and communicating information and opinions. The first paper to be published in *Australian Forestry* was on plant nutrients and pine growth in Western Australia (Kessel & Stoate 1936). Of the 11 papers published in volume 1, number 1, six dealt with plantations,[21] with the other papers covering generic forestry issues (education, fire protection, plant anatomy, water catchments, soil science). There were no papers specifically addressing native forest issues.

The journal's early focus on softwood plantations contrasted with the Institute's emblem, the leaves of *Eucalyptus rostrata.* This species was selected because it was the most widely distributed of the commercial eucalypt species. The leaves circled the fruit vessels and buds of an important member of each state's forest flora (Institute of Foresters of Australia 1936, p. iii). South Australia was not represented by a radiata pine cone, although radiata pine accounted for 80 per cent of the state's sawn timber production in 1936 (Forestry and Timber Bureau 1969, p. 49).

2.7 Private processing companies

Paper had been made in Australia since 1868 using rags, recycled paper and imported pulp (Dargavel 1995, p. 40-1). A wood-fibre feedstock was dependent on the technical and commercial feasibility of pulping eucalypts and radiata pine, work that was undertaken in the early 1920s.

The Australian paper industry was rationalised in the years between the two world wars with newsprint produced by Australian Newsprint Mills Ltd. (ANM); packaging paper by Australian Paper Manufacturers Ltd. (APM); and printing paper by Associated Pulp and Paper Mills Ltd. (APPM) (Dargavel 1995, p. 41). Newsprint and packaging papers, made principally from softwood fibres, were the dominant paper grades - consumption of printing papers was relatively minor.

By the late 1940s, the outlook for the Australian pulp and paper industry was overwhelmingly optimistic. Australia's paper consumption grew by an average 6.6 per cent per annum between 1945/46 and 1949/50 (Forestry and Timber Bureau 1969, p. 39). With half of Australia's paper consumption met by imports there was potential for significant import replacement. Imports of wood pulp also accounted for one-third of

[21] A paper on world softwood resources was included in this group because it provided market information for the softwood plantation program.

the pulp used for Australia's paper production (Forestry and Timber Bureau 1969, p. 39). Softwood fibre supply was the main constraint to import replacement.

ANM decided to secure its softwood pulp for newsprint manufacture by entering into an agreement with Canadian mills in 1937 to share the Australian newsprint market - then all met by imports - on the condition that ANM bought softwood pulp from Canada (Dargavel 1995, p. 41). This agreement meant that ANM had no interest in securing an Australian wood resource either from softwood plantations or native forests.

APM decided to grow its own softwood resource. In 1951, it established the subsidiary company APM Forests Pty. Ltd. to secure the necessary wood supply and appointed W.G. Chandler[22] General Manager. APM embarked on a program to establish 10 000 hectares of softwood plantations close to its Maryvale Victoria mill (Chandler 1957, 1960a). Softwood planting was facilitated by the Victorian Government through the *Land (Plantation Areas) Act 1959*, which empowered the Victorian Forests Commission to identify suitable land to lease for planting. Although the core of APM's paper operation was located at Maryvale, state decentralisation policies in a protectionist industry policy framework encouraged APM to look at interstate opportunities. Softwood planting commenced in Queensland in 1956 to feed a future pulpmill; trial plantings began in northern NSW in 1957; and, in 1960, APM announced the construction of a paper mill at Spearwood, Western Australia, suggesting that a pulpmill was a future possibility (Chandler 1960b; Mann 1990, p. 161).

Chandler communicated the company's experiences in softwood plantation establishment through the IFA's journal, newsletter and conferences (Chandler 1953, 1957, 1960a, 1960b, 1963). These communications provided valuable information on radiata pine planting techniques, management and costings.

In contrast to Australia's highly concentrated pulp and paper industry, sawn timber and plywood was produced in 2 730 mills processing less than 4 000 m^3 on average in 1960 (Forestry and Timber Bureau 1969, pp. 5 & 148). As discussed above, the increasing regionally concentrated softwood plantation supply in South Australia enabled investment in larger sawn timber and wood panel manufacturing establishments. Australia's sawn timber consumption soared during the post-World War II reconstruction but, in contrast to paper, high sawn timber consumption growth rates were not sustained past the early 1950s (figure 5.4). Australia's wood growing regimes would be more likely to become increasingly focussed on supplying raw material for paper production, with sawn timber playing a lesser role (chapters 3 & 5).

Industry associations

The first sawmillers' association formed in Western Australia in 1895, with sawmillers in other states following over the next half century (table 2.1). Associations in

[22] Chandler was also an IFA Councilor and Editor of *Australian Forestry*.

Queensland, Western Australia and Tasmania comprised both sawmillers and timber merchants - who also dried and dressed the sawn timber when necessary (Hanson 1958). Producers using native forests and plantations were represented in these state based associations, sometimes as specific groups. For example, the New South Wales radiata pine sawmillers were represented as the Monterey Pine Group and the Victorian Sawmillers' Association had a softwood division.

The Queensland Timber Stabilisation Board, comprising the state's smaller sawmillers and merchants, formed in 1938 to promote stability in the production and marketing of sawn timber amongst its members. The Queensland Sawmillers' Association represented the larger businesses operating in the Brisbane region. The Eastern States Timber Industry (ESTIS) formed in 1943 with membership comprising the Queensland, New South Wales, Victorian and Tasmanian sawmillers' associations and government forest agencies (Hanson 1958, p. 5; Dargavel 1995, p. 194). Its aim was for a '*permanently stabilized native timber industry in Australia*' by promoting stability in the production and marketing of 'Australian-grown' sawn timber and harmonious relationships between the forest agencies and sawmillers. A council conducted ESTIS business with representatives from each of the constituent organisations (Hanson 1958, p. 5).

The Conference went national with the formation of AUSTIS in 1959. In the same year, the Radiata Pine Association of Australia was also formed. Softwood plantation sawn timber (principally radiata pine) accounted for 14 per cent of Australia's production in 1959 (figure 5.4) and the industry knew it would soon outgrow its market of low-grade products such as packing case material. The principal aim of the Radiata Pine Association of Australia was to transform the then poor image of radiata pine to a highly regarded structural and appearance product (Pine Australia 2001).

Early expressions of competition between the softwood plantation and native forest based industry can be observed in the organisations formed in 1959. These expressions were overwhelmed in the 1970s and 1980s, however, as both the plantation and native forest industries were attacked by a forceful environment movement, and others increasingly concerned about native forest logging and extensive clearing for plantation establishment (chapter 4 and 6).

2.8 Environment movement

Australia's 19th century conservation effort was very much a part of mainstream society (Robin 1998; Hutton & Conners 1999; Bonyhady 2000). Acclimatisation societies and scientific societies (royal societies or natural history societies) urged wise resource use and nature protection respectively, and sat reasonably comfortably with the colonies' emerging identity and development. The early foresters, as discussed previously, were part of Australia's first wave conservation movement that lobbied influential people in, or well connected with, government and promoted public education on the importance of wise use and nature protection.

The social base for the first wave, utilitarian-focussed conservation movement started to erode in the 1930s, intensifying with post-World War II industry development. The scientists and professionally trained resource managers were now largely in the public service that, in turn, became captured by development interests (Hutton & Conners 1999). Post-war economic growth and its embodied technology created new environmental problems that were challenged less in closed meetings with government but increasingly in the public arena. Campaigns over Barrier Reef oil exploration, the Little Desert, Myall Lakes, Colong caves and Lake Pedder were increasingly played out in the public arena, challenging contemporary notions of industry development (Hutton & Conners 1999; Robin 1998) and breaking the links between the movement and the 'establishment'.

Robin (1998) associated this post-war wave of environmentalism and its eschewal of co-operative tactics with a search for new ways of living and new cultural critiques. Social and political dimensions of conservation were elevated as the values underpinning science; economics and technology became increasingly challenged. Missing from the environment movement as the 1960s progressed, argued Robin, was a new cultural critique - a new factor to be added to the analysis of the issues of the day (Robin 1998, pp. 135-6). This observation remains relevant today as nations, not just Australia and not just the environment movement, continue to grapple with the tensions of industry development and its environmental and social consequences.

A plethora of largely state based organisations (for a listing since federation, see Dargavel 1995, pp. 144-5) formed to tackle the perceived environmental problems that had emerged since the early 1960s. Forest campaigns became prominent as large areas of native forest were cleared for Australia's escalating softwood tree cropping and export woodchipping commenced (chapter 4 and 6). The foresters found themselves recast from being wise-use conservationists to environmental destroyers, a portrayal many found difficult to comprehend (Robin 1998, pp. 145-6).

2.9 Unions

Unions representing Australian wood products industry employee interests were established soon after Federation. Sawmill management and ownership started to separate with mechanisation and increasing scales of operation. Workers (usually on time wages) became more dissatisfied over wages, hours and conditions and gradually joined the labour movement (Dargavel 1995, p. 36).

The Federated Sawmill, Timber-yard and Woodworkers' Employees Association of Australasia formed in 1907, changing its name to the Amalgamated Timber Workers' Union of Australia in 1913 and the Australian Timber Workers' Union in 1918 before merging with the Pulp and Paper Workers' Federation of Australia to become the Forest and Forest Products Division of the Construction, Forestry, Mining and Energy Union (CFMEU) in the early 1990s. Through the 1920s, the union forcefully campaigned to reduce the 48-hour working week to 44 hours. It eventually won the case, but not without imprisonment of some leaders, lock-outs, violence and financial damage (Construction, Forestry, Mining and Energy Union 2001a).

Both the Australian Workers' Union (AWU), which facilitated the formation of timber unions that remain active today in Western Australia, Queensland and Tasmania, and the Australian Timber Workers' Union were affiliated with the Australian Council of Trades Unions (ACTU). Because unions affiliate a percentage of their members to the Australian Labor Party (ALP), union leaders were (and remain) important power brokers and shapers of public policy. Prior to the 1970s, it was the norm for unions to control up to 85 per cent of the delegates to the ALP state branch conventions and, through this, they controlled ALP federal conferences and the federal executive of the party (Warhurst & Parkin 2000, pp. 232-1). Up to 1960, the priority issues for wood products industry unions were workers' wages, hours, conditions and employment opportunities. The source of the mill's log supply was irrelevant - most union members worked in native forest sawmills and the small but growing softwood plantation industry was perceived as import replacement and therefore not a threat to existing Australian jobs.

2.10 Plantation funding - the unfinished business

Australia's early 20th century forestry institutions were largely formed from a public interest in securing a wood supply to meet housing needs. Technological breakthroughs in pulping radiata pine and eucalypt fibre elevated paper products to Australia's post-war agenda of national self-sufficiency. Running alongside these industry and consumer developments was a consolidation in forest agency thinking about the growing of future wood resources. Its origins are found in 18th century European society and forestry practices. It was assumed that proper silvicultural treatment required a market for the large volume of non-sawlog material in Australia's previously unlogged forests. It remained elusive until the technological and commercial breakthrough in eucalypt pulping.

Meanwhile, sawn timber continued to be the main wood use. By the late 1940s and early 1950s, foresters were envisaging an 'ultimate' Australian population of 20 million people requiring an estimated seven million m^3 of sawn timber per annum.[23] This was about 60 per cent greater than the estimated sustainable supply that could be derived from native forests (Cromer 1951, p. 134). Softwood continued to meet half the consumption, and foresters had no doubt that much greater quantities of softwood would be consumed if available (Cromer 1951, p. 134). Softwood tree cropping, pioneered in wood-scarce South Australia, became a post-war priority for other Australian states, in addition to raising the use and productivity of existing native forest stands. Australia's softwood plantation estate increased by an average 6 per cent per annum from 1946 to 1959 (Forestry and Timber Bureau 1969, p. 143; figure 3.1).

Despite this high planting rate, state agency plantation targets remained a long way from being realised as the 1950s drew to a close. Victoria entered the 1960s with a softwood plantation estate not quite meeting half the 80 000 hectare target set in the mid 1920s (Carron 1985, pp. 184-5). New South Wales' 200 000 hectare target, set by Jolly also in the 1920s (Carron 1985, p. 12), was only 18 per cent realised by 1959. By the end of the 1950s, Western Australia still had nearly 70 000 hectares of their 80 000 hectare target set in 1949 (Carron 1985, p. 163) to plant. In 1939, Tasmania set a target of establishing 8 000 hectares within 80 kilometres of a major industrial centre or port (Carron 1985, p. 89). This area was nearly achieved by 1959 but not within the specified radius from the market. By 1959, Queensland was nearing the halfway mark for its 81 000 hectare target established in 1950 (Gair 1951).

This planting underachievement was taken up by the Commonwealth Forestry Bureau, but not before an extension to its powers marked by its renaming as the Commonwealth Forestry and Timber Bureau in 1946 (table 2.1; chapter 3).

The Bureau restored the Interstate Forestry Conferences, breaking their 25-year absence by hosting the eighth conference in Perth in December 1949. The conference concluded that Australia's future wood requirements could not be met without the establishment of large areas of softwood plantations, that the then rate of planting was inadequate, that growing 'utility' softwoods in plantations was economically proven and that exotic softwoods could grow better than native species on some lands. The conference recommended an investigation of suitable sites for economic softwood 'afforestation' and the development of a coordinated plan for accelerated softwood planting (Forestry and Timber Bureau 1949).[24]

In January 1951, Arthur Fadden, Australia's Acting Prime Minster wrote to each of the State Premiers enclosing a copy of the resolutions from the 1949 Australian Forestry Conference. He informed the Premiers that the Federal Government would develop the

[23] The population expectation proved realistic for 2000 but the consumption projection exceeded Australia's actual consumption in 1999/2000 by 46 per cent.

[24] The conference also made recommendations regarding native forests: namely reserving more for wood production, increasing funds for their management, and enhancing fire control (Forestry and Timber Bureau 1949).

Forestry and Timber Bureau to enable it to undertake the information and research tasks required to implement the recommendations. Fadden also advised that the Federal Government was investigating additional resources for fire control, forestry education and future conferences. Before closing, he requested the Premiers to advise him '*as to the extent to which your Government would be prepared to implement the recommendations of the Conference*' (Fadden 1951). Notably the Federal Government was not offering resources to assist in the softwood planting - the reason for the under-planting.

The State Premiers responded to what they perceived as a challenge to their commitment and states rights. Their 'keep out' message to the Prime Minister was clear. Individually, they advised the Prime Minister of their awareness of the softwood planting imperative. Some State Premiers boasted about their planting achievements. None expressed a desire for Federal Government funding. Premier Playford of South Australia understandably stated that the recommendation applied to other states and that the state provided adequate funds for softwood planting (Playford 1951). Tasmania's Premier advised that his Government agreed with accelerating softwood planting, that the planting rate had doubled in the previous three years and that funds were being made available as far as the State's financial resources would permit (Cosgrove 1951). The Western Australian Premier assured the Prime Minister that his Government was '*seized with the importance*' of extending its softwood plantations and that loans had been provided to enable this (McLarty 1951). Vince Gair, Premier of Queensland, informed the Prime Minister that '*The softwood planting programme is the work of highest priority in Queensland and no other State has planted as great a softwood area since the war as this State.*' He advised that labour shortage, not finance, was the constraint (Gair 1951). McDonald, Premier of Victoria, recognised that the softwood resources of the State were inadequate and advised that the planting program had not been implemented because of labour shortages (McDonald 1951). The Premier of New South Wales advised that extensive surveys of areas suitable for planting to softwoods had been undertaken and that planting will continue as '*facilities permit*' (McGirr 1952).

The Federal Government took heed of the Premiers' states' rights message and left them alone. Foresters and industry became increasingly dissatisfied about the states' softwood planting over the 1950s. They felt that funding was the main constraint.

Chapter 3

Federal Government funding for softwood plantations

3.1 Introduction

In 1966, the Federal Government decided to finance a major acceleration in softwood planting in Australia. A year later, the policy received bipartisan support with the enabling legislation, the *Softwood Forestry Agreements Act 1967*, warmly welcomed by the parliamentary opposition party. The State Governments agreed to expand their softwood planting according to an agreed schedule, and the Federal Government agreed to finance the additional area planted over and above the status quo planting. The financial assistance took the form of 35-year loans with interest and repayment deferred for the first ten years. Interest, which for most states was not capitalised over this ten-year period, was set at the rate the Federal Government paid on long-term loans raised through public subscription.

This was a landmark policy for Australian forestry, and the factors leading up to it will be described in this chapter. The Federal Government had forcefully entered the Australian wood production arena - traditionally viewed as a state responsibility - to generate a substantial wood supply increase over the long term. Past Federal Government financial assistance to the states for forestry was short term and targeted primarily towards unemployment relief (Anon 1936b, pp. 2-3; Carron 1985).

The historical dominance of the public sector in wood supply (chapter 2) was further entrenched by the decision. As the Federal Government's funding intent became clear, more players asked why the assistance could not be used to encourage the private sector to undertake the planting. The conservative Menzies Liberal-Country Party Coalition Government surprisingly did not take the opportunity to facilitate a greater role for the private sector in Australia's wood production. Instead, the increased role of the private sector in wood supply came about through the states variously leasing public land and providing funding assistance to private plantation growers, and the later privatisation by some states of the plantations established under the *Softwood Forestry Agreements Acts*. In more recent years, the Federal Government has played a greater facilitatory role in private plantation establishment (chapters 4 and 6).

The softwood plantation agreements generated a four-fold increase in Australia's softwood planting (chapter 4). The planting, much of it undertaken by clearing native forested land, triggered an environmental backlash that, combined with the introduction of the exporting of native forest woodchips, launched Australia into three decades of forest conflict. During this time the softwood plantations were constantly building Australia's wood inventory, reaching maturity around 30-35 years after planting. The increased wood supply from plantation thinning and final harvesting of the first rotation

crop has generated major structural change in the industry (chapter 5) and presented new opportunities for industry development and native forest conservation in Australia (chapter 7).

The policy embodied in the *Softwood Forestry Agreements Acts* was intertwined with the formation of the Australian Forestry Council (AFC). The Federal Government's announcement of the AFC triggered a lengthy states rights battle, which was ultimately resolved with the states' recognising the power of the Federal Government to affect industry development and expectation of financial assistance for softwood planting.

The Federal Government's softwood plantation funding decision has received scant attention despite the wide policy implications it has for wood supply today. Jacobs, the most influential Federal Government forestry bureaucrat at the time, in his paper *The establishment of the Australian Forestry Council*, described the events leading to the establishment of the AFC. He considered the development to be an 'exchange of views' in the early 1960s between the Federal and State Governments on ways to improve consultation on wood and wood products industry policy (Jacobs 1965b, p. 92). Rule,[25] writing at the time of the negotiations and substantially about the softwood sector, provided no account of the background leading to the establishment of the AFC other than a reference to '*the persistent spadework beforehand by the Minister for National Development, the Hon. Gordon Freeth.*' (Rule 1967, p. 81). Routley & Routley (1974), who argued against the softwood program, focussed on critiquing the information and arguments used to support the program and the foresters' wood production ethic - not on the policy process. Carron, a colleague of Jacobs, provided a brief description of the formation of the Australian Forestry Council and a slightly more detailed description of the process leading to the softwood forestry agreements as part of his wider history of forestry in Australia (Carron, 1985, pp. 304-9). Dargavel (1995) wrote of the increasing concerns about a wood shortage in Australia leading to the formation of the AFC, which '*advocated more pine plantations with a will*' (Dargavel 1995, pp. 76-7).

The confidentiality surrounding virtually all of the Federal Government documents relating to the policy (see Jacobs 1964e) only partly explains the dearth of historical writing. The foresters, as engaged proponents, held detailed knowledge of the policy process. Perhaps the absence of a detailed history of the events is connected to the observation I made in chapter 2 that plantations, as an agricultural wood production system, have been substantially written out of Australia's forest history.

The aim of this chapter is to describe the policy process culminating in the crucial *Softwood Forestry Agreements Act 1967*. The absence of a detailed historical account of the funding decision diminishes our capacity to understand current Australian wood industry and forest issues. My reconstruction of the events draws substantially on Federal Government files from the Australian National Archives opened under the 30-year rule just in time for this thesis. The files contain a detailed record of the information used in the policy process, the events and the debates. The players include

[25] A. Rule was one of the first lecturers at the Australian Forestry School when it opened in Canberra in 1927 (Carron 1985, p. 264).

Prime Ministers, Premiers, State and Federal Ministers, Federal Government Departmental Secretaries, officers in the Forestry and Timber Bureau and the Federal Departments of Treasury and Trade, heads of the state forest agencies and those outside government such as the Commonwealth Scientific and Industrial Organisation (CSIRO) and industry.

In addition to the correspondence between these players, the files contain the cabinet submissions, briefings and decisions; the information used to analyse the economic viability of the softwood planting program; Hansard reporting of the first AFC meeting; and the background papers and minutes of the Standing Committee of the AFC. These documents, together with Hansard records of parliamentary debates and information from published sources, have been used to reconstruct the process leading to the Federal Government's decision to finance the acceleration of softwood planting in Australia. Despite the comprehensiveness of the documents, gaps from the non-recording of events and communications are inevitable.

3.2 Announcing the Australian Forestry Council

A national forestry council was discussed in forestry circles soon after Federation (chapter 2), but the idea lay dormant until momentum for a national forest policy was regained in the late 1950s. The states were originally not particularly enthusiastic about the idea of a council and Victoria, with its forceful state and rural rights Premier, Henry Bolte, strongly objected to it. During Bolte's three-year resistance, the nature and membership of the council was changed to meet substantially Bolte's demands and softwood planting put on the top of the Council's agenda. This section describes the events leading to the first of what was to become three Federal Government announcements on the formation of the AFC.

The seventh British Commonwealth Forestry Conference held in Australia and New Zealand in 1957 encouraged Australia to expand its forestry research effort, recommending a central research institute within the Forestry and Timber Bureau and a co-ordinating advisory committee with representatives from the federal and state forest agencies, the CSIRO and other scientists (Anon. 1957, p. 66). The advisory committee recommendation was the genesis of the AFC. The British Commonwealth Forestry Conference considered that for some issues, namely forestry finance and softwood planting programs, policy should be left to the individual country.

The IFA addressed these policy issues at their 1958 national conference. Kessell, by then Managing Director of Australian Newsprint Mills, presented a paper based on an earlier one he delivered to the seventh British Commonwealth Forestry Conference (Kessell 1957) tackling the problem of fluctuating public funding for softwood plantation establishment. Kessell recommended a stabilisation fund to provide temporary assistance to State Governments funded by Federal Government revenue from tariffs on wood products (Kessell 1958). The IFA Council endorsed the proposal

that was later worked into a document by A.G. Hanson[26] and A.J. Leslie,[27] members of the Institute's Victorian Division. The proposal was submitted to the Tariff Board inquiry into the timber industry held later that year but action on it was overtaken by events (Carron 1962). The Institute's position, established in 1958, was that Federal Government funding was required to increase softwood planting for national self-sufficiency in wood products.

Another of the Institute's 1958 conference resolutions was to send a delegation of three IFA Council Members (S.G. Jennings, President of the Institute, W.G. Chandler and K.P. McGrath, Principal of the Australian Forestry School) to meet with the Prime Minister. For many years, foresters had spoken of the need for a greater national focus on forestry (chapter 2). The imperative increased because the Federal Government had retained its wartime power to impose income tax, fundamentally shifting the power for financing.

The Prime Ministerial meeting took place on 4 August 1959 (Anon. 1959), well into Menzies' second decade as Prime Minister. His first decade was comparatively easy with a booming post-war economy further stimulated by post-war immigration. Economic policy was dominated by the loosening of wartime Government controls and extended to privatising Government equity in operations such as oil refining, radio broadcasting, manufacturing and whaling (Whitington & Chalmers 1971, p. 192). By the mid 1950s, the Australian economy was faltering, with prices for primary products collapsing after the end of the Korean War and unemployment increasing. This was Menzies' time for projects of national development and employment generation. The Snowy Mountains scheme, an initiative of the Chifley Labor Government, symbolised this national development. Softwood planting for national self-sufficiency slotted easily into this 'big government' policy framework.

The Institute's delegation pitched their message astutely, placing forestry as fundamental to the realisation of the Federal Government's national development plans. The softwood planting program was presented as the most practical way to meet Australia's future wood requirements. The delegation reported that Menzies accepted that there was a case for examination and that the matter would receive his active consideration. Menzies cautioned though, indicating something of the political and constitutional difficulties that confronted Federal Government action - even on the matter of the Institute's request for an inquiry into Australia's potential to meet its wood needs (Anon. 1959, p. 1).

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[26] Hanson was Officer in Charge of the Division of Timber Supply Economics, Forestry and Timber Bureau. As discussed later, Hanson's projections of Australia's wood consumption underpinned the three million acre softwood plantation target. Hanson was well qualified for the job, having a Bachelor of Science, Bachelor of Commerce and a Diploma of Forestry.

[27] Alf Leslie graduated from the School of Forestry, Creswick and University of Melbourne in 1941, and worked for the Victorian Forests Commission and APM Forests before becoming a lecturer at the University of Melbourne in 1958. He taught at the University of Ibadan in 1962-64, was a Reader at the School of Forestry University of Canterbury 1974-77, and worked for the United Nations Food and Agricultural Organisation, becoming Director of the Forest Industries Division of the FAO in 1981 (Ferguson & Youl 1997).

The Federal Government proceeded cautiously, using the resolutions of the 1957 British Commonwealth Forestry Conference to establish the institutional framework to co-ordinate policy between the Federal and State Governments and to involve industry. The measures were announced by Gordon Freeth, Minister for the Interior and responsible for the Forestry and Timber Bureau, in the House of Representatives on 18 April 1961. The research functions of the Forestry and Timber Bureau were to be extended by establishing a Forest Research Institute as a division of the Bureau. The Minister also announced the AFC to serve as a national forest advisory body and mechanism to co-ordinate the Bureau's work with that of the state forest agencies, the CSIRO, universities and the industry. The Minister advised that the AFC membership would comprise representatives of the state and territory forest agencies, the CSIRO, the universities and, 'if considered desirable', other appropriate organisations. The industry sectors to be represented were not specified. Carron (1985, p. 304) writes that the IFA and the private plantation growers were hopeful of being represented. A likely candidate was W.G. Chandler, Managing Director APM Forests, IFA Councilor and a member of the delegation to the Prime Minister.

The key forestry task identified by Freeth was to bring Australia's forest estate to a condition of maximum productivity by reducing the lost economic opportunities in native forests due to disease, fire and insect attack (Freeth 1961). There was no mention of expanding Australia's softwood plantation estate or of Federal Government funding.

Freeth's announcement triggered the states' rights battle that Menzies predicted. During the three years it took to resolve the dispute, the function of the AFC shifted from being a co-ordinating mechanism for forest research to advocating a major acceleration in softwood planting in Australia with Federal Government funding - the policy established by the Institute of Foresters in 1958.

3.3 Establishing the Australian Forestry Council

Max Jacobs

In December 1959, M.R. (Max) Jacobs[28] became Director-General of the Forestry and Timber Bureau and therefore the key Federal Government forestry bureaucrat involved in the negotiations over the formation of the Australian Forestry Council (AFC) and the framing of the *Softwood Forestry Agreements Act 1967*. Jacobs had a significant forestry research background covering both pines and eucalypts. He published papers on growth stresses in trees (particularly eucalypts), the effects of wind on tree growth, (particularly pines), radiata pine propagation, and eucalypts in world forestry (Jacobs 1935, 1936, 1937a, 1937b, 1938a, 1938b, 1939a, 1939b, 1939c, 1945, 1955). He was responsible for meeting the 1960 United Nations Food and Agricultural Organisation

[28] Jacobs, born in Adelaide in 1905, was trained in forestry with postgraduate studies at Oxford, Germany and the United States. He was previously Chief Forester of the Federal Capital Territory, Lecturer at the Australian Forestry School, Research Officer at the Commonwealth Forestry Bureau and Principal of the Australian Forestry School (Meyer 1985, p. 60). Jacobs became acting Director-General of the Forestry and Timber Bureau on 9 December 1959, and was permanently appointed in 1961.

request for help in establishing eucalypt plantations in other countries, organising the collection and despatch of seed (Meyer 1985, p. 69). Jacobs worked with Kessell and other foresters to establish the Institute of Foresters of Australia. He negotiated the Institute's initial constitution and early changes through the Attorney-General's Department (Jacobs 1960). Jacobs was an inaugural Councillor and member of the three person editorial committee responsible for the production of the Institute's journal *Australian Forestry* (Meyer 1985, p. 64). Jacobs remained a member of the Institute but held no official position whilst Director General of the Forestry and Timber Bureau.

The Institute was pleased with Jacobs' appointment as Director-General, foreseeing the establishment of the AFC and hopeful of the Institute's representation on the Council (Anon. 1961). Meyer (1985, p. 61) observed that, in forestry circles, Jacobs is remembered '*with affection and respect by those he taught and those he worked with.*' To others, Jacobs is remembered as a key architect of the softwood planting acceleration with its destruction of native forests (see for example Routley & Routley 1974). Jacobs retired as Director-General in 1970, ending 44 years of Government employment in forestry education and as a public servant. He subsequently worked for the FAO and the World Bank and as an industry consultant in Australia, maintaining his long held view that there should be a closer association between foresters and companies using the public wood resource. Jacobs died on 9 October 1979. Carron recalled that it rained on his funeral:

> ' "Never mind," I could hear him say, "It's good radiata weather".' (as quoted in Meyer 1985, p. 70).

Some writers present Jacobs as a forest hero, identifying his skills as crucial for the softwood planting policy (Meyer 1985; Carron 1985). Hasluck holds great reservations about the role of 'great men' in history. He argued that a complex of causes produces most situations facing government and a complex of forces shapes most of the decisions made and actions taken (Hasluck 1997, p. 51). Jacobs, by virtue of his position, skills, experience and commitment, played a crucial role in 1960s forest policy, but the policy was also the outcome of the larger causes and forces to which Hasluck refers.

States' rights

Premier Bolte was in no hurry to respond to Freeth's announcement. Seven months elapsed before he wrote to Menzies arguing that forestry was a state matter involving state land over which individual states held sovereign rights (Bolte 1961). Bolte was concerned that the composition of the Council would see the states *'completely overwhelmed'* by a large number of people unfamiliar with the problems of forest administration. His concern reflected, at least in part, the Victorian foresters' centralisation fears displayed in the Creswick/Australian Forestry School rivalry. Bolte did not reject the AFC outright but recommended an alternative membership modeled on the Australian Agricultural Council with a council of forestry ministers meeting annually and permanent heads of the State and Federal Government forest agencies meeting as a standing committee. The irony of Bolte's proposal is clear for those

perceiving plantation 'forestry' as agriculture. The Australian Agricultural Council was established in 1934 and excluded forestry from its definition of primary production (Carron 1985, p. 305). Foresters at the time also supported such a separation.

Menzies replied, not disagreeing with Bolte, but arguing that his proposal should not replace the AFC, which was intended as a consultative body between forest agencies, industry and related interests (Menzies 1962). Bolte countered, presenting additional arguments, namely the lack of clarification of the functions of the AFC and the existence of the Australian Timber Industries Stabilisation Conference, which acted as a consultative medium (Bolte 1962). Further written exchanges occurred. The Forestry and Timber Bureau, through the Department of the Interior, maintained its advice to the Prime Minister's Department that the AFC should not be replaced by Bolte's proposal because it would exclude industry representation. McLaren, Secretary of the Department of the Interior, argued:

> '*There is a fundamental difference between Australian agriculture and Australian forestry. Agriculture is essentially carried out by very large numbers of private individuals who form a group of considerable political significance. The industries based on agriculture are also mainly private concerns. On the other hand, in the case of the timber industry the State Forest Services are in complete control of log supplies from Crown forests, whereas the industries based on forest products are mainly privately owned. There tends to be a monopoly by the Crown on raw materials. The industries based on forest products complain that they do not have reasonable representation in the policy-making field connected with their raw materials. The proposed Forestry Council with the membership suggested by the Minister has been warmly supported by all manufacturing sections of the timber industry – particularly Victorian industry.*' (McLaren 1962).

The Forestry and Timber Bureau chose not to present the option to (a Liberal-Country Party) Government of facilitating a wood and wood products industry structure more in line with agriculture or advocating plantation establishment as a private sector responsibility.

The Bureau lost the argument about industry representation on the AFC. In a letter prepared for Menzies' signature, but signed by the Acting Prime Minister, Bolte was advised on 21 December 1962 that the Federal Government accepted his proposal to establish the AFC along the lines of the Australian Agricultural Council with state and Federal Ministers supported by a Standing Committee. It was noted that the Standing Committee for Agriculture comprised the heads of the State Agricultural Departments, Federal Government representatives from the Departments of Primary Industry, Territories, Health, the Treasury and Trade and the CSIRO (Gorton 1962a). Bolte had successfully removed direct industry representation on the AFC[29] but refused to sign

[29] The door was kept open to non-government interests through the Standing Committee to the AFC comprising the heads of the state forest agencies and the CSIRO. The Standing Committee could

Victoria onto the Council because of the dominance of Federal Government representation.

The Prime Minister suggested a meeting of State and Federal Government Forestry Ministers early in the New Year (Gorton 1962a, 1962b). At this meeting, held in Melbourne on 13 February 1963, the Ministers approved without amendment the functions of the AFC as proposed by Freeth. The broadly based functions were prepared by Jacobs and approved by Freeth on 31 January 1963 (approval signed on Jacobs 1963a). The functions were subsequently adopted with minor amendment by the AFC at its first formal meeting in August 1964.

The functions of the AFC were:

- To promote the welfare and development of Australian forestry.
- To arrange mutual exchange of information regarding the production and utilisation of forest products.
- To ensure the maintenance and improvement of the quality of forest products and the maintenance of high-grade standards.
- To formulate and recommend a national forestry policy for Australia directed in particular to the development of Australian forests to meet the national requirements for timber and forest products, both for domestic use and export.
- To promote and co-ordinate research into problems affecting the establishment, development and management of forests and the utilisation of forest products.
- To examine methods of obtaining adequate finance for the development of forests.
- To consider matters submitted to the Council by the Standing Committee on Forestry (Freeth 1963a).

Freeth's second statement announcing the formation of the Council advised that, subject to State Government agreement, the AFC would comprise the three Federal Government Ministers - for the Interior (Chair), Territories and Trade - and the State Ministers responsible for forests (Freeth 1963a). This was a substantial reduction in Federal Government ministerial representation proposed by the Acting Prime Minister in December 1962. The Victorian Government remained antagonistic. Victoria's Minister for Forests, Lindsay Thompson, echoed his Premier's opposition to the Federal Government having three representatives on the Council (Anon. 1963). Premier Bolte did not sign Victoria onto the AFC until 16 months later. In the intervening period a series of events laid the groundwork for the AFC becoming the institution promoting an expansion in public softwood plantations with Federal Government funding.

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establish technical committees, thus enabling input from non-government interests. Jacobs had in mind here committees on trade and research (Jacobs 1963a).

Australia-New Zealand free trade proposal

The State Governments initially appeared unconcerned about the slow progress in establishing the AFC. They were not the promoters of the institution and there was no talk of financial sweeteners for accelerating softwood planting from the Federal Government at this stage. Their lack of interest quickly dissipated with the announced negotiations between Australia and New Zealand for a free trade area in wood products. John McEwan and John Marshall, Trade Ministers for Australia and New Zealand respectively, met to discuss the issue in Wellington, New Zealand in April 1963. New Zealand was seeking increased economic and employment opportunities through exporting. John McEwan was sympathetic to the New Zealand situation, recognising that New Zealand would need considerable assistance if Britain abandoned it to gain membership to the European Economic Community (Whitington & Chalmers 1971, p. 202). Trade liberalisation in either wood or dairy products was understood to have the potential to meet substantially New Zealand's concerns. McEwan, as Leader of the Country Party, opposed dairy product market liberalisation. This left the focus on wood and wood products - not then part of the primary industries club. New Zealand had targeted the wood and wood products industry for substantial export-oriented expansion. By 1961, Alex Entrican, the soon-to-retire Director of the New Zealand Forest Service, was promoting the concept of New Zealand being a net exporter of wood and wood products as an aim in its own right rather than as a convenient outlet for surplus wood (Kirkland & Berg 1997, p. 89). A few years earlier the New Zealand Government had signed an agreement with Tasman Pulp and Paper committing the Government to long-term wood supply under commercially favourable conditions, equity participation and substantial supporting infrastructure (Kirkland & Berg 1997, pp. 80-6).

The Trade Ministers agreed to establish a Joint Standing Committee to investigate trade between the two countries. Because Australia was a signatory to the General Agreement on Tariffs and Trade (GATT), a free trade agreement limited to wood products was not possible - GATT stipulates that when two countries enter into a free trade agreement, substantially all the trade should be free. The foresters, not apparently understanding this point, were concerned that the burden of an agreement would fall substantially on the Australian wood and wood products industry. The foresters were also unclear about which wood products were already traded duty free.

The Australian and New Zealand Minister's joint statement issued on 11 April 1963 announcing the decision to pursue negotiations triggered alarm bells in State and Federal Government forest agencies. Softwood planting by the Australian states was growing strongly in this post-war period (figure 3.1; table 3.1) and the heads of the state forest agencies were concerned that free trade would imperil the profitability of Australia's processing industry and flow back to undermine the softwood planting program. They prepared a statement advising their respective Governments to protect the Australian industry in the proposed free trade negotiations (Heads of Forest Services 1963). The statement stimulated the State Premiers to write to the Prime Minister regarding an early meeting of the AFC to consider the proposed Free Trade Agreement (Freeth 1963b).

Table 3.1 Softwood plantations - Australia and New Zealand (000 hectares) for selected years. Source: Gray (1935); Forestry and Timber Bureau (1969); Forestry and Timber Bureau, Annual Reports for various years; Department of Primary Industries (1981); Australian Bureau of Agricultural and Resource Economics (1992); Wood et al. (2001); New Zealand Ministry of Forestry (1995); New Zealand Ministry of Agriculture and Forestry (2001b).

Planted area as at	NSW	Vic	Qld	SA	WA	Tas	ACT	NT	Aust	NZ[a]
1920								-	1	77[b]
1939	18	17	8	37	5	1	5	-	97[d]	329[c]
1946	12	15	12	42	5	1	5	-	94[e]	332
1963	44	47	44	63	15	10	10	.1	233	372
1970	81	89	80	82	28	23	12	1	396	465
1980	174	162	157	95	60	52	14	4	718	846
1990	252	210	190	98	85	72	15	4	926	1 261
2000	270	215	179	114	98	76	15	5	972	1 769

a. Includes hardwood plantations, which accounted for 3 per cent of the plantation estate in 2000.
b. Estate area as at 1921.
c. Estate area as at 1936.
d. Includes private plantings of unspecified location.
e. Includes private plantings unspecified for all states other than South Australia.

At the same time that the Federal Government announced the trade negotiations, Jacobs addressed the fifth Australian Timber Congress in Adelaide and proposed that Australia establish a three million acre (1.2 million hectare) softwood plantation estate (Jacobs 1963c). Proponents of this bold initiative, discussed in detail below, perceived the proposed Free Trade Agreement as a serious threat. If New Zealand could or wanted (by planting more softwood) to meet Australia's softwood needs, why should Australia embark on a major planting program? However, the announced negotiations worked to the advantage of proponents of an expanded softwood plantation estate, because they elevated softwood plantations and the goal of expanding the estate from relative obscurity to the attention of the highest levels of government across Australia. New Zealand's desire to expand its softwood plantings to meet Australia's future needs, particularly for pulp and paper, supported the Australian foresters' case that the future domestic market demanded a larger softwood planting program. The free trade negotiations shone the spotlight on the manufacturing that would be lost if Australia were to let New Zealand undertake the planting.

The free trade negotiations proceeded slowly, nearly breaking down and delayed by the December 1963 federal election. Post-election reshuffling saw the Forestry and Timber Bureau moved to William Spooner's[30] Department of National Development. The Department was under constant threat of being absorbed by the Trade Department with McEwan believing that National Development was incapable of dealing with tough international negotiations over resources.[31] These inter-departmental tensions

[30] Menzies appointed Spooner to Cabinet during World War II as part of an unsuccessful attempt to prevent his government disintegrating. Spooner was one of the most virulent party critics of Menzies (Whitington & Chalmers 1971, p. 49).

[31] McEwan was angered by the Australian contracts for supplying iron ore to Japan at bargain rates. He persuaded Cabinet to use export controls to prohibit exporting at low prices. McEwan blamed Spooner for allowing nearly all the major mineral contracts with Japan to be signed fob - that allowed the Japanese to monopolise iron ore shipments since the seller's price was only to get the ore to the ship. The cost of shipping ore to Japan was close to the cost of ore itself - i.e. Australia was missing out on the

contributed to the Department of Trade's reticence to share information with the Department of National Development and intensified Jacobs' suspicions about the intent of the free trade negotiations.

Spooner met with the state Forestry Ministers on 12 April 1964. The states expressed their concerns about the free trade negotiations. Spooner thought that '*there was a good deal of loose talk*' from the states but knew the issue had to be handled carefully. He asked his Department to prepare a letter to McEwan recording the state's request to be consulted before any agreement was completed (Spooner 1964). Spooner's letter initiated a meeting of the heads of the state forest agencies with representatives from the Prime Minister's Department and the Department of Trade. The Department of Trade originally proposed that each state meet separately with them and the Prime Minister's Department initially agreed. Jacobs was the most likely instigator of the changed arrangements (Jacobs 1964b). Jacobs understood the meeting's importance for the softwood planting program and wrote to each of the heads of the state forest agencies advising them of the points made in a letter from his Minister to the Prime Minister. Jacobs was aware that this might not be proper conduct for a Federal Government public servant, writing:

> '*Please use this with discretion, but with the knowledge that any point used by my Minister which your state may wish to stress is now known to be a point which should be considered at senior level by the Commonwealth Government.*' (Jacobs 1964b).

Jacobs knew from his discussions with the Prime Minister's Department which arguments would strike a sympathetic response. The consultative meeting, held in Canberra on 29 May 1964, did not satisfy the state forest agencies. They were unable to establish how a free trade agreement would affect the Australian wood products industry. The forest agency's dissatisfaction was conveyed back to the State Premiers who renewed their calls to the Prime Minister for an early meeting of the AFC.

States' rights resolved

The threat overhanging state based manufacturing from a possible Free Trade Agreement with New Zealand elevated the formation of the AFC to highest priority status. This meant meeting Bolte's outstanding objections. Menzies had earlier established that McEwan, as Minister for Trade, did not wish to be a member of the AFC (Jacobs 1964a). This paved the way for limiting the Federal Government's representation on the Council to two; namely the Minister for National Development and the Minister for the Interior representing forestry in the Territories.

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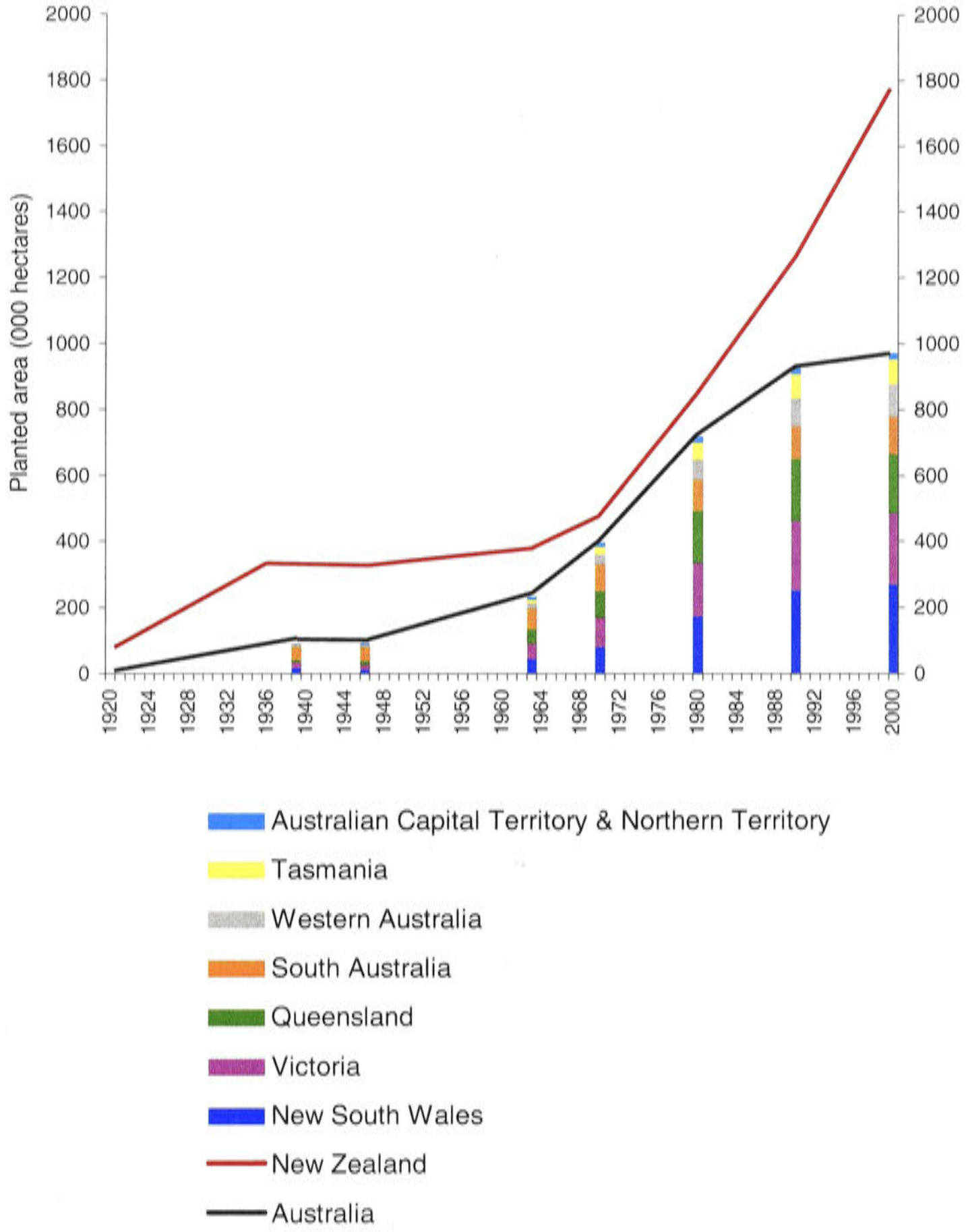
shipping business. McEwan tried to recoup some of this business, but failed because of the weakness of the mineral contract (Whitington & Chalmers 1971, p 133). The experience was repeated in the early 1970s when Australia commenced exporting woodchips to Japan.

Figure 3.1 Softwood plantation establishment in Australian States/Territories and New Zealand for selected years. New Zealand plantings include small areas of hardwood plantations. Source: Table 3.1.



Spooner's meeting with the state forestry ministers on 12 April 1964 put further pressure on Victoria. By now a major softwood planting program with Federal Government funding was in the wind (Spooner 1964) with the AFC as the facilitating institution. Spooner reported after the meeting to his Departmental Secretary:

> '*Victoria said it was averse to more than one Commonwealth Minister. This was unpopular with the other States who wanted to get on with the job. I just said that Victoria was not facing the facts of life if it thought that the Commonwealth would agree to any scheme which did not provide for representation of the Minister for the Territories and let it go at that. I fancy that my statement may cause Thompson to bring the matter to finality in Victoria.*' (Spooner 1964).

Spooner's reference to a 'scheme' appears to be the softwood plantation expansion program that, as discussed below, was spoken about at the meeting. Menzies wrote to Bolte three days after Spooner's meeting with the State Ministers advising him that the Minister for Trade would not be a member of the AFC thereby limiting the Federal Government's representation to two ministers. He trusted that the Premier may now be able to agree and that the Government could proceed with establishing the AFC (Menzies 1964a). A corresponding letter was sent to the other Premiers (Menzies 1964b), who quickly reconfirmed their agreement. Bolte replied on 5 June 1964, concurring with the Prime Minister's latest suggestion:

> '*...in order to enable the AFC to proceed',* [but maintained his view that] *'it is not proper that the Commonwealth should have double the representation of any one state on a council dealing with a state responsibility.*' (Bolte 1964).

Bolte had effectively achieved his original desire to exclude industry and minimise Federal Government representation on the AFC so as to retain the maximum power for the states. McEwan, as Acting Prime Minister, advised the State Premiers that the AFC would be formed, leaving Menzies to make the third and final announcement to the press on 23 July 1964 (Australian Forestry Council 1964, p. 8).

Differences in forestry policy may also have contributed to Victoria's intransigence. Lindsay Thompson, Victoria's Forest Minister, hinted this at the first AFC meeting in his response to the Chair's opening remarks saying:

> '*As representative of the State that perhaps proved to be the hardwood stumbling block...*' (Australian Forestry Council 1964, p. 6).

A.O. Lawrence, the Chair of the Victorian Forest Commission, was particularly interested in the 'wise use' and development of the state's forest resources (Carron 1985, p. 186) i.e. multiple use of native forests for wood and water. The Victorian Government had invested relatively little in softwood plantations, leaving the task to the private sector, notably APM Forests. Victoria had the largest softwood plantation

area of all the states in 1964, however in contrast to all other states, the private sector was the lead planter (table 3.2).

The Victorian Government encouraged private sector planting through the Victorian *Lands (Plantation Areas) Act 1959* that provided 60-year leases over Crown lands at low rental for tree planting and ultimate free holding. Additional land was leased to APM under the *Forests (Wood Pulp) Agreement Act 1961* (Chandler 1963, p. 5). Victoria was also developing financial incentives for small landowners to establish plantations, providing loans with interest payments deferred until income started flowing from the planting.

Table 3.2 Public and private softwood plantation area by Australian State and Territory in 1964. Source: Forestry and Timber Bureau (1969, p. 143).

	Public plantation area (hectares)	Private plantation area (hectares)	Private plantation area as per cent of total softwood plantation area (%)
NSW	98 759	18 099	15.5
Vic	54 486	71 674	56.8
Qld	106 119	9 800	8.5
SA	122 608	41 104	25.1
WA	38 918	1 370	3.4
Tas	18 348	7 108	27.9
ACT	26 368	100	0.4
NT	376	50	11.7
Aust	465 982	149 305	24.3

3.4 The softwood planting target

The first meeting of the AFC was held on 21 August 1964, only a month after the Prime Minister's announcement. The two main agenda items were a briefing on the proposed Free Trade Agreement by McEwan and the softwood planting program with Jacobs presenting the Standing Committee's proposal to increase the national planting rate to 75 000 acres per annum (Australian Forestry Council 1964, p. 35). The meeting did not actually pass a resolution agreeing to this planting rate. The verbatim Hansard recording of the meeting indicates that poor chairing by David Fairbairn (Minister for National Development after Spooner's retirement on 14 July 1965) and inadequate preparatory briefing of state forestry Ministers led to the lack of resolution over the planting target. The matter was rectified at the second AFC meeting with a national target for the softwood plantation estate set at three million acres to be achieved by planting 75 000 acres per annum for 35 years.

The aim of this section is to establish how the three million acre target was derived.

Self-sufficiency goal

Self-sufficiency had been at the centre of Australia's forest policy since the early 20th century (Leslie 1963; Carron 1980; chapter 2). The rational for self-sufficiency has been debated (Carron 1980, Board of Inquiry into the Timber Industry in Victoria

1985) and loose definitions have enabled a pragmatic muddling through from a public policy perspective. Fielding (1962) argued that Australian foresters should maintain the ideal of virtual self-sufficiency in wood, noting that its achievement would increase the value and importance of their industry and the esteem of foresters. He considered that:

> [Foresters] '*could no longer be regarded as unique in being responsible for the production of a crop which can be grown successfully in Australia, but which nevertheless is imported on a large scale.*' (Fielding 1962, p. 123).

For Australia, with its relative abundance of land and small population, self-sufficiency in wood is a readily achievable goal. When achieved, a policy of self-sufficiency means that future growth in the industry will be constrained mainly to population growth. Jacobs recognised the constraining nature of self-sufficiency and broadened the concept to meeting '*the national requirement for timber and forest products, both for domestic use and export.*' (see earlier discussion on the functions of the AFC).

Carron (1980) observed that in Australia self-sufficiency in wood has been largely about replacing imported softwood sawn timber with domestic production. This is a critical understanding. The softwood planting program was promoted as aiming for self-sufficiency through replacing softwood imports. This emphasis worked to smooth over fears that native forest hardwoods would play a diminished role in the market. I found no recorded discussion in forestry circles about the potential for a large softwood plantation program to also displace native forest hardwood sawn timber. It was widely understood that softwood and hardwood were substitutable in many sawn timber applications (chapter 2). I will return to this point in later chapters.

The first task in planning for self-sufficiency is to estimate the nation's future wood requirements. The wood deficit is then calculated as the difference between projected consumption and expected production from native forests and existing plantations. Planting targets can then be calculated making assumptions about plantation productivity, log grade yields and rotation time.

Consumption projections

The Interstate Forestry Conferences had urged the Forestry and Timber Bureau to produce periodical estimates of Australia's future wood requirements. The difficulty of the task was well recognised. Rodger reported in 1953 that the Bureau had not yet succeeded in producing reliable estimates (Leslie 1963, p. 3). Generating reliable consumption projections is not exclusively a wood and wood products industry problem. Nor is it a technical problem of modeling capability or a problem due to inadequate time series data. Global wood consumption projections prepared by the Food and Agricultural Organisation (FAO) of the United Nations are noted for their unreliability despite the use of relatively complex models, a detailed information base and long runs of time series data (Leslie 1997; Clark 2001a). Capturing the effects of technological development through new products and processes has always been challenging. The poor modelling (or exclusion) of wood saving technologies, such as

increased paper recycling and substitution of wood based panels for sawn timber and plywood, has worked to generate higher consumption projections (Sedjo & Lyon 1990; Clark 2001a). Perhaps some forestry organisations find it difficult to accept the implications of slowing population growth in high income countries combined with low income elasticities of demand for wood products used for housing (see Clark 2001a for long-term trends in wood and wood products consumption in high and low income countries).

Uncertainty, the bane of all economic forecasting, is a particular problem for the wood industry because of the long investment lead times. It was generally considered that 40 years was required for a softwood plantation to generate suitably sized sawlogs (Jacobs 1963c; Lewis 1957a). Projecting consumption of any product over 40 years is difficult because many of the explanatory variables are unpredictable over that time scale and some even unknown.

The 1950s and early 1960s saw increased effort in projecting Australia's future wood requirement. In most exercises, population and per capita consumption were the dominant explanatory variables. They were projected to 2000 to enable one softwood plantation rotation or crop cycle. There was debate about Australia's future population - reflecting different views about migration, economic development and ecological carrying capacity. Future Australian population levels of up to 50 million and even 100 million were spoken of (Jacobs 1964b). Despite this exuberance, forecasters of Australia's future wood requirements were constrained and fairly accurate, assuming an Australian population in 2000 of between 20 and 22.4 million. Assuming a fixed time-invariant relationship between population and consumption or, as discussed in chapter 2, assuming that per capita consumption would increase, accounts for much of the inaccuracy in wood consumption projections. Simplistic assumptions about per capita consumption enabled more complex and demanding analysis of the effects of wood saving technologies, changing income elasticities of demand, changing demographics and competition from substitutes to be avoided.

In April 1959, Rodger (nearing retirement) presented the paper *Softwood planting program for Australia* at the Eastern States Timber Industry Stabilisation Conference in Lorne, Victoria. He calculated that by 2000 Australia, with an assumed doubling in population and constant per capita consumption, would consume 17.9 million m^3 of sawlogs per annum. Rodger limited his consumption projection to the sawlog requirement because he considered that growing sawlogs would automatically generate the wood (from thinnings and sawmill residues) for other wood products such as paper and wood based panels. The state forest agencies reported that native forests could supply 7.7 m^3 of sawlogs per annum by 2000, and, after allowing for wood supply from existing softwood plantations, Rodger calculated that Australia's softwood planting needed to increase from the then rate of 19 840 acres per annum to 32 940 acres per annum to achieve self-sufficiency (Rodger 1959). Rodger's paper implied a national softwood plantation estate of around 1.8 million acres (0.7 million hectares).

R.F. Turnbull, Senior Principal Research Officer-in-Charge of the Utilisation Section of CSIRO's Division of Forest Products, presented similar volume projections. Turnbull's

work was more detailed than Rodger's with projections disaggregated into the main products, which enabled varying trends in housing and the growth in pulp and paper consumption to be specified. Turnbull projected that by 2000 Australia would require 10 to 11.3 million m^3 of sawlogs per annum with total wood requirements (excluding fuel wood) of 17.2 to 21.6 million m^3 per annum (Turnbull 1959). Turnbull's projections have proved to be remarkably accurate. Australia's consumption of wood products in the year ending 31 December 2000 required an estimated 18.6 m^3 of wood (appendix A, table A1).

In the same year, Hanson projected Australia's wood requirements to 1975 and suggested that by 2000 Australia's annual log requirements for sawn timber could be 28 million m^3. Hanson, like Rodger, considered that the requirements for other wood products could be achieved as a subsidiary of sawlog production (Hanson 1959). Three years later, Hanson prepared more detailed projections of Australia's wood requirement in 2000 using population and individual per capita consumption estimates across the range of wood products as explanatory variables. He projected that Australia would consume 32.6 million m^3 of wood in 2000 (excluding fuel wood) (Hanson 1962a). Hanson's 1962 projection was 51 per cent greater than the upper level projection prepared by Turnbull in 1958.

Leslie, in a masters thesis written at the time of the wood projections, wrote:

> '*It is apparent that some of the differences are of a very serious order.*' (Leslie 1963, p. 31).

He was commenting particularly on the differences in the projections by Hanson and Turnbull. Leslie went on to criticise the forestry profession's failure to address the differences:

> '*It seems rather surprising therefore that in Australian forestry neither the questions of the forecasts themselves, nor the problems associated with economic forecasting for forest products have aroused anything like the interest that has been shown in many problems of forestry production processes, whose relative importance actually depends on the future markets for these products.*' (Leslie 1963, pp. 5-6).

Hanson's 1962 projections prevailed and underpinned Australia's three million acre softwood planting target.

Australia's softwood planting target

Addressing the Australian Timber Congress in 1963, Jacobs acknowledged the other projections and noted that Hanson's projection was relatively high:

> '*Mr. Hanson forecast a higher future demand than the other authors mentioned, and the comparison of the estimates of present growth with*

> *his estimate of the log production required by the year 2000 is challenging.*' (Jacobs 1963c, p. 2).

Jacobs nonetheless defended his decision to use Hanson's projection, arguing that Hanson's per capita consumption assumptions for sawn timber had already been exceeded on different occasions in three Australian states and for pulp were lower than some countries with similar economies to Australia's. This simplistic explanation confirms Leslie's observation that there has been little questioning of the forecasts despite their major discrepancies. Jacobs also argued that the per capita consumption assumptions could be realised if Australia grew sufficient wood at a reasonable cost. Underlying this argument was the view that a wood surplus would dampen wood prices, which would enhance the competitiveness and therefore market share of wood products against non-wood substitutes. The attitude that wood growing could be immune from commercial rigour had its roots in Empire Forestry as articulated by Swain (chapter 2). An alternative outcome that Jacobs did not present was that softwood plantation products could displace native forest hardwood sawn timber.

An examination of the Forestry and Timber Bureau files failed to find any evidence that Jacobs briefed the Minister or Department Secretary before proposing the three million acre softwood plantation target to the Australian Timber Congress. Only two months before delivering his paper, Jacobs briefed his Minister for a meeting with State Forestry Ministers in Melbourne on 13 February 1963. Jacobs advised that Australia faced a wood deficit but that:

> '*the area of wooded land…is fully capable of growing the timber requirements of the likely population of Australia and that all Governments should cooperate in developing this vital resource.*' (Jacobs 1963b).

Jacobs did not clarify that the Bureau's analysis supported a national softwood plantation target of three million acres and that he, as Director-General, would soon publicly announce this target to the industry.

An examination of the files indicates that Spooner first became aware of the planting target at a meeting with State Forestry Ministers on 12 April 1964. Jacobs attended this meeting (Australian Forestry Council 1964, p. 42). Spooner wrote to his Department Secretary:

> '*There was a strong demand to have the Forestry Council constituted. The idea is to evolve a national forestry policy. Most obviously this means establishing a case to plant another 2 or 3 M. acres of trees. I should imagine at Commonwealth expense. We need to go carefully otherwise it will be expensive. I think it would be as well to start thinking and talking early in the programme of ways and means under which private investment can be induced to do the job to some material extent.*' (Spooner 1964).

If the Minister had been briefed on the planting target, why would he repeat it to his Departmental Secretary? The Bureau's files contain no evidence that the Minister was formally presented with the softwood planting target as a policy proposal for approval. The Minister was clearly concerned about the cost of increased softwood planting and requested his Department to elevate the role of the private sector in the program. These concerns went largely unheeded and were discarded after Spooner's retirement.

A reference to the Federal Government's Committee of Economic Inquiry chaired by John Vernon is required before closing this discussion on the planting target. The Committee was appointed in February 1963 to examine the future for Australian manufacturing. The Committee asked the Forestry and Timber Bureau for their views on the future demand and supply for wood and the possibility of import replacement (Horner 1963). The Bureau presented projections of Australia's wood needs in 2000 ranging from 27.2 to 32.6 million m^3 assuming a population of 20 to 23 million and per capita wood consumption of 1.37 m^3. This was calculated for wood as a whole, there being no disaggregation for each wood product. The Bureau calculated that after deducting projected supply from native forests and with current planting programs continuing, Australia needed to accelerate its annual softwood planting to between 60 000 and 75 000 acres. Compared to Jacobs (1963c), the Bureau was advocating a higher planting rate using a lower wood consumption projection. The anomaly is explained by different assumptions about plantation productivity, the size of the existing plantation estate and native forest wood supply (table 3.3). The Bureau did not point out, and therefore did not explain, the anomaly in their submission to the Committee.

APM wrote to the Committee advising that the Forestry and Timber Bureau data on softwood planting were incorrect. APM thought that, by September 1963, Australia had 626 000 acres of softwood plantations (25 per cent private) and that the annual planting was about 36 000 acres (Wilson 1964). The Bureau reported in November 1963 that Australia then had 550 000 acres of softwood plantations and that this area was increasing by 25 000 acres per annum. Wilson's pointed remark to the Vernon Committee, '*In view of their importance and recent attention which has been given to softwood planting it is highly desirable that incorrect figures should not be bandied about.*' (Wilson 1964), signaled an emerging rift between APM and the Forestry and Timber Bureau over the role of the private sector in the planting program.

The Vernon Committee noted the Forestry and Timber Bureau's softwood planting proposal but reported that:

> '*...the lack of detailed statistics on a uniform basis about Australian timber resources...makes it extremely difficult to pass judgement on this proposal.*' (Commonwealth of Australia 1965, para. 8.167).

Table 3.3 Historical progression of the assumptions and information supporting the proposed three million acre softwood planting target for Australia. Source: Jacobs (1963c); Forestry and Timber Bureau (1963); Standing Committee to the Australian Forestry Council (1964b); Forestry and Timber Bureau (1969); Fairbairn (1966b); Departments of National Development and Treasury (1965a & b); *Softwood Forestry Loans Act 1967*; Fairbairn (1967).

	Jacobs 1963	Forestry and Timber Bureau submission to Vernon Committee 1963	Standing Committee report to AFC 1964	Department of National Development submission to Cabinet 1966	Department of National Development and Treasury reports to Cabinet 1965	*Softwood Forestry Loans Act 1967*[h]
Projected Australian consumption of wood[a] by 2000 (million m^3 per annum)	32.6	27.2 to 32.6	27.2 to 32.6	n.r.	over 28	over 32.6
Then[b] annual softwood planting rate (000 acres)	25	25	35 in 1962, 41.25 planned for 1964, 46.8 announced annual target by the states	40	40	29 in 1965[i]
Then[b] plantation area (000 acres)	500	550	n.r.	n.r.	nearly 700 (520 public)	n.r.
Estimated native forest wood supply by 2000 (million m^3 per annum)	17.0	10.1	10.4	n.r.	Not quantified. Half of Australia's wood supply was expected to come from native forests in 2000.	n.r.
Plantation productivity[c] (MAI = m^3/ha/year)	14	n.r. 20 to 21 a.c.[d]	n.r. 13.2 to 16.9 a.c.[f]	n.r.	16[g]	at least 14
Proposed annual planting rate (000 acres per annum)	60	60 to 75	'at least' 75	75 (65 public and 10 private)	75	75
Plantation rotation (years)	40	n.r.	n.r.	35	35	35
Total plantation area target (000 acres)	3 000	2 650 to 3 175 a.c.[e]	n.r. 3 240 a.c.[f]	3 000	3 000	3 000

a.c. means calculated by the author using information in the report and limited assumptions as specified.

n.r. means not reported. The absence of a figure means that it could not be calculated using information in the report without having to make major assumptions.

a. Excluding fuel wood.
b. The absence of a year reference means the document did not specify it.
c. Used to generate planting targets.
d. The figure was calculated using a 35-year rotation with the 75 000 acre per annum planting proposal relating to the higher consumption projections.
e. The figures were calculated assuming planting continues for 35 years.
f. Assuming 35-year rotations and plantation area in 1964 of 615 287 acres (Forestry and Timber Bureau 1969).
g. Average of mean annual increments (MAI) for each state as reported in Departments of National Development and Treasury 1965b, p. 8 weighted by the recommended area to be planted by each state.
h. Including information provided in the Ministerial Statement to the House of Representatives, 9 March 1966, and second reading speech.
i. The Minister's speech was unclear, Forestry and Timber Bureau data show that the figure was for public sector planting.

The Committee expressed the hope that the AFC would help to improve the information base and emphasised the role of the private sector:

> '*...we hope the importance of the private sector will not be overlooked either in relation to current problems or to the future expansion. We suggest that close contact be established and maintained between the Standing Committee and owners of private forests.*' (Commonwealth of Australia 1965, para 8.167).

The Committee was favourable to additional plantation establishment, particularly on existing agricultural land where farmers could reap additional benefits (e.g. wind protection, shade for cattle and aesthetic amenity) and suggested the distribution of free seedlings and additional information services. The Vernon Committee avoided making a judgement on the Bureau's softwood planting proposal.

Jacobs reported to the first AFC meeting that the wood consumption projections presented in the Bureau's submission to the Vernon Committee were the basis for the proposed expansion in softwood planting (Australian Forestry Council 1964, p. 34). There are grounds to dispute this claim and argue that Hanson (1962a) is the original source. Since Jacobs first proposed the three million acre target in 1963, variations in projected consumption, different plantation productivity and rotation time assumptions and varying information about native forest wood supply and the size of the existing plantation estate have left the three million acre target unchanged (table 3.3).

3.5 AFC decision to plant softwoods

On the day the Prime Minister announced the formation of the AFC (23 July 1964), its Standing Committee met informally in Melbourne (Standing Committee to the Australian Forestry Council 1964a). Following the meeting, a three-page document 'The Softwood Afforestation Programme' was prepared by the Forestry and Timber Bureau for the first AFC meeting. The forest agencies considered that Australia's

native forests could supply 10.4 million m^3 of wood annually by 2000 and therefore could only partially meet projected consumption.[32] The Standing Committee argued that increasing softwood planting was economically preferable to increasing the productivity of native forests:

> '*There is little prospect of increasing production from native forests at a cost which would compare favourably with softwood planting. These softwoods in general grow faster than the native hardwoods, and have advantages over them for many purposes including some kinds of paper making and building construction, because of long fibre-lengths, lightness, ease of working and permeability by preservatives. Softwood plantations in Australia have already proved to be economic, and there are still large areas of land suitable for planting within economic range of markets.*' (Standing Committee to the Australian Forestry Council 1964b).

The Standing Committee's document presented the case for increasing Australia's softwood planting rate to 75 000 acres per annum. The document was deficient in quantified information - providing no data on the current area of softwood plantations, presenting insufficient information for the 75 000 acre figure to be recalculated (and therefore verified), and making no mention of the three million acre area target (table 3.3).

The haste and brevity of the Standing Committee's work was challenged. J.D. Boyd, Acting Chief of the CSIRO's Division of Forest Products, attended the meeting and wrote to Jacobs, as Chair of the Standing Committee, concerned that the haste would mean that Ministers would not be adequately briefed on the important issues to be addressed at the first AFC meeting. Boyd was not arguing against the softwood plantation program. His concern was about the process of policy formulation and the Committee's responsibility to the Government:

> '*I would like to make it clear that the documentation provided for the Standing Committee meeting in Melbourne was not, in my view, adequate…*' (Boyd 1964).

Boyd's impression was that:

> '*…under the present conditions, Council will assemble without proper briefing in the sense that individual conservators will have had to place their own interpretation of the significance of the two major items* [free trade agreement and softwood planting program], *and the Ministers will have no clear idea of a national policy as supported by the Standing Committee.*' (Boyd 1964).

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[32] Australian hardwood native forests supplied 10.7 million m^3 of wood in the year ending June 2000 (Australian Bureau of Agricultural and Resource Economics 2001b, p. 63).

Boyd advised Jacobs that Allan Harris, Western Australia's Conservator of Forests, was '*similarly disturbed about the situation*' and agreed with Boyd's suggestion that the Forestry and Timber Bureau prepare and circulate a draft document presenting the case for a softwood program for the Standing Committee and that the Standing Committee meet again for two days to consider it before the AFC meeting (Boyd 1964).

Jacobs (1964d) explained the haste by the desire of the State Forestry Ministers to meet before the Federal Minister for Trade discussed the Free Trade Agreement with New Zealand. He agreed with Boyd that the Bureau's paper on the softwood program required much more work and advised Boyd that his immediate aim was to make the Minister for Trade aware of the current softwood planting being undertaken by the states. Jacobs argued that the planting rate the Trade Department and the New Zealand Government had assumed was about half the actual. This meant that the cost of opening the Australian market to New Zealand's wood products industry would be much greater than the Department of Trade realised. The Forestry and Timber Bureau's files show that the planting rate used by the Department of Trade (35 00 acres per annum) was actually supplied by the Forestry and Timber Bureau (Department of Trade 1964). The official figures, also compiled by the Bureau, show an additional 36 000 acres established in 1963 and 40 000 acres in 1964 (Forestry and Timber Bureau 1969, p. 143). Jacobs was wrong on two counts. First, the Department of Trade had made no assumption about the then planting rate - this information was provided by the Bureau. Secondly, the planting rate used by the Department of Trade was reasonably accurate anyway and also confirmed by APM.

Jacobs concluded his letter to Boyd saying:

> '*At the moment I do not hope to achieve anything further than this* [making McEwan aware of the implications for the current softwood planting program of a free trade with New Zealand in wood products], *and will be very pleased if we get this far.*' (Jacobs 1964d).

If this was an accurate account of the agenda, Jacobs could have accommodated Boyd's concerns by delaying consideration of the softwood program until the second AFC meeting. This did not happen and a month later, on 21 August 1964, the first meeting of the AFC was held in Parliament House, Canberra, where Jacobs proposed an accelerated softwood planting program. The meeting was recorded verbatim by the Hansard reporters (Australian Forestry Council 1964).[33]

McEwan attended the first part of the meeting to discuss the New Zealand-Australia free trade negotiations and whether any agreement would inhibit or threaten Australia's proposed softwood plantation expansion. McEwan advised that the negotiations were

[33] A subsequent meeting of the AFC Standing Committee considered a paper prepared by Jacobs, 'The need to treat Council and Standing Committee documents as confidential'. Jacobs considered that all members of the Council and Standing Committee would agree that all papers, reports and minutes should be treated as confidential (Jacobs 1964e). This secrecy worked to intensify concerns about the AFC on matters of public interest.

around New Zealand having the opportunity to sell duty free wood and wood products (including pulp and paper) with the exception of dressed sawn timber, building boards, plywood and veneers.[34] McEwan argued that the Australian wood and wood products industry had nothing to be concerned about. He presented tables (based on Anon 1964) showing the future Australian pulp market's capacity to accommodate all of the projected Australian and New Zealand production that was surplus to their domestic requirements. New Zealand's projected surplus was expected to supply slightly less than 10 per cent of the Australian market in 2000. McEwan argued that a problem for Australia would only arise if the population assumption and the planting rate were too high. McEwan made it clear that the figures were not his:

> '*If we accept these figures – and it will not be I who will defend them, it will be the boffins who will defend them – there will be nothing to worry about then.*' (Australian Forestry Council 1964, p. 21).

The 'boffins' to whom McEwan was referring was mainly the Forestry and Timber Bureau, which provided the data on Australian demand and wood availability. McEwan presented the same analysis for sawn timber and came to the same conclusion:

> '*This is what leads us on the face of it to believe, working from figures supplied by our own Forestry Bureau and the advice from New Zealand as to their plans, that this* [a Free Trade Agreement] *is not a proposition that holds any jeopardy for Australian timber interests.*' (Australian Forestry Council 1964, p. 25).

McEwan also reassured the Council that he would consult with them before adding additional wood products onto the free trade list.[35]

McEwan's argument meant that any concerns about a free trade agreement required the State Ministers to challenge either the Bureau's consumption projections or the size of New Zealand's surplus production. Victoria's Minister, Lindsay Thompson, argued that sawn timber consumption would be significantly less than projected because of declining per capita sawn timber consumption and quoted supporting figures from the

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[34] The New Zealand-Australia Free Trade Agreement was signed on 31 August 1965 and required that both countries maintain existing duty free trade, which applied to a substantial part of the wood and wood products trade. On those products where duty applied, mainly dressed sawn timber, packaging materials and paper products, it required both countries to reduce these duties progressively. With respect to wood products, both countries would co-operate with a view to achieving a harmonious and mutually beneficial expansion of trade between them and to promoting the most efficient use of their combined resources with a joint consultative council of forest industries to be established (Parliament of Australia 1965).

[35] Imports of softwood sawn timber from New Zealand accounted for 9 per cent of Australia's sawn timber consumption in the year ending June 2000, imports of wood panels from New Zealand accounted for 7 per cent, and imports of paper from New Zealand accounted for 5 per cent. These actual figures are reasonably in line with the projections quoted by McEwan. However, imports from other countries were not considered in the analysis. Over the year ending June 2000, net imports (imports less exports) of sawn timber accounted for 18 per cent of Australian consumption and net imports of paper accounted for 26 per cent of Australian consumption. Australia was a net exporter of wood panels in 1999/00 (Australian Bureau of Agricultural and Resource Economics 2001b).

Sawmillers Association. McEwan responded by repeating that the consumption figures came from the Forestry and Timber Bureau. After McEwan left the meeting, Thompson said that the consumption projections might be overestimates and asked the Standing Committee to recheck all the figures. Enticknap, the New South Wales Minister for Agriculture and Conservation, was concerned that non-wood substitutes could affect the industry greatly. Fairbairn, who was chairing the meeting, also commented on the use of concrete and steel over sawn timber (Australian Forestry Council 1964).

The consumption projections were not re-examined by either the Standing Committee or the Forestry and Timber Bureau. Instead, McEwan's 'no worries' statement and reassurances were interpreted by Fairbairn as removing a few misapprehensions about accelerating Australia's softwood planting (Australian Forestry Council 1964, p. 29). With discussion on the proposed New Zealand-Australia Free Trade Agreement finished - the stimulus for the rushed meeting - the AFC moved to the next agenda item, namely the '*The softwood afforestation program*'.

Jacobs introduced the item and quickly explained that the Bureau's consumption projections were higher than others because the Bureau had taken into account the persistent underestimation made in previous forecasts (Australian Forestry Council 1964, p. 34). No specific studies were quoted, but from the discussion above, Jacobs seems to be implying that Turnbull (CSIRO) and Rodger (the Bureau's previous director) were also stuck in the mould of persistent underestimation. Jacobs did not use this opportunity to address the declining per capita sawn timber consumption and non-wood substitute concerns specifically raised by Ministers Thompson and Enticknap.

Jacobs explained the rationale for an accelerated softwood planting, namely constrained native forest wood supply relative to the projected requirement, the economic attractions of growing softwood due to its relatively high growth rates and the wide market applications for softwood. Jacobs advised that an annual planting rate of 75 000 acres was required for reasonable self-sufficiency. This would require increasing the planting rate by 30 000 acres per annum on top of the existing state targets (table 3.3). This was the most conservative approach to 'ease' the State Ministers into the program. There was no mention of a three million acre target or possible Federal Government funding. Jacobs reported that there was ample (public) land for planting but, recognising Victoria's policy, noted that some states might choose to lease land to the private sector or encourage planting on private land. Also noted were the attractions of regional industry and employment growth based on import replacement. Jacobs concluded the presentation with the Standing Committee's recommendation that the Committee investigate in more detail the land potential for the program (Australian Forestry Council 1964).

The Ministers' response was cautious and confused. Enticknap led the response to the planting proposal saying:

> '*This is a pretty big factor.*' (Enticknap as reported in Australian Forestry Council 1964).

He wanted assurance that sufficient land with good wood yield potential was available for competitiveness. (Later in the discussion Jacobs referred to a meeting between Spooner and the state forestry Ministers where Enticknap indicated that New South Wales had three million acres of land available.) Enticknap suggested that the Council agree in principle to raising the annual planting to 75 000 acres with the Standing Committee researching the land availability issue. Thompson said:

> '*I think that the consideration of certain factors before we finally agree on a target is essential.*' (Thompson, as reported in Australian Forestry Council 1964).

He was referring particularly to Victoria's lack of knowledge about the availability of suitable land. Richter, Queensland's Minister for Local Government and Conservation, spoke of taxation concessions to encourage private planting:

> '*I think that could very well bridge the gap.*' (Richter as reported in Australian Forestry Council 1964).

Enticknap questioned the wisdom of the AFC '*getting down to recommending forms of assistance for private planters.*' Shortly later Enticknap reported that the New South Wales Forestry Commission had set up a branch to encourage private planting. Thompson advised the Council of the Victorian Government's policies to encourage private sector planting. Jacobs and Fairbairn sought an in principle agreement to the 75 000 figure. The discussion broadened and doubts were raised about New Zealand's intentions, the Standing Committee's figures and the cost of transporting sawn timber in Australia. Enticknap appeared frustrated that the 75 000 acre figure was not being supported in principle. Fairbairn thought that it had been. Jacobs sought clarification and Fairbairn sought verification that the meeting agreed in principle to aim for a 75 000 acre per annum planting rate. Thompson, noting that New South Wales could cover the whole planting, asked whether the national planting figure was too low.

Shortly after, Thompson agreed to setting the figure as a desirable target and investigating its practical feasibility. Lawrence, Chair of the Victorian Forests Commission, said that if the softwood resource were to be extended by the magnitude discussed, there would have to be high government appreciation for proper management and use of the resources:

> '*Every forester will tell you that we do not want to repeat the New Zealand experience where virtually 1 million acres of timber were grown with no market, but with very great faith and hope.*' (Lawrence, as reported in Australian Forestry Council 1964).

Lawrence knew that significant capital would be needed to process the resource and was concerned that government did not appreciate the potential threats to this investment being realised. The discussion then shifted to what products were already imported duty free from New Zealand and how any free trade agreement might affect competition. The discussion on the softwood program finished at this point with a

resolution put by Thompson that the Council welcomed the assurance from the Trade Minister that every precaution would be taken to safeguard the interests of processing industries. The first AFC meeting ended without a resolution on the softwood planting program. Boyd's concerns about the inadequate time for briefing Ministers were justified. Poor chairing was also evident.

The first formal meeting of the Standing Committee to the AFC was held in Canberra on 2-3 December 1964. The meeting commenced with Hanson introducing the paper the Bureau had prepared with the assistance of the state forest agencies, 'Australian plantation potential' (Forestry and Timber Bureau 1964a). The paper detailed for each 'forest' region in each state and territory the existing plantation area, planned planting, potential plantation area, plantation productivity and estimated annual wood yield. The paper concluded that there was enough suitable land to achieve the three million acre target. The exclusion of the private resource from the tables was argued on the grounds of insufficient knowledge about the private sector's future plans. However, a figure of 10 000 acres per annum was suggested as a possible private planting rate, noting that this was consistent with recent past planting. The paper rationalised the small role given to the private sector, arguing that most private plantings were less productive because of *'inferior management and/or management aimed at maximising financial returns rather than volume returns.'* Without industry representation on the AFC and its Standing Committee, these claims could go unchallenged.

Jacobs, chairing the meeting, advised (incorrectly) that the AFC had agreed that raising the softwood planting to 75 000 acres was desirable and asked if the Committee would like to consider how the increased planting rate would be achieved. A confused discussion followed. Lawrence asked for the rationale behind the 75 000 acre figure; Harris (Western Australia) replied that it was what the AFC agreed to; Jacobs said the agreed program was to reach three million acres; Bednall (South Australia) pointed out that the three million target was not mentioned at the AFC meeting; Lawrence wanted a determination on the public sector proportion of the planting; Hanson suggested that the task was to decide how the planting should be distributed amongst the states; confusion continued about the 75 000 acre figure with a suggestion that this was a minimum; another suggested they were '*stuck with this figure*'; concerns were raised about the state's capacity to nearly double the existing program. Lawrence advised that if the planting rate were to be increased to 75 000 acres per annum, '*money would have to be found*' and it '*was a little too early to discuss allocation of acreages between Governments.*' (Standing Committee to the Australian Forestry Council 1964c).

At this point, the discussion became focussed with Hudson (New South Wales) speaking to a table showing what his state could do given financial aid. Jacobs advised that the Vernon Committee was likely to report to the Federal Government that the cost of the extra planting would be £2-3 million per annum and hoped that the Vernon Committee would make a recommendation for Federal Government funding. This recommendation was not forthcoming and, as discussed in chapter 2, the Committee was not impressed with the Bureau's documentation of the case for increased public sector softwood planting. A run-through of the states quickly established that, with financial assistance, a total of 60 000 acres per annum could be handled by the states.

Lawrence remained concerned about the private plantings, convinced that the private sector was on the edge of a planting boom. Jacobs, as Chair, let the issue pass unaddressed and asked for the item to be finalised.

The key elements of the Committee's report to the AFC would be:

- that adequate land was available.
- that the public sector plant 65 000 acres per annum, with a state/territory allocation as specified, leaving 10 000 acres per annum to the private sector.
- that the additional costs in each state (over and above the costs of the current annual planting) would be detailed over the next five years (Standing Committee to the Australian Forestry Council 1964c).

With industry having no voice on the AFC or its Standing Committee and with the expectation of Federal Government funding, the heads of the state forest agencies had divided amongst themselves the business of meeting the yet to be approved three million acre softwood plantation area target.

A later agenda item, 'The encouragement of forestry on private land', brought contradictory comments, with Bednall noting that encouraging private forestry was one way of meeting the 75 000 acre target and Crane (Forestry and Timber Bureau) noting that the Government could save money if the private sector could grow wood more cheaply than the forest agencies. Jacobs saw '*great political advantages in having 1000 forest owners backing the afforestation program.*' He ignored the option of large private industrial plantation growers instead of large public sector forest agencies meeting the planting target. The discussion fixed on using the taxation system to encourage private sector planting and no changes were made to the 10 000 acre per annum share notionally allocated to the private sector as part of the national program (Standing Committee to the Australian Forestry Council 1964c; Forestry and Timber Bureau 1964b).

The AFC at its second meeting on 10 February 1965 accepted the assurances of the Standing Committee that there was adequate land and agreed to recommend to their Governments that the national softwood planting increase to 75 000 acres per annum. The Council envisaged that the private sector would establish 10 000 acres per annum and recommended that the government sector plant the difference. The Council requested Fairbairn approach the Federal Government to present the case for a specific allocation of funds for the additional softwood planting.

3.6 Preparing the case for Federal Government funding

Federal Government funding required economic evaluation of the program by the Department of Treasury. The Forestry and Timber Bureau viewed the Treasury examination as the toughest test for the program. Boswell, Fairbairn's Departmental Secretary, advised his Minister that Treasury would be treated carefully:

> '*We are looking for a decision by the Commonwealth to assist the States in carrying out a continuing programme of expanded plantings extending at least over the next thirty-five years and involving in the aggregate hundreds of millions of pounds,*' [and cautiously warned his Minister:] '*The stakes are high and while we would like to reach finality on the matter as soon as possible we judge it better to proceed slowly and reach a favourable conclusion rather than trying to force things along with a strong possibility of an unfavourable reaction because of our insistence of early consideration.*' (Boswell 1965).

Fairbairn wrote to the Treasurer, Harold Holt, advising of the AFC's recommendations and suggested that the two Departments prepare a paper examining the case for Federal Government assistance for Cabinet consideration (Fairbairn 1965). Holt agreed (Holt 1965). The officers responsible for the study were Hanson and R.W. Cole[36] and they decided to undertake what they called a benefit-cost study. Benefit-cost analysis had become a prominent tool to analyse investment proposals, particularly those in the public sector, by including social benefits and costs not normally included in the price system (Leslie 1967). It was a favoured tool of agricultural economists such as Lloyd, Gruen and Davidson at the time. The benefit-cost analysis undertaken by the Departments of Treasury and National Development was a simple discounted cash flow analysis of the direct costs and revenues of the plantation investment. The work was presented in a report to Cabinet (Departments of National Development and Treasury 1965a). The findings were included in another report undertaken by the two departments that considered the wider benefits (not costs) of the program, namely a reduced import bill, decentralisation and regional employment (Departments of National Development and Treasury 1965b).

The Departments of National Development and Treasury advised that a complete economic evaluation of the proposed planting program in each of the six states was not possible given the limited available data and time for analysis. The state forest agencies provided estimates of their planting and maintenance costs. These were not examined in detail, although they were likely to be overestimates given the expectation of Federal Government funding (Departments of National Development and Treasury 1965a, p. 9). A comparison with private sector planting costs was not undertaken, possibly because Cole was not aware of published data on APM Forests' plantation establishment and maintenance costs. The state forest agency's data showed the cost of

[36] R.W. Cole was then in the Economic and Financial Survey Division, Department of the Treasury. Cole, later Sir William, became Secretary of the Public Service Board.

plantation establishment and maintenance (excluding land and housing costs) ranged between £112 and £453 per acre (Departments of National Development and Treasury 1965a, p. 8) with an area-based weighted average of £179 per acre. These costs were significantly greater than those reported for APM Forests' operations in 1957 of £22 per acre (including land) for establishment and £1.1 per acre per year for maintenance (Chandler 1957, p. 46). Chandler, in a paper presented at a conference on private forestry hosted by the NSW Division of the Institute of Foresters in 1963, presented data showing APM Forests' plantation establishment costs (excluding land) at £30 per acre (Chandler 1963, p. II-4). Hanson was aware of these up-to-date private sector costings because he delivered the preceding paper (Hanson 1963) and asked Chandler a question on his. As discussed below, the public-private cost differential was only identified and challenged when the *Softwood Forestry Agreements Bill 1967* was debated in the House of Representatives.

The high public plantation establishment costs could be accommodated without generating a loss because the analysis used relatively high shadow prices for wood. Shadow prices for commodity sawlogs - the dominant plantation product in volume and revenue terms - were 120-300 per cent higher than the actual stumpage prices (table 3.4). The planting program would have been unprofitable if actual stumpage prices were used in the analysis. The departments argued that it was inappropriate to use actual stumpage prices because of State Government policy to keep stumpages lower than market levels. They argued that, although such a policy came at a cost to the states, it delivered national benefits in manufacturing industry.[37] Shadow prices were derived as the residual price calculated by deducting the costs (and allowing for a reasonable profit) of harvesting, transporting and processing from the price of imported products - douglas fir for sawn timber and New Zealand pulp. Treasury was particularly concerned that the shadow prices might not accurately reflect the free market prices for radiata pine. They were sensitive to the implication that higher shadow prices meant that higher costs could be absorbed knowing that someone else (i.e. the Federal Government) would fund the program. These qualifications were powerless against the report's main conclusion:

> '*The balance of probabilities favours the proposed programmes in New South Wales, Victoria, South Australia and Tasmania. With respect to the proposed Queensland programme, the conclusion goes the other way: the probabilities, reasonably interpreted, do not favour the planting of Hoop pine as an economic proposition while the planting of*

[37] Other justifications for low stumpage prices were the need to overcome prejudices against radiata pine as a newcomer to the market, to encourage investment in new pulping facilities, and the state government argument that stumpages should only be sufficient to pay for the cost of regeneration - to charge more is 'tantamount to taxation' (Departments of National Development and Treasury 1965a, p. 17). These were not Hanson's personal views. Hanson argued that stumpage prices should be increased to recover the full market value of publicly owned assets. Forest agencies were tempted to set stumpages low to reduce the political pressures exerted by customers and consumers generally. It was less onerous for the agencies to persuade their state treasuries to make more funds available than to be consistently resisting pressures for lower stumpage charges. Higher stumpage rates would stimulate private forestry and dampen forest alienation to traditional agriculture (Hanson & Leslie 1965). Earlier, Hanson had argued for increased stumpages on pulpwood to stimulate supply (Hanson 1962b).

> *Exotic pine could be considered only marginal at best. The Western Australian programme, as proposed, has many uncertainties in its economic effects and it is not possible to put forward even a tentative conclusion. It is suggested that further work be done on the economics of the W.A. programme.*' (Departments of National Development and Treasury 1965b, p. 31).

Table 3.4 Shadow prices used to evaluate the commercial viability of the softwood planting proposal. Source: Departments of National Development and Treasury 1965a, p. 16.

	Shadow price (£ per cubic foot)	Stumpage rate (£ per cubic foot)	Difference (%)
Sawlogs[a] for commodity sawn timber			
NSW	0.20	0.05	300
Vic	0.25	0.10	150
Qld – hoop pine	0.22	0.10	120
Qld – exotic pine	0.21	0.07	200
SA	0.30	0.10	200
WA – radiata pine	0.21	0.06	250
WA – pinaster pine	0.26	0.09	189
Tas	0.17	0.05	240
Sawlogs[a] for joinery			
NSW	0.40	0.10	300
Vic	0.45	0.12	275
Qld – hoop pine	0.43	0.40	7.5
WA	0.42	0.10	320
Pulplogs and casewood[ab]			
NSW	0.05	0.01	400
Vic	0.08	0.04	100
Qld – hoop pine	0.06	0.02	200
Qld – exotic pine	0.05	0.02	150
SA	0.09	0.05	80
WA – radiata pine	0.05	0.04	25
WA – pinaster pine	0.08	0.03	167
Tas	0.02	0.02	0

a. Unless specified all logs are radiata pine.
b. An average figure was taken when pulplogs and casewood were separately listed.

Treasury worked on the assumption that there would be sufficient demand for the wood. Treasury had prepared their own estimates that were '*broadly consistent with the conclusion*' that the planting program together with wood supplies from native forests would make Australia reasonably self-sufficient. With this separate examination, Cole and Hanson were able to write jointly:

> '*Although such long-term projections are highly speculative it is considered reasonable to accept from the outset the proposition that a planting programme of the order envisaged would not be likely to create problems of excessive supply in Australia as a whole.*' (Departments of National Development and Treasury 1965a, p. 10).

The agreement that the greater part of the softwood program was probably economic was a strategic breakthrough for the proponents of the softwood planting program. We

can only muse about the Treasury response had they been made aware of the apparent public-private sector planting cost differential.

Treasury argued that there was no case for Government funding, particularly given that the program was shown to be largely an economic proposition (Departments of National Development and Treasury 1965b, pp. 13-5). The Department of National Development disagreed with the Treasury's view (Departments of National Development and Treasury 1965b, pp. 16-8). The two departments presented their respective arguments on Federal Government funding in separate submissions to Cabinet.

3.5 Cabinet decision

The Departments of Treasury and National Development's main report (Departments of National Development and Treasury 1965b), which incorporated the economic analysis together with a consideration of wider issues, namely the import saving and decentralisation benefits, the proposed New Zealand-Australia Free Trade Agreement, private sector planting and Federal Government funding, was completed on 24 December 1965. Fairbairn presented his Cabinet submission (No. 1205) before the year's end. The Prime Minister's Department presented their brief to the Prime Minister (Anon. 1966) on Fairbairn's submission on 18 January. They advised that Treasury and National Development disagreed on the financing issue and that the Minister for National Development was proposing a compromise - 50 per cent of the cost of the additional plantings to be funded by a Federal Government loan and 50 per cent by a grant. The Prime Minister was advised that neither the details of the proposed arrangements with the states, nor of any alternative arrangements had been discussed with Treasury.

The recently appointed Treasurer,[38] William McMahon, decided to make a separate Cabinet submission. On 15 February 1966, Cabinet considered two submissions on the softwood program - Number 8, submitted by Fairbairn (Fairbairn 1966a) on 28 January, and Number 13, submitted by McMahon on 31 January 1966 (McMahon 1966).

Fairbairn's submission presented the background to, and arguments for, the softwood planting program. He saw no disagreement between the two departments about the overall desirability of the program with their work showing the greater part of the proposal to be economic. On the funding issue Fairbairn argued:

> '*While I do not reject the possibility that the States could find at least some of the finance for the expansion programme, I do not feel that there are sufficiently compelling reasons at the State level to cause all the States to bring this about as quickly as we would wish. The State's position in this regard can be easily appreciated. The main benefits tend*

[38] Harold Holt, the previous Treasurer, became Prime Minister on Menzies' retirement on 26 January 1966.

> *to be largely national in character, in particular the substantial import savings (at economic costs) and the achievements of worthwhile decentralised development.*
>
> *In making their request the States have not asked for any specific form of financial assistance. Grants would of course be the most attractive to the States. However, since forestry is a revenue earning activity and the analysis has shown that softwood plantations can pay their way in the long term, I think it is reasonable for the Commonwealth to expect repayment of some of the funds advanced to the States for forestry.*
>
> *However if all the funds were to be made available by way of interest bearing repayable advances, this would raise financing problems for the States. They would be faced with a mounting commitment in interest and capital repayments during the lengthy initial period before any substantial revenue from the planting programme. For this reason I fear that the States would not regard an offer by the Commonwealth of an interest bearing repayable advance as a satisfactory solution to the financing problem in the initial stage.*' (Fairbairn 1966a, para. 19, 20, 21).

Fairbairn recommended that the Federal Government finance the additional planting for the first five years, 50 per cent as a grant and 50 per cent as a loan. He also recommended that Cabinet indicate a preparedness to consider further support before the end of the initial five-year funding period. On the issue of the uneconomic planting in Queensland and Western Australia, Fairbairn sought Cabinet approval to approach Queensland about providing funding for exotic planting only (i.e. not for planting indigenous hoop pine) and recommended Western Australia's plantings remain as proposed but that future consideration be given to scaling it down to match the state's market. On the issue of private sector planting, Fairbairn argued that there was limited scope for increasing private plantings in the immediate future, presenting his view that any encouragement given to private planting would not significantly affect the initial five-year program. Government would always be a major provider of wood because of the long delay before the first harvest, and therefore income, from plantations (Fairbairn 1966a).

The Treasurer argued that the benefit-cost analysis favoured increased planting of softwoods in south eastern Australia but not Queensland and Western Australia. He pointed out that:

> '*In these circumstances, the Australian Forestry Council's programme could not be given a general blessing as it stands without ignoring the possibility that it involves directing resources into less economic areas.*' (McMahon 1966).

He advised that the AFC should be asked to look at the program again given the results of the benefit-cost analysis and data that were not available to the AFC when the

program was prepared. It was a long-term program (35 years) and haste was not necessary. The Treasurer noted that the AFC program was predominantly a Government planting program - private enterprise was to play only a minor role and little attention was given to how the states might encourage private planting. The Treasurer's submission specified the generous approach used to calculate the benefit-cost ratios and argued that Federal Government funding would see '*payments to the states well beyond what would be necessary.*' Whilst the Treasurer was opposed to funding by grants, he left the door open to financing by loans, advising that loan conditions could be varied, for example, by deferring repayment. But, before considering the form of assistance, it was necessary to decide whether or not any Federal Government assistance should be given to the states for softwood planting (McMahon 1966).

Cabinet decided to provide financial assistance to the states. The record of the decision shows that Cabinet:

- endorsed the AFC proposal to increase the softwood planting rate from the present 40 000 acres per annum to 75 000 acres per annum for the next 35 years,
- approved funding by the Federal Government for the initial five-year program as proposed by the AFC - subject to modification as the Minister may negotiate with Queensland,
- indicated a preparedness to consider further support before the end of the initial five-year period,
- agreed to the funding wholly by long-term loans free of interest and repayment of principal for the first ten years, after which interest and repayment would apply (Bunting 1966).

The Treasurer's point, about Cabinet needing to decide first whether assistance should be provided, was made at the end of his submission when, in my opinion, it should have been the first consideration. An affirmative decision from Government would then trigger inquiry and debate over the form and amount of funding. Instead, the process started with Treasury becoming engaged in a rushed economic analysis using questionable data.[39] Consultation with APM Forests could have provided a quick check on the state forest agencies' plantation cost data and competitiveness in plantation wood growing. The interdepartmental reports provide no evidence that such an easy check was undertaken. The Forestry and Timber Bureau controlled the data collection process. On receiving the data, it undertook, independently of Treasury, its own analysis to satisfy itself that the information was adequate. As Jacobs advised his Departmental Secretary,

> '[w]e *will also obtain in this way, an indication of the probable results of the independent studies the Treasury will carry out with our data.*' (Jacobs 1965a).

[39] The rush was initially motivated by the Bureau's desire to have a Cabinet submission agreed to by Treasury and the Department of National Development before the budget session. Jacobs became aware that this could not be achieved by July 1965 (Jacobs 1965a).

There was scope for considerable data adjustment in compiling the cost and shadow pricing information. For example, Hanson directed his staff to add to all New South Wales costs 52.5 per cent for overheads and £100 000 per annum for land purchases (Hanson 1965a). Data from other states were not filed, but presumably the same cost add-ons applied. No evidence was found of overt data manipulation by the Bureau. That Western Australian and Queensland hoop plantations were reported as negative propositions lends support to the view that the data were not manipulated to generate a favourable economic result. Despite the clarity in the Cabinet submissions over the non-viability of the program in these two states, the benefit-cost analysis results were ambivalent. Western Australia's pinaster plantations and Queensland's hoop plantations were reported as the least economic, but were still (just) favourable under at least one of the three analyses used (Departments of National Development and Treasury 1965a, p. 7).

3.6 Parliament votes on the softwood loans bill

Fairbairn announced the Government's decision in a Ministerial Statement to the House of Representatives on 9 March 1966. He advised that about $20 million in long-term loans would be made available to the states over the following five years to help increase their softwood planting in order to enable Australia to meet its wood needs by 2000 (Fairbairn 1966b). The statement initiated the first major debate on 'forestry' in the Federal Parliament. There was unanimous support for the initiative, although some members argued that the funding was inadequate. The issue that received most discussion was the lack of support for private growers - four of the six speakers expressed this bipartisan concern. Davies (Australian Labor Party) argued that if cheap money is provided for state planting it will encourage the private sector to curtail their already significant investment and rely on government for their wood supply. The private sector could now let the risk shift to the public sector and rest assured of cheaper wood supplies (Davies 1966). Nixon, a Country Party Member whose seat took in APM Ltd. was deeply concerned about the role for the private sector:

> '*It is a pity that we cannot encourage private enterprise to grow these trees, particularly as this is a free enterprise government.*'(Nixon 1966).

As we shall see, this was not Nixon's last word on the matter, but his protests were ineffective.

The Ministerial Statement enabled the states to plan for the expansion with reasonable confidence about Federal Government funding whilst the legislation was being prepared. The *Softwood Forestry Agreements Bill 1967* was presented to the House of Representatives on 10 May 1967 and debated in the early hours of 19 May. The Labor opposition welcomed the legislation and hoped for its speedy passage through Parliament. Nixon, despite being in the Liberal-Country Party Government, led the main debate on the Bill. He again expressed his disappointment that the Government

was not able to assist private companies in the planting of softwoods, arguing that the private sector was more efficient in growing wood and that their enterprise earned taxable income. Earlier, Jacobs had been called to a conference with Nixon and Fairbairn to discuss APM Forests' plantation costs (Jacobs 1967). Nixon was dissatisfied with the reason given to him for the Government's dismissal of the private sector, namely that the states could plant trees more cheaply. Using the Minister's statements, he calculated that the public sector planted trees at an average cost of $131 per acre compared with the private sector (APM Forests) cost of $60 to $70 per acre.[40] Nixon argued it would be best for the Government to allocate the funds to companies like APM Forests (Nixon 1967). His arguments were ineffective. Treasury officers at Parliament took notes on APM Forests' costs as quoted by Nixon (Jacobs 1967).[41]

Fairbairn concluded the brief forty two-minute debate on the Bill:

> '*I think everyone welcomes the Bill as one of the finest measures in conservation and in the development of our resources that has ever passed through the house.*' (Fairbairn 1967).

The Bill was passed through both Houses without amendment on 19 May 1967. A delighted Jacobs sent telegrams to the heads of the state forest agencies (Jacobs 1967). It was a great victory for the foresters who nine years earlier had sketched out a policy of increased softwood planting with Federal Government financial assistance.

3.7 Summary

The complexity of the linked nature of institution building and public policy development is clearly demonstrated in the establishment of the AFC and Federal Government policy to finance the softwood planting acceleration. The origins for both the AFC and softwood planting policy can be sourced to the problems perceived by the early Australian foresters, the political and social environment in which they operated, and the institutions and policy frameworks subsequently established in the first half of the 20th century (chapter 2). The IFA was critical in clarifying the priorities - establishing a large softwood plantation estate and securing Federal Government funding - and presenting the initiative in the wider national development agenda of the 1960s. The absence of dissenting views in the IFA's newsletter and journal suggests that the policy was widely supported within the forestry profession at the time.

The Forestry and Timber Bureau, and in particular its Director-General, Max Jacobs, played a crucial role in securing the AFC's formation and shaping the softwood planting policy. The Bureau networked with the state forest agencies to put softwood planting on the Federal Government's agenda; used crisis opportunities (i.e. the

[40] Nixon's calculations slightly underestimated the actual cost of the program, which averaged $153/acre for the first five years (chapter 4). Note that this average cost was slightly more than half that reported by the forest agencies in Departments of National Development and Treasury (1965b).
[41] This information may explain the lowering of the planting cost from those first estimated by the forest agencies to that used in the actual funding allocation.

proposed New Zealand-Australia Free Trade Agreement) to focus State Premiers and Forestry Ministers on the need for an AFC; prevented a fundamental change in Australia's wood sourcing arrangements by virtually ignoring the advice provided by an array of sources that the private sector be put more firmly on the wood growing agenda; and controlled information at all levels. Despite the demonstrated capacity of the Forestry and Timber Bureau to influence the agenda, the 1960s policy outcome was clearly Government sanctioned. Federal Government funding was argued in Cabinet with the conflicting views of the Departments of Treasury and National Development presented in separate Cabinet submissions. The Government's funding policy (leaving aside the public-private debate) received bipartisan support in Parliament. This bipartisan political support has been lost in the later criticism of the forestry profession and the Bureau over the softwood planting program.

Three sleeping issues lay underneath this bipartisan support, however, namely the high consumption projections underpinning the softwood target, the role of the private sector and the clearing of native vegetation to establish the land base for planting. Checks and balances failed to identify or deal with these issues at the time the policy was developed. There was no mechanism for acknowledging and resolving the lack of consensus amongst the foresters about Australia's future wood requirements. This failing is of greater concern given that the information was used to support publicly funded investment decisions. Treasury's quick analysis of the market outlook also proved quite incorrect. The only serious challenge to the consumption projections underpinning the planting target arose from McEwan's use of the projections to allay the State Forestry Ministers' fears about possible increased imports of wood products as a result of the proposed New Zealand-Australia Free Trade Agreement. However, as it became clear that the Federal Government would finance the planting acceleration, possibly through grants or soft loans, market-based checks and balances that might have worked to constrain State Government funding effectively disappeared.

The planting policy presented the opportunity for the Federal (Liberal-Country Party) Government to restructure the Australian wood industry so that the private sector could take on a greater role in wood production. The Vernon Committee, the Treasury, elements within both sides of Parliament and industry advocated such an approach. Cabinet rejected Treasury's advice, although it could be argued that neither Treasury nor the Treasurer presented a forceful argument for a greater private sector role. The calls in Parliament for a greater private sector role in tree growing came too late. It is possible that the issue would have come under greater scrutiny if the Treasury and Cabinet had been aware of the private-public sector planting cost differential. Allocating a substantial implementation role to the private sector would seriously threaten the wood supply dominance of the state forest agencies, which were now closely networked with the Forestry and Timber Bureau.

The third sleeping issue - native vegetation clearing for plantation establishment - was not identified as an issue at the time. Neither the Forestry and Timber Bureau nor Treasury identified it as a potential issue for Cabinet's attention. At the time, there was no Federal environment portfolio to alert Government of the imminent conservation backlash - something inconceivable by the end of the 20th century, but consistent with

the limited environmental agenda of conservation activists in the 1960s (Robin 1998). As discussed in chapter 4, checks were subsequently added to Cabinet submission procedures to ensure that environmental issues were not ignored. Neither the lengthy parliamentary debate generated by the Minister's 1966 Statement on forests in the House of Representatives nor the debate on the *Softwood Forestry Loans Bill 1967* drew any comment about native forest clearing for plantation establishment.

Chapter 4

Evaluating the implementation of the 1960s plantation policy

4.1 Introduction

Slightly more than three decades have elapsed since the Federal softwood plantation loans scheme commenced. The planting target and underpinning consumption projections were set to the year 2000. Using recently released data, they can now be quantitatively evaluated. Was the 1.2 million hectare (three million acre) softwood plantation area target met? Have the plantations supplied the volume of wood suggested by Jacobs in his 1963 address to the Australian Timber Congress? We shall see that the consumption projections underpinning the plantation area target significantly overstated Australia's wood needs in 2000. What were the reasons? This chapter addresses these questions and evaluates the implementation of the Federal Government's 1960s policy of securing Australia's wood self-sufficiency by around 2000.

The analysis is also of interest from a historical and a natural resource policy perspective. This chapter discusses the political fate of the softwood funding arrangements and the rise of other government plantation assistance measures. Its main purpose is to present a quantitative background to Australia's current wood supply situation. This contributes to the investigation in following chapters of resource driven industry structural change and the opening of new public policy options for native forests and the wood-based industries.

4.2 Federal Government assistance for plantation establishment

Softwood Forestry Agreements Acts

The Federal Government's *Softwood Forestry Agreements Acts 1967, 1972, 1976 and 1978* provided for loans from the Federal Government to the states[42] to enable them to meet their softwood planting obligations. The loans were for a 35-year duration with principal repayment and interest payment deferred for the first ten years. It was not required that interest over this period be capitalised. The interest rate was set at the long-term rate on Commonwealth securities. The Federal Government subsidy for softwood planting therefore comprised the lower interest due to the low financial risk of Federal Government credit, and the extent to which interest was not capitalised during the 'holiday' period. In his second reading speech, Fairbairn stated that the ten-

[42] Funding for plantations in the Australian Capital Territory was provided directly through the Federal Government budgetary process.

year remission of interest was equivalent to a grant to the states of about 38 per cent of total plantation costs (Fairbairn 1967, p. 1931).

Indicative or maximum financial commitments were made in the Acts or the Minister's reading speech. The states submitted funding requests to the Federal Government to cover the cost of planting, tending and replanting failures. Land acquisition and execution of works including land clearing were included. Annual planting schedules were specified for each state with the Federal Government's funding component financing plantings above a specified base level. The 1967 Act specified annual planting rates for the period 1967 to 1971 inclusive; the 1972 Act for 1972 to 1976, the 1976 Act for 1977 only, and the 1978 Act limited the funding to maintenance work. Federal Government funding assistance for plantation establishment lasted for only eleven years - not the 35 years envisaged by the Minister for National Development. The following section explains why and how the funding ceased.

By the early 1970s the Federal Government was confronted by mounting public concerns about native forest clearing for softwood planting. Most of the softwood plantations established in Australia prior to the mid 1980s, as for other agriculture, were realised by the clearing of native vegetation. National data are not available on the extent of land clearing for plantation establishment. Cadman (1990) estimates that approximately 90 per cent of Australia's plantations were established by clearing native vegetated, mainly forested, land. The National Plantation Inventory presents historical data on the planting base for Queensland - such data for other states are substantially incomplete. Of the 185 799 hectares of plantations established in Queensland from the early 20th century to 2000, 73 per cent were planted on native forest land. The clearing of native forests for plantation establishment in Queensland started to decline in the early 1980s and had virtually ceased by 2000. The increasing area of mature softwood plantations means that second crop plantings - i.e. now on non-native forest land - account for most of Queensland's planting today. This re-planting accounted for 78 per cent of Queensland's plantation establishment over the 1990s, and planting on other agricultural land accounted for 22 per cent of the planting (Wood et al. 2001, pp. 146, 154). State Government regulations on land clearing (Centre for International Economics 1997, p. 31) have significantly curtailed land clearing for plantation establishment in all states except Tasmania (see Wood et al. 2001 for 2000 planting data in all states except Tasmania; Geoff Law pers. comm. 2000 for Tasmania).

The late 1960s softwood planting acceleration and hence native forest clearing coincided with Australia's developing ecological consciousness (Robin 1998; Hutton & Conners 1999). The before and after images of large-scale native forest clearing for softwood plantation establishment (see, for example, Routley & Routley 1974) and public protests connected with a rising public concern about the development path Australia appeared to be pursuing. The Gorton Liberal Coalition Government established the House of Representatives Select Committee on Wildlife Conservation in 1970, and the softwood program was incorporated in their inquiry. On this issue the Committee recommended that:

- uneconomic, previously-cleared farmland be used for softwood planting rather than clearing additional native forests, and
- surveys to assess the wildlife values of areas to be cleared for softwood plantations be undertaken before clearing (House of Representatives Select Committee 1972).

The environmental implications of native forest clearing for plantations were not considered at any stage in the softwood planting policy formulation process (chapter 2). However, within five years of the passing of the 1967 Act, a Parliamentary Select Committee was recommending measures to address the environmental concerns. This five-year period corresponded to one of the fastest-changing eras in Australian and international environmental consciousness, sometimes referred to as the 'environmental revolution' (Robin 1998). During this time there was a rapid rise in awareness of land 'degraded' through poor agricultural practice.

Federal Government funding for softwood planting was periodically exposed to parliamentary scrutiny because legislation was required to extend the funding for the next five-year planting schedule. The 1972 Bill was presented to Parliament in an election year. Whitlam, the leader of the opposition Australian Labor Party (ALP) had signalled a policy of safeguarding the environment. The opposition stated that it was not opposed to the 1972 Bill and expanding the plantation estate, but it was concerned about procedural and practical issues. It moved an amendment criticising the Government's failure to conserve existing hardwood native forests and associated flora and fauna in relation to softwood plantings (Patterson 1972). The speech by Tom Uren (ALP) in support of the amendment was the first parliamentary articulation of the environmental problems of the softwood program. Uren considered that softwood plantations should be established on already cleared agricultural land thus solving the 'degraded land' problem and meeting the new need to retain native forests. He argued that the Bill was environmentally irresponsible and economically highly questionable:

> '*It represents a classic case of national development designed and financed on the narrowest of economic considerations and based on very speculative future projections of Australia's population and per capita consumption of wood. The Bill contains not one word about the large environmental impact of the policies contained in it. Unlike the afforestation projects of most other countries, pine plantations in Australia in the main are being established on Crown lands already occupied by native hardwood forests.*' (Uren 1972a).

The ALP amendment was defeated and the Bill passed through to the Senate. In the Senate, an amendment moved by the Democratic Labor Party was successfully passed. The amendment comprised two parts: the first ensuring that native forests not be cleared for softwood planting without an environmental impact study, and the second requiring that planting conform to sound forestry, environmental and financial practices. The Minister for National Development (now Sir Reginald Swartz) in the House of Representatives proposed an alternative amendment '*ensuring that environmental factors relating to the planting have been considered.*' (Swartz 1972).

Swaetz's amendment was successfully passed and the Senate agreed to the amendment in place of its. It was a historic occasion with Uren noting:

> '*It is probably the first time - it will be only the first of many - that governments have been brought to task with regard to and reminded of the impact of certain legislation on the environment.*' (Uren 1972b).

Only five years earlier, the Minister for National Development had described the same legislation as one of the finest conservation measures that had ever passed through the house.

Neither the planting target nor the level of financial assistance was affected by the amendment. Under the 1972 Act, 22 128 hectares of softwood plantations would be established per annum, with the states financing 12 011 hectares per annum and Federal Government loans financing the difference. However, the parliamentary debate signalled the imminent cessation of Federal Government funding.

Shortly after the 1972 parliamentary debate, the Government announced that any future Cabinet submission on any proposal relevant to the environment and any State Government project for which finance was sought from the Federal Government would have to be accompanied by a statement on the likely environmental impact of the proposal and supported by assurances that all the appropriate environmental factors had been considered and evaluated (Carron 1985, p. 311).

The ALP, under Whitlam's leadership, won the December 1972 federal election. The Government transferred the Forestry and Timber Bureau to the Department of Primary Industries. The subsequent review of its functions and relations with other government organisations saw a boosting of the CSIRO's role in wood and wood products industry research, the Department of Primary Industries made responsible for 'forestry' up to the mill door, and the Department of Industry and Commerce made responsible for matters inside the mill door. The Department of Primary Industries would retain responsibility for the export woodchip industry, sleepers and whole logs (Carron 1985, pp. 256-7). These administrative arrangements, mirroring those in the states, remain in place today. In reality, the demarcation line is blurred and the primary industries/forest agency portfolios tend to dominate the development of wood and wood products industry policy. This is due to the public ownership of much of the wooded land and the focus of the political conflict at the wood supply level. This point is elaborated in chapters 6 and 7.

The scrutiny of the softwood planting program continued. The Task Force appointed in early 1973 to review the continuing expenditure policies of the previous Government, recommended further study into the economic viability of the softwood program before commencing negotiations over future funding (Carron 1985, p. 314). By this stage, controversy over softwood planting was joined by the controversy over the emerging native forest export woodchip industry.

Japanese companies were increasingly interested in purchasing Australia's native forest hardwood resource for papermaking. In November 1967, the Premier of New South Wales, Robert Askin, announced that a consortium, including the Daishowa Paper Manufacturing Company, had been awarded the right to purchase native forest eucalypt wood from the south east of the state for export as woodchips. Another project was being considered in the state's north. Other states were examining native forest woodchip export opportunities at the time. The Western Australian Government had invited applications for exporting woodchips from the Manjimup forest area; Victoria had numerous inquiries with the forest areas around Portland, Melbourne and East Gippsland being considered for export woodchip operations; the Queensland Government had held some discussions with Japanese interests; Australian and Japanese companies had shown interest in Tasmania and a number of inquiries were received by the State Government; eight companies had been given until the end of August 1968 to submit proposals for woodchip export projects in the Northern Territory (Fairbairn 1968).

Securing a market to finance the culling of unwanted 'defective' trees to make room for a new and vigorous eucalypt forest crop had been the foresters' long-unrealised dream (chapter 2). The softwood plantation program added a new dimension. Much of the native forest cleared for softwood planting was burnt (Routley & Routley 1974) and the Japanese pulp and paper industry's interest in Australia's native forest resource alerted foresters and government to the lost revenue. Developing a native forest woodchip export business was a '*cost-free or cheap way of clearing unwanted forest in preparation for softwood planting.*' (Boswell 1967). The two developments, increased softwood planting - entailing native forest clearing - and native forest export woodchipping, combined in the late 1960s to launch Australia into four decades of forest conflict (Quarmby 1986; Dargavel 1995; Frawley 1999).

In May 1973, a Federal Government interdepartmental committee was established to investigate the softwood program and native forest woodchip operations. Pressure for a public inquiry saw the Government shift the softwood planting investigation in 1974 to the House of Representatives Standing Committee on Environment and Conservation. The Committee was required to report on the operations of the 1967 and 1972 Acts with particular reference to their environmental, social and economic impact and to make recommendations on legislation for any future softwood plantation agreements. A year earlier, the Whitlam Government had set up the National Estate Committee of Inquiry to examine the national estate and find measures to preserve and enhance it.

The National Estate Committee reported in 1974. On the issue of softwood plantations, it recommended more economic evaluation of the program and the cessation of clearing of native forests for plantation establishment (Committee of Inquiry into the National Estate 1974). The following year the House of Representatives Standing Committee on the Environment and Conservation reported and presented wide-ranging findings and recommendations. It found that there was a need for a softwood program, possibly on a lesser scale than planned, and recommended that the next Act cover a period of ten years. It also recommended greater exposure of the program to public scrutiny and an immediate study into the economic viability of the program. The Committee

recommended that Federal Government financing of plantation establishment on native forest land cease except where a thorough and stringently supervised independent research program had been conducted into the flora and fauna of the area, as well as its soil quality, and where the planting plan allowed for their protection (House of Representatives Standing Committee on the Environment and Conservation 1975).

The Bureau of Agricultural Economics (BAE)[43] undertook the economic study as suggested by the House of Representatives Standing Committee. Its primary objective was to determine the future level of demand for wood products in Australia and to determine if it was in the nation's interests to meet this demand through domestic production or through imports. The BAE concluded that, given projected native forest wood supply, softwood planting should be continued for the years 1976 to 1980, but at a lower rate than previously, in order to achieve self-sufficiency by 2020.[44] It recommended an annual planting rate of between 16 700 and 18 200 hectares per annum (Bureau of Agricultural Economics 1977, p. 132).

The AFC had decided to postpone recommending a softwood planting rate for the 1976 Act until after the FORWOOD conference.[45] On the issue of the softwood program, the FORWOOD Conference proposed an annual planting (public and private) of 28 500 hectares over the period 1975-2010. The plantation estate would not increase each year by this amount because some of the planting would be undertaken as second crops on existing plantation land (FORWOOD 1975, p. 53).

With this body of work and competing interests, the Fraser Liberal-National Party Coalition Government presented the 1976 Bill to provide $6 million of funding for an additional year of planting. On an annual basis, the area of plantations funded by the Federal Government would be halved to around 5 000 hectares. No commitments were made to continue the funding. The 1976 Bill was enacted in December 1976 - half way through the planting year. Federal Government funding to the states on such projects now required an environment impact statement. The states agreed that as much as possible of the remaining year's planting would be undertaken on already cleared agricultural land (Carron 1985, p. 315). The 1978 Act saw the cessation of Federal Government funding for plantation establishment. The $4.2 million funding commitment under the Act was to be spent on maintaining plantations established under the scheme for the five years commencing 1977/78. Payments continued through

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[43] The BAE was established in 1945 to service the Ministry of Post-War Reconstruction and the Department of Commerce and Agriculture. In 1989, it was amalgamated with the Bureau of Resource Economics (focussed mainly on energy issues) to form the Australian Bureau of Agricultural and Resource Economics (ABARE). ABARE undertakes economic research and provides information and analysis on a range of agricultural, minerals and energy industries (Australian Bureau of Agricultural and Resource Economics 1999b).

[44] The Bureau projected Australia's demand for wood in 2000 at 25.2 million m^3 per annum (Bureau of Agricultural Economics 1977, p. 117). This was 35 per cent greater than the actual requirement of 18.6 million m^3 (appendix A).

[45] The AFC authorised the Forestry and Wood-Based Industries Development Conference (FORWOOD) in 1969 and provided it with wide-ranging terms of reference to be considered by eight specialist panels with reports prepared for consideration at the FORWOOD Conference in April and November 1974 (FORWOOD 1975).

to 1983/84 to cover claims outstanding when the 1978 Act lapsed (Industries Assistance Commission 1989).

The softwood plantation program came in on a wave of bipartisan support that was subsequently halted by bipartisan actions, commencing with the Gorton Liberal-National Party Coalition Government, extended by the Whitlam ALP Government, and completed by the Fraser Liberal-National Party Coalition Government.

Loan payments from the Federal Government to the states under the Softwood Forestry Agreements Acts totaled $373 million in 1999/00 dollars (table 4.1). According to the Acts, these funds were required to meet the costs of establishing and maintaining 102 000 hectares of softwood plantations (table 4.1). The average cost of $3 670 per hectare (in 1999/00 dollars) is approximately double the softwood plantation establishment and management costs reported by ABARE in 1999 (Burns et al. 1999, pp. 217-8). Plantation costs in Queensland and Victoria show significant deviations above and below the Australian average respectively (table 4.1). However, these figures are not evidence of public sector inefficiency in plantation wood growing - as Nixon argued in 1967. Some of the funds may have been used to finance what should have been State Government funded plantations either at the time or after Federal Government funding ceased.

Table 4.1 Commonwealth payments to the states for softwood plantation establishment and maintenance. Source: *Softwood Forestry Agreements Acts 1967, 1972, 1976, 1978*; Minister for Primary Industries and Energy (1997); Australian Bureau of Statistics (2001b).

State	Loan payments 1967-1983 ($ million in 1999/00 dollars)	Planting area financed by loan funds (hectares)	Implied plantation establishment and maintenance cost ($/hectare)
New South Wales	127.67	39 200	3 257
Queensland	88.13	15 900	5 543
Tasmania	46.83	10 600	4 418
Western Australia	45.87	10 800	4 247
Victoria	44.80	19 400	2 309
South Australia	19.21	5 500	3 493
Total states	372.51	101 400	3 674

The Acts require that principal and interest payments on each of the 35-year loans commence ten years after each loan is provided. The actual repayments vary considerably between states. South Australia and Tasmania have had their repayments of principal and payment of interest waived. New South Wales, Queensland and Western Australia have paid various amounts of principal and interest and Victoria has repaid all loans early and in full. Unlike other states, Queensland and Victoria capitalised the interest over the ten-year holiday period and included it in repayments (Minister for Primary Industries and Energy 1997; table 4.2). These arrangements have continued unchanged since 1997 (S. O'Loughlin pers. comm. October 2001). Tasmania and South Australia have therefore received outright grants for their softwood plantings. At the other extreme, Victoria - the state that frustrated the formation of the AFC - has repaid all its loans and the interest that was capitalised over the holiday

period. Victoria's clearing of outstanding debts was in preparation for the sale of the state's plantation resource in 1998.

Table 4.2 Loan payments to the State Governments under the Softwood Forestry Agreements and principal and interest paid by each state to 30 June 1997 (million $ nominal). Source: Minister for Primary Industries and Energy (1997).

State	Loan payments to state	Principal repaid as at 30 June 1997	Interest paid as at 30 June 1997	Outstanding principal repayments as at 30 June 1997	Outstanding interest payments as at 30 June 1997	Total payments (principal and interest) paid and outstanding	Per cent of total payments (principal and interest) paid as at 30 June 1997 (%)
NSW	27.23	10.95	30.45	16.28	13.82	71.50	57.9
Qld	18.08	9.06[a]	13.74	29.93[a]	32.80	85.53	26.7
WA	10.08	8.93	11.70	1.15	0.33	22.11	93.3
Tas	9.96	0	0	waived	waived	waived	waived
Vic	9.06	17.24[a]	6.29	0	0	23.53	100.0
SA	3.65	0	0	waived	waived	waived	waived

a. Interest over interest holiday period was capitalised and included in repayments.

Other planting assistance

The rate of softwood planting declined by approximately a third following the cessation of Federal Government funding. However, annual planting continued during the 1980s at twice the rate of the post-war to mid 1960s period (table 4.3). The states were conscious of the need to establish the critical mass to enable scale economies in processing in their key plantation regions (see for example Victorian Government 1986, p. 56).

Although APM Forests commenced planting eucalypts in the 1950s (Chandler 1963), it was not until the mid 1980s that investment in eucalypt plantations in Australia became a more widespread corporate strategy (Clark 1992a). The decision reflected a combination of the cost and quality attractions of growing wood as an agricultural crop (chapter 5), increasing interest globally in eucalypt fibre, particularly for printing and writing paper (Figueiredo 1987; Deslandes 1987), and risk reduction associated with government native forest land use decisions (Mann 1990, p. 160).

Federal Government financial and non-financial assistance provided further incentives for plantation investment, but this time the assistance was indifferent as to whether the plantings were for hardwood or softwood. The National Afforestation Program commenced in 1987/88 with the aim of stimulating eucalypt planting with grants to meet establishment costs and provide research and demonstration funding (Industries Assistance Commission 1989, p. 5). Additional Federal Government support for tree planting was provided through the Trees on Farms, One Billion Trees, Farm Forestry Programs and Regional Forest Agreement compensation funds. A plethora of other assistance measures - resource inventory compilation, research and development funding, conference sponsorship, land availability assessment, reviews of plantation

codes of practice and information collection - has provided additional industry support (Centre for International Economics 1997, p. 59). Federal Government assistance for plantation establishment in Australia since the softwood plantation loans scheme ceased has not been comprehensively documented, and the effectiveness of the programs has not been comprehensively researched. Assistance measures for commercial farm tree planting (provided mainly through share farming and joint venture arrangements) were documented and reviewed by Prinsely (1991). Farm tree planting accounted for approximately five per cent of Australia's plantation estate in 2000 (Wood et al. 2001, p. 28).

Table 4.3 Australia's plantation establishment phases, softwood and hardwood and private sector plantings. Source: Gray (1935); Forestry and Timber Bureau (1969); Australian Bureau of Agricultural and Resource Economics (2001b) and earlier editions; Wood et al. (2001).

Phase	Year	Increase in softwood plantation area (hectares per annum)	Increase in hardwood plantation area (hectares per annum)	Increase in total plantation area (hectares per annum)	Privately owned plantations as % of total at the end year of the phase (%)
Pre WWII	1920-1939	5 089	na	5 089	8.3[b]
Post WWII to softwood loans agreement funding	1946-1966	9 406	661[a]	10 067	25.2
Softwood loans funding	1967-1983	29 297	1 250	30 547	31.1
Post-softwood loans funding to 1990	1984-1990	19 098	7 632	26 730	29.5
Eucalypt planting priority	1990-2000	4 576	40 615	46 187[c]	46.0[d]

a. Calculated from 1947.
b. Softwood plantations only.
c. Total includes mixed hardwood and softwood species and unknown species.
d. Excludes joint venture plantings and plantings of unknown ownership.

In 1997, the Federal Minister for Primary Industries and Energy launched *Plantations for Australia – the 2020 Vision*. The document presented an industry-proposed and government-endorsed target of trebling Australia's plantation estate by 2020 (Ministerial Council on Forestry, Fisheries and Aquaculture et al. 1997). Like its 1960s softwood predecessor, the planting target (roughly three million hectares instead of three million acres) was not accompanied by a rigorous market analysis (see Clark 2001a for a global market analysis from the perspective of a plantation investor). Unlike its 1960s predecessor, however, the 2020 Vision was aimed at encouraging private sector investment.

Mass marketed tax effective schemes were rampant in Australia during the second half of the 1990s (Senate Economics Reference Committee 2001), and the emerging plantation prospectus-based industry rode this wave. The prospectus-based industry had two powerful marketing tools to help distinguish it from other tax effective

investments. Firstly, Federal Government encouragement for plantation investment was clearly articulated though the 2020 Vision and the enthusiastic Minister for Forests and Conservation, Wilson Tuckey. Second, the widely-held perceptions of a global wood shortage (see for example Simons Consulting Group 1994; Apsey & Reed 1994; Cameron 1996, and, for an alternative view, Sedjo & Lyon 1990; Food and Agricultural Organisation of the United Nations 1999; Clark 2001a) created a healthy price outlook for wood. Australia's hardwood planting increased by an average 41 000 hectares per annum over the 1990s - a planting rate exceeding softwood planting during the 1970s and 1980s (figure 4.3). As discussed in chapter 6, prospectus-based investment drove most of this planting.

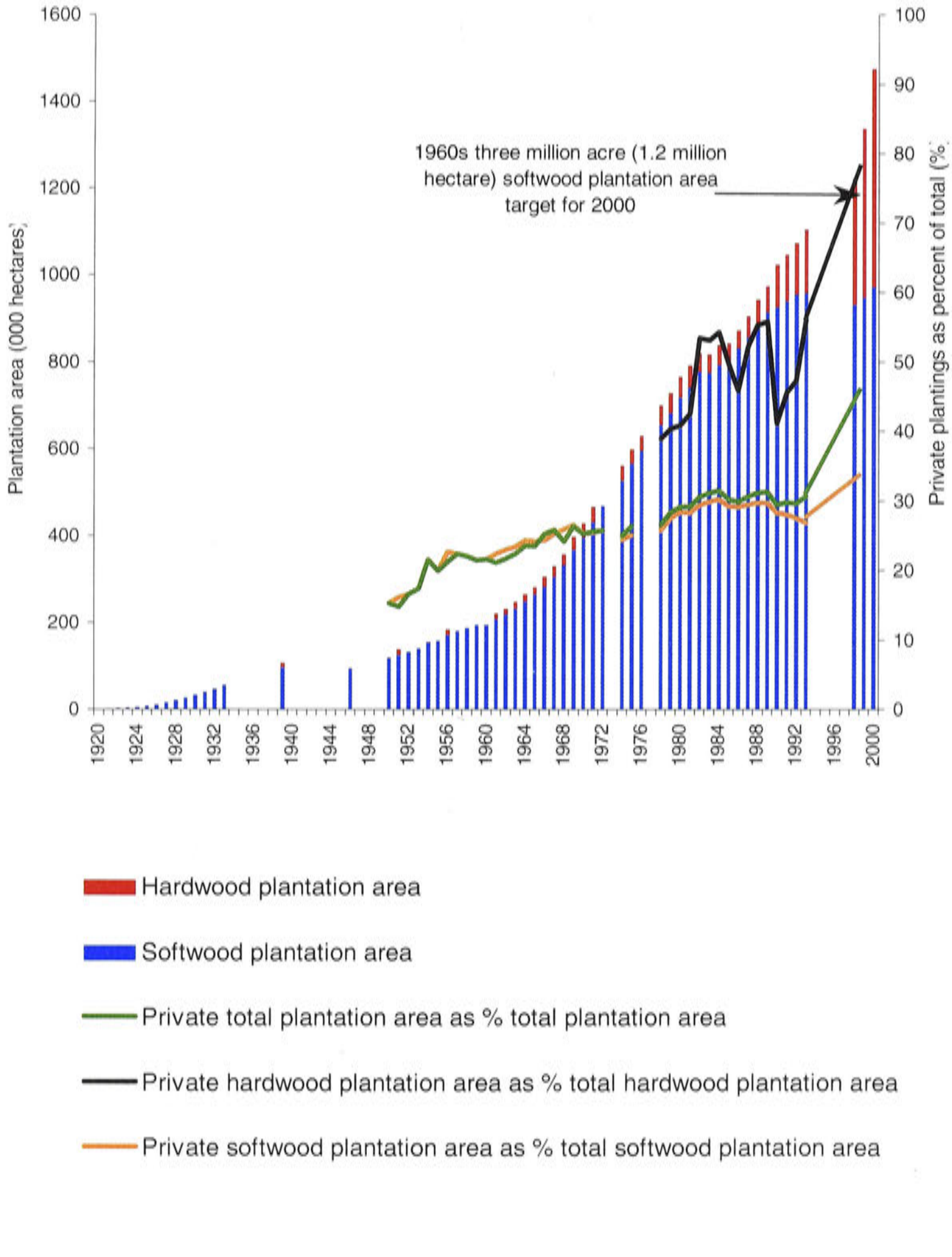
State Governments provided complementary assistance through joint venture planting programs; funding field days, publications, extension and advisory services and farm forestry networks; establishing private forestry units or groups as part of the state forest agency or as an independent statutory body; and development of strategies for private forestry (Centre for International Economics 1997, pp. 60-1; National Plantations Advisory Committee 1991, appendix A).

Offsetting these government assistance measures is the extent that the wood supply from publicly owned native forests - a competing product in the commodity wood market - is subsidised and therefore works to discourage private plantation investment (Industries Assistance Commission 1989; Marsden Jacob Associates 2001). This issue is discussed in chapter five.

4.3 Was the 1960s planting target achieved?

The 1.2 million hectare (three million acre) softwood plantation area target aimed to secure Australia's wood self-sufficiency by 2000. With rotations of approximately 35 years and the program commencing in 1967, the area target (1.2 million hectares) would be achieved by around 2000. By the early 1990s, Australia's softwood planting on new areas (first rotation planting) had plateaued, slowly reaching 0.97 million hectares by 2000 (figure 4.1; table 4.4). First rotation planting by the private and public sectors slowed as growers came to perceive future wood yields in reasonable alignment with market expectations and plantation areas were increasingly able to support scale economy processing plants in most major plantation regions. Over the 1990s, Australia's softwood plantation estate increased by an average 4 600 hectares per annum (table 4.3). Some plantation managers (e.g. APM Forests) converted softwood plantation areas after harvesting to hardwood plantations (Resource Assessment Commission 1992a, p. L9). The area of private softwood plantations in Queensland has steadily declined with housing estates established on much of the land after harvesting. Australia's softwood plantation estate is expected to stabilise at around one million hectares for the immediate future (Resource Assessment Commission 1992a, p. 258). The process of replanting harvested areas for the next crop is now dominating the softwood planting program (see, for example, Department of Primary Industries 2001, p. 80).

Figure 4.1 Softwood and eucalypt plantation establishment Australia 1920-2000, public and private. Non entries are due to the absence of area data or unreliable data. Source: Gray (1935); Forestry and Timber Bureau (1969) & Annual Reports; Department of Primary Industries (1981); Australian Bureau of Agricultural and Resource Economics (1992); Wood et al. (2001).



The 0.97 million hectares of softwood plantations in Australia in 2000 represents 81 per cent of the softwood target set in the 1960s.

During the 1990s, Australia's planting effort shifted to eucalypt species for use in printing and writing paper production. By September 2000, 0.50 million hectares of eucalypt plantations had been established in Australia. Together, softwood and hardwood plantations in Australia covered 1.5 million hectares in 2000 (table 4.4). The three million acre (1.2 million hectare) target proposed by Jacobs in 1963 has been achieved with two modifications; namely, the switch to hardwood planting and the increased role of the private sector (figure 4.1).

Table 4.4 Plantation area Australia, by state, September 2000 (hectares). Source: Wood et al. (2001).

State/territory	Softwood	Hardwood	Mixed species	Unknown	Total
New South Wales	270 672	44 626	2 676	923	318 897
Victoria	215 110	101 453	2 035	35	318 633
Western Australia	98 441	214 993	430	0	313 864
Queensland	178 620	9 435	2 660	192	190 907
Tasmania	75 630	109 567	0	0	185 197
South Australia	113 871	20 703	718	261	135 553
Australian Capital Territory	14 585	194	0	0	14 779
Northern Territory	5 235	1 649	29	0	6 913
Australia	972 164	502 620	8 548	1 411	1 484 743

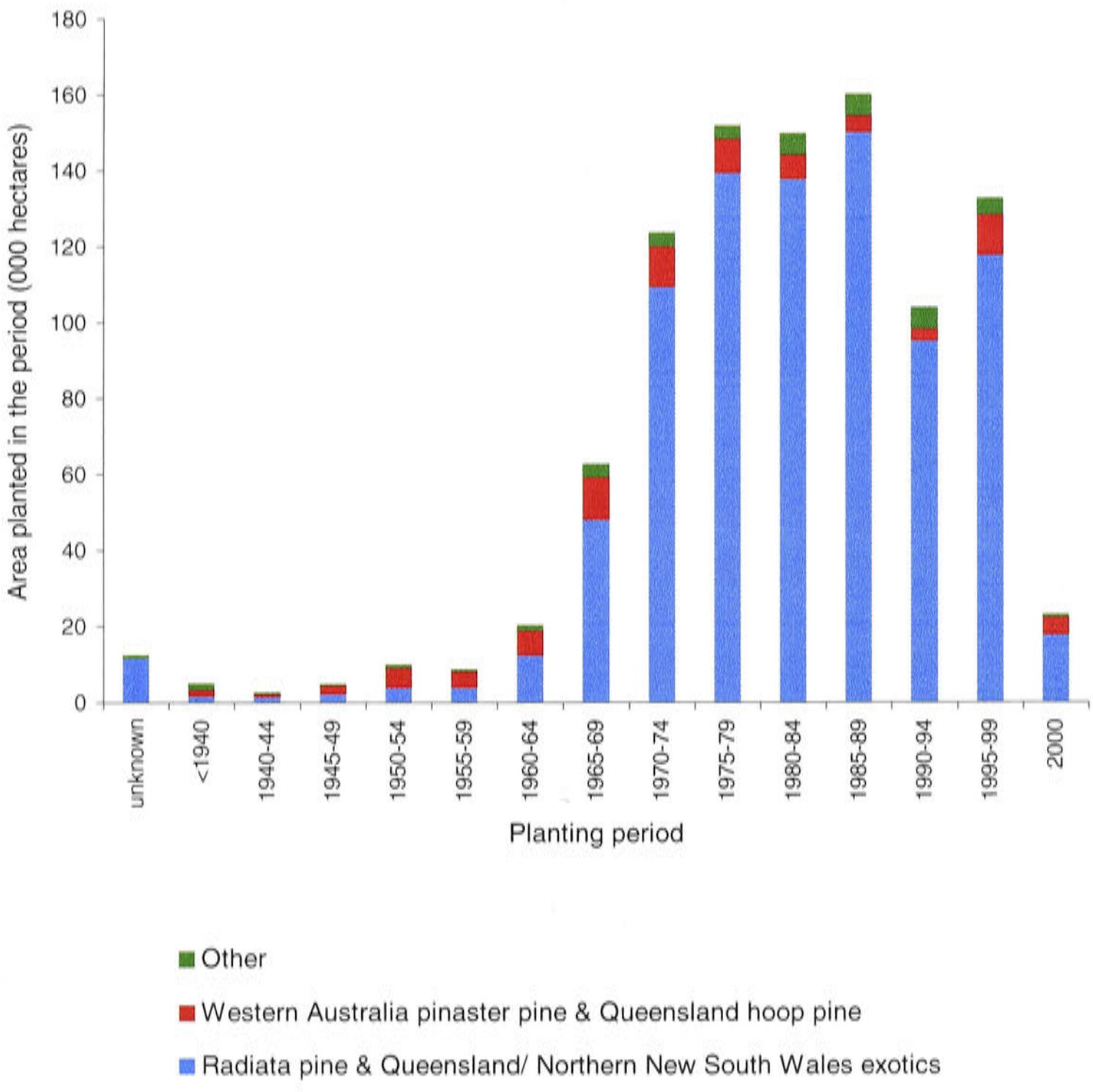
Plantation wood supply - softwood

The 1.2 million hectare plantation target was intended to supply half of Australia's projected wood needs (excluding fuel wood) of 32.6 million m^3 per annum by 2000 (chapter 2). We cannot by directly examining published supply data determine if this wood supply objective was met because Australia's plantation resource is currently under-used (chapter 6). This means that estimates of Australia's plantation supply potential are required to determine whether the wood supply target was met. The key pieces of information for this task are the softwood plantation age profile (a snapshot of the plantation estate showing the area planted in specified time periods) and productivity (m^3 of merchantable wood per hectare per annum).

Figure 4.2 presents Australia's softwood plantation age profile at September 2000. Radiata pine and other exotic species plantings in Queensland and northern New South Wales make up 88 per cent of Australia's softwood plantations (Wood et al. 2001). They are generally managed over 30-year rotations (Clark 1995a). Plantations established in the planting years 1970-74 (the effect of the Federal Government's financial assistance is observable) should be coming on stream for clearfell harvesting around 2000-04.[46] Western Australia's pinaster pine and Queensland's hoop pine plantations, make up 8 per cent of Australia's softwood plantations (Wood et al. 2001). These are managed over rotations of approximately 40 to 50 years (Morris & Clark 1995; Turner & James 1997a). Figure 4.2 indicates that Australia's softwood plantation

[46] That the radiata pine plantations and exotic species plantations in Queensland and northern New South Wales established before 1970 are still standing (85 000 hectares - 10 per cent of those species plantations) suggests an under-use of the resource at September 2000. This issue is discussed in chapter five.

Figure 4.2 Softwood plantation age profile - Australia September 2000. Only one year of planting is recorded for 2000. Queensland and Northern New South Wales exotics comprise *Pinus radiata, p. elliotti* and *p. caribaea*. Source: Wood et al. (2001).



estate has reached a reasonably mature age profile status. This means that by around 2000 the plantations were able to supply close to their maximum sustainable annual wood yield. Productivity improvements, particularly with the next crop (see for example Boardman & Simpson 1981; Boardman 1988; Flinn & Turner 1990), will increase sustainable supply over the longer term.

Table 4.5 Australia's softwood plantation productivity. Source: Australian Forestry Council (1989); National Plantation Inventory (1997); Clark (1995a); Departments of National Development and Treasury (1965a); FORWOOD (1975); Jacobs (1963c); Resource Assessment Commission (1992a); Turner & James (1997a).

Author and date	Plantation MAI (m^3 per hectare per annum)	Comments
Jacobs 1963	14.0	An undocumented assumption.
Departments of National Development and Treasury 1965	16.0	Weighted average of the data supplied by the state forest agencies for the benefit-cost analysis submitted to Cabinet.
FORWOOD 1975	16.0	The weighted average for all commercial species planted on a significant scale.
Australian Forestry Council 1989	18.0	An undocumented assumption.
Resource Assessment Commission 1992	18.0	Average productivity reported for sawlog/chiplog plantations in NSW/Vic/SA (appendix P p. 7).
Clark 1995	16.4	Wood from the then 944 500 hectare softwood plantation estate (p. 29) fully on stream by 2005 supplying 15.5 million m^3 per annum (p. xi)
National Plantation Inventory 1997 [a]	13.7	Projected average annual supply over 35 years (1995 to 2029) of 12.15 million m^3 (p. 79) from a 883 980 hectare estate (p. 10).
Turner & James 1997[a]	17.8	Calculated from indicative yield tables prepared for the National Plantation Inventory (1997). Regional wood volumes weighted by plantation area data reported in National Plantation Inventory (1997).

a. The difference between National Plantation Inventory (1997) and Turner & James (1997) - work undertaken as part of the National Plantation Inventory 1997 - is discussed in chapter 7.

The annual wood yield from Australia's softwood plantations by 2000 can be estimated by applying productivity assumptions to the area data. Wood yields from Australia's softwood plantation estate have been widely investigated, but most studies are difficult to evaluate because of inadequate documentation (chapter 7). The productivity assumptions - either directly assumed or implied in the projections - of the main reports are presented in table 4.5. The productivity figures are averages for the Australian estate as a whole; they are not representative of the increased productivity generally achieved in more recent plantings. Productivity is measured by the mean annual increment (MAI) - the annual increase in the volume of merchantable wood per hectare over the rotation. From table 4.5, a MAI of 16 m^3 per hectare per annum appears to be a reasonable, probably conservative, estimate of the overall productivity of Australia's current softwood plantation estate. This means that wood supply from Australia's

softwood plantations (972 165 hectares) could be expected to average approximately 15.6 million m^3 per annum by around 2000. Jacobs (1963c) proposed that softwood plantations would meet half of Australia's projected wood consumption in 2000 - 16.3 million m^3 to be supplied from softwood plantations and 16.3 million m^3 from native forests. Jacobs' softwood plantation wood volume aim for 2000 appears to have been achieved - the slight difference being within the statistical discrepancy of such exercises.

Plantation wood supply - hardwood

As discussed above, and further in chapter 6, Australia's eucalypt plantation establishment is in a growth phase. Uncertainty about future planting rates for these generally short rotation plantations[47] (i.e. 10 to 15 years) makes it difficult to generate reliable projections of wood supply past 2010. However, the purpose of this chapter is to examine the outcome of the 1960s plantation program focussing on plantation wood supply at 2000. It is projected that Australia's eucalypt plantations can supply 2.4 million m^3 of wood per annum in 2000-2004 (National Plantation Inventory 1997; Duggie 2000).[48]

Summary

Australia achieved the three million acre (1.2 million hectare) plantation area target set in the 1960s, allowing for some eucalypt plantation substitution. Australia's 1.5 million hectares of softwood and eucalypt plantations are estimated to have an annual wood supply potential of 18 million m^3 in 2000. Wood self-sufficiency was the underlying aim of Australia's 1960s plantation policy, and it was considered that this would be achieved with native forests supplying half the market and softwood plantations the other half. Hanson (1962a) estimated that Australia would require 32.6 million m^3 of wood to meet Australia's projected consumption of wood products (excluding for fuel) in 2000 - half (16.3 million m^3 per annum) to be sourced from plantations. From a wood production perspective, the 1960s plantation policy was implemented.

4.4 Were the consumption projections realised?

Australia's consumption of wood products, domestically produced or imported, during the year ending 31 December 2000 required 18.6 million m^3 of wood (appendix A, table A1). Australia's wood consumption in 2000 was therefore only slightly more than half the 32.6 million m^3 of wood projected by Hanson in 1962. The main factors responsible for the over-estimation were:

- the high per capita consumption assumption for sawn timber,

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[47] As discussed in chapter 2, the South Australian experience indicated that fast growing softwood species were favoured over eucalypts in plantation regimes aimed at sawlog production. Most of Australia's eucalypt plantations have been established to supply chiplogs for pulp production and are managed using rotations considerably shorter than that required to grow a sawlog.

[48] The projections presented in Duggie (2000) were prepared by myself.

- not factoring in wood saving technology in the paper industry, namely recycling, and
- a high population assumption (appendix A, figure 4.3).

The consumption projections underpinning Australia's softwood planting program were intensely debated in the 1970s. Routley & Routley (1974) dominated this critique, presenting arguments and quantified evidence to contradict most assumptions made in Hanson (1962a). The Routleys estimated Australia's likely future wood requirements by examining each variable and preparing a range of likely per capita consumption estimates for a range of expected populations. They estimated that Australia's wood consumption in 2000 would most probably range between 19 and 21 million m^3 (Routley & Routley 1974, p. 57).[49] This was a remarkably accurate projection, but, as discussed in chapter 3, other foresters working in the late 1950s and early 1960s had also accurately projected Australia's future wood requirement. It should be noted that, relative to the foresters, the Routleys had twelve years additional data to assist in their critique and projection work.

The Routleys argued that the softwood plantation program was designed to simulate consumption with targets disguised as projections - what foresters hoped would be consumed if cheap wood was available. They explained:

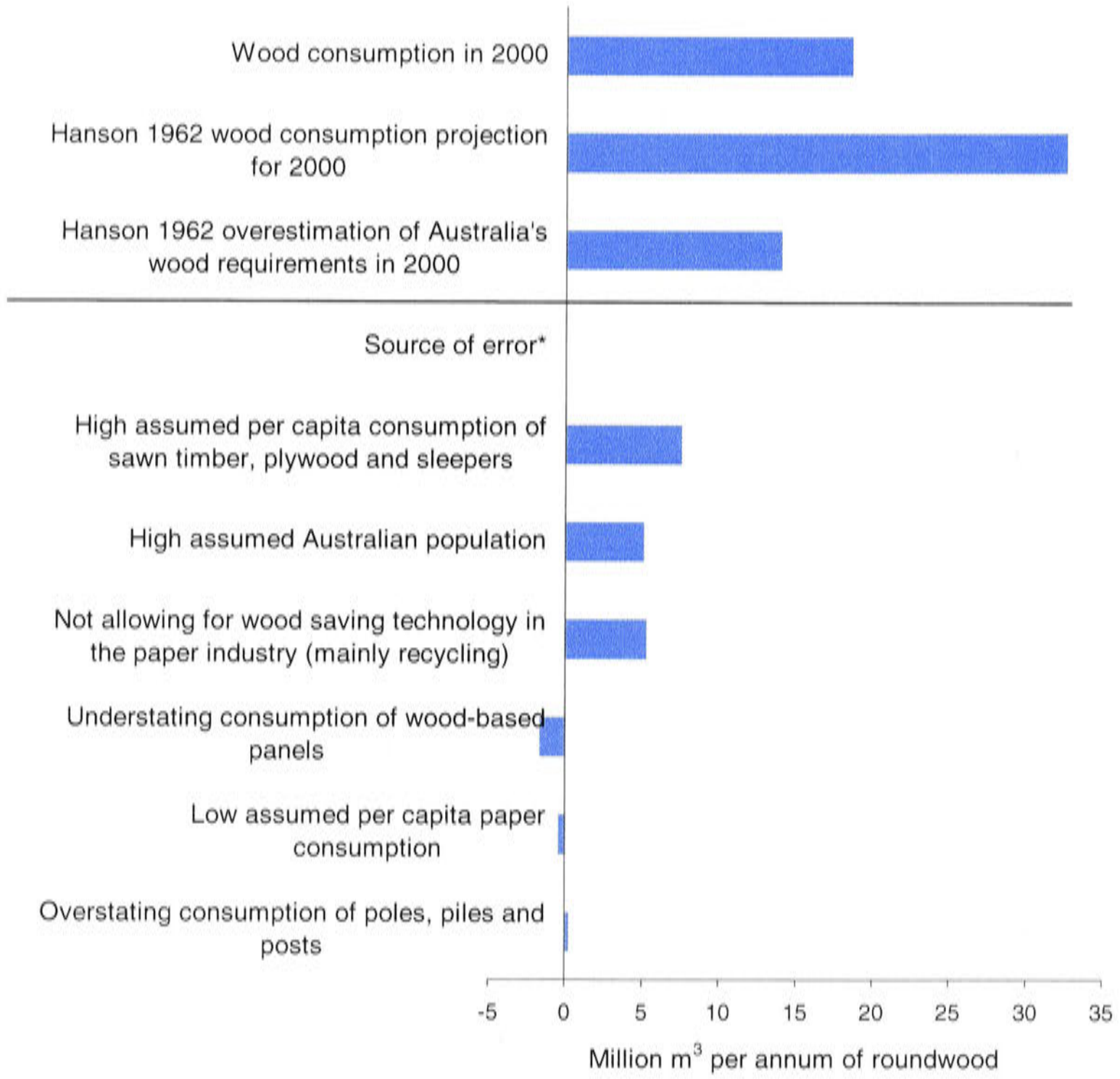
> '*That overestimation is the favoured method is not however hard to explain; it is an outcome of the fact that in forestry planning prediction has been biased by promotion, and promotion of wood products along big business lines with the aim of maximizing their consumption. The overestimation method, applied in a developmental 'pioneering' ethos, helps, in its turn, to account for the environmentally irresponsible attitude of much standard forestry planning.*' (Routley & Routley 1974, p. 49).

The Routleys charged the foresters with an exclusive focus on wood production. Declining per capita sawn timber consumption, the trend extensively researched by the Routleys, was well known in forestry circles - including Hanson and Jacobs. By the late 1950s, the erosion of the sawn timber market by non-wood substitutes and wood saving technologies was well-documented (Hanson & Wilson 1958; Hanson 1959; Clarke 1959, Turnbull 1959). The industry was also expressing its concern about declining market share. The Chair of the Australian Timber Producers' Panel (of state sawmilling associations) wrote to Jacobs congratulating the Government on the establishment of the AFC and expressing the hope that it would thoroughly address the problem of declining demand for traditional sawn timber products (Cotton 1964).

Some foresters argued that the competitiveness of the sawn timber industry could be enhanced by ensuring sufficient wood to keep log costs down and also enable scale economies in processing (Rodger 1959; Fielding 1962). Leslie argued that this view was not valid because sawn timber was price inelastic. Leslie also noted that sawn

[49] Figures reported in cubic feet converted to cubic metres.

Figure 4.3 Error source in Hanson (1962a) projected Australian wood requirements in 2000. Source: Appendix A.



* Error source calculated by substituting 2000 data for each of Hanson's assumptions whilst holding all else constant. The total overestimation cannot be derived by aggregating the error sources because the error with the population assumption would be double counted.

timber had a low income elasticity of demand and that these price and income elasticities explained much of the declining per capita consumption of sawn timber (Leslie 1963, p. 116). Supplying cheap wood would not by itself reverse declining per capita consumption.

Hanson and Jacobs were aware that the wood consumption projection presented in Hanson (1962a) was high. As discussed in chapter 3, Jacobs described the projection as 'challenging' but presented arguments to support the per capita consumption assumptions. The consumption outcome, argued Jacobs, would depend on log supply and its suitability for wood products in favour at the time (Jacobs 1963c, p. 3). These arguments were repeated in the Forestry and Timber Bureau's submission to the Vernon Committee:

> '*...there is no justification for anticipating a fall in the per capita log equivalent of forest products used in Australia, provided the material is available for purchase at a reasonable price.*' (Forestry and Timber Bureau 1963, p. 9).

Jacobs wrote to the Vernon Committee providing additional points justifying the per capita assumptions. In addition, he argued that if Australia's wood consumption was over-projected, there was a latitude of at least twenty years before '*there is the embarrassment of material going to waste*', although the commercial cost was appreciated (Jacobs 1964c). To summarise, it was widely understood that Australia's per capita consumption of sawn timber was declining and widely hoped, in forestry circles, that creating a large softwood supply would reverse the trend.

I suggest an additional explanation for the high consumption projections. Whilst the substitutability between sawn timber and non-wood products was widely discussed, a silence appears to have swept over the issue of substitutability between native forest hardwood and plantation softwood. This was not always the case. Turnbull from the CSIRO's forest products utilisation section wrote:

> '*A great deal of discussion has taken place from time to time concerning the respective merits of hardwood and softwood. In utilization the difference in merits of these two classes of wood is not as distinct at it appears to be in the minds of some foresters. I believe that softwoods and hardwoods are interchangeable in use to a far greater degree than is generally recognized.*' (Turnbull 1959, p. 36).

Gray (1957) and Harris & Nunn (1957) had also written papers on hardwood/softwood substitutability for the British Commonwealth Forestry Conference held in Australia and New Zealand in 1957. The conference discussed the desirable balance between softwood and hardwood production, and each country was left to decide whether to favour hardwoods or softwoods (British Commonwealth Forestry Conference 1957, p. 19).

There was no reference to substitution between native forest hardwoods and plantation softwoods in any of the papers prepared for the AFC's softwood program, in the records of the AFC meetings, the reports by the Departments of National Development and Treasury for Cabinet or the Parliamentary debates on the *Softwood Forestry Agreements Bill 1967*.

The softwood program was viewed as Australia becoming self-sufficient in softwoods through import replacement (chapter 3). The softwood planting target was presented as the gap filler - the unmet projected consumption after using the native forest wood supply and wood from the then relatively small area of existing plantations. This understanding sidestepped the sensitive issue of plantation softwoods (largely a future industry) competing against native forest hardwoods (an existing industry).

The rationale for the native forest market share in the new wood supply regime was simplistically prescriptive. When the three million acre (1.2 million hectare) plantation target was first proposed, Jacobs allocated half of the market in 2000 to be supplied by native forest wood leaving the other half to softwoods (Jacobs 1963c, p. 3). Hanson later explained the rationale for this mix in a meeting with his local division of the Institute of Foresters:

> '*A purely subjective judgement was made that half of our total requirement should come from plantations and half from native forests.*' (Hanson 1965b, p. 2).

This critical assumption sits uneasily with Hanson's Bachelor of Commerce and his obvious understanding of market competition (Hanson 1959, 1963; Hanson & Wilson 1958).

Perhaps the architects of the softwood program understood the sensitivity of the substitution issue and its potential to undermine the plantation program. They could avoid the issue and conflict in the 1960s because, at that time, the task was to establish the plantations. Competition would not fully emerge until around 2000, when large volumes of softwood sawlogs would come on stream for processing. The challenge for the 1960s architects was to establish a plantation resource to match future consumption without arousing anxiety among the native forest hardwood sawmillers. One way of achieving this could be to generate optimistic consumption projections, thereby supposedly creating a wood supply role for native forest sawn timber.

Having examined the competitiveness/substitutability issue, Hanson came down in favour of softwood:

> '*The way to counter these trends* [declining per capita sawn timber consumption] *is to give to the consumers the type of timber they need as cheaply as possible. In the author's opinion we are not doing this if we continue to grow hardwood in the same proportion as at present.*' (Hanson 1959, pp. 39-40).

After presenting both sides of the hardwood versus softwood argument, Hanson concluded:

> '*From the point of view of cost of sawn product, the advantage appears to be with softwood.*' (Hanson 1959, pp. 39-40).

He drew a similar conclusion for the paper pulp industry:

> '*The advantages of the yield of long-fibred pulp makes softwood preferable for most production lines. Those items for which hardwood pulp are preferred represent a small proportion of the total consumption.*' (Hanson 1959, pp. 39-40).

For the other uses of wood - posts, piles and poles - Hanson commented:

> '*Technically, hardwood is more suitable than softwood for most of these items but the advantage is reduced by the greater ease with which softwood is treated with preservative.*' (Hanson 1959, pp. 39-40).

Jacobs, using more technical arguments, also saw the wider industry advantages of a higher dependence on softwoods rather than native forest hardwoods. Writing well after the planting decision and with his knowledge on tree growth stresses, he based his explanation of Australia's need for a large softwood plantation resource on the growth properties of hardwoods:

> '*The inner parts of hardwoods contain an in circle which develops millions of microscopic compression failures which relieve the stress, but permit fungal attack and rotten hearts. Hardwood trunks must grow to an appreciable diameter, and therefore age, before they are really suitable for the sawmilling industry. Conifers behave differently ... Largely because of this simple difference in growth habits, three quarters of the sawnwood used in the world is coniferous. So many machines are designed for it. We need an adequate resource of this material.*' (Jacobs 1973, p. 47).

As Australia exhausted its sawlog stocks in previously unlogged native forests, the problems to which Jacobs was referring would intensify because, without relatively fast-growing softwoods, the sawmilling industry would become increasingly dependent on the younger native forest regrowth resource.

Perhaps the desire to avoid unsettling the existing native forest hardwood sawmillers played no role in Hanson's wood consumption projections and, unlike other projections at the time, he simply got them wrong. The most we can say is that Hanson's and Jacobs' collective understanding of sawn timber intra-industry competition and technical and economic issues of wood growing were strong motivations for defending the high consumption projections.

4.5 Sawlog demand, consumption and plantation supply

Sawn timber consumption, and hence sawlog supply, has dominated much of the analysis and debate surrounding Australia's wood and wood products industry. This can be explained by the historical importance of sawn timber in the wood product mix, the labour intensiveness (hence political sensitiveness) of the many small native forest based sawmills still in operation and the environmental arguments supporting the management of native forests over longer, therefore less environmentally damaging, rotations to produce sawlogs for building rather than smaller logs over shorter rotations for paper. Implicit in this view is the contestable point that house building is a more legitimate use of wood than paper. The widespread importance placed on sawlogs/sawn timber calls for a separate examination of the plantation targets and wood consumption projections for this sector of the industry.

Continuing high growth in sawn timber consumption dominated the consumption projections underpinning the plantation area target. Projected demand for saw and veneer logs[50] accounted for nearly 70 per cent (22.1 million m^3 per annum) of Australia's projected wood requirements in 2000 (Hanson 1962a). Australia's actual sawn timber and plywood consumption in the year ending 31 December 2000 required 12.4 million m^3 to make (appendix A table A1; figure 4.4). As discussed above, the high per capita sawn timber assumption explains most of the very large over-projection.

The rapid post-war growth in Australia's sawn timber consumption did not continue. Consumption started to level out in the 1950s and after the 1970s oil shock. Australia's sawn timber consumption is characterised by housing-cycle induced oscillations around a low, long-term growth trend (figure 5.4). The high end-point of the actual consumption data presented in figure 4.4 (year ending 31 December 2000) shows the effects of the pre-goods and services tax building boom. The inevitable decline will see sawn timber consumption falling as part of the normal oscillation. I expect Australia's average annual consumption of sawn timber and plywood over the 1996-2002 housing cycle to be around 11.5 million m^3.[51] Hanson's 1962 projection is nearly double this figure.

Actual softwood plantation sawlog production in 2000 does not accurately reflect the plantation supply potential because of the under-use problem raised earlier and in more detail in chapter 5. The simple but reliable approach used earlier to estimate total plantation wood supply (i.e. all log grades) is not appropriate for estimating output disaggregated into log grades. This is because growers in different plantation regions have different management objectives - some aim to maximise sawlog production whilst others focuss more on chiplog supply for paper production. The approach taken here is to present the various projections of Australia's softwood plantation saw and

[50] Veneer logs for plywood are included in the discussion to be consistent with most projections that include veneer logs in their sawlog projections. Plywood accounted for 5 per cent of Australia's saw and veneer log consumption in 2000 (appendix A, table A1).

[51] Consumption in 2001 and 2002 calculated by continuing the long-term trend growth of 0.3 per cent per annum from the trough of 1996.

veneer log supply undertaken since the late 1980s and compare them with consumption (figure 4.4).

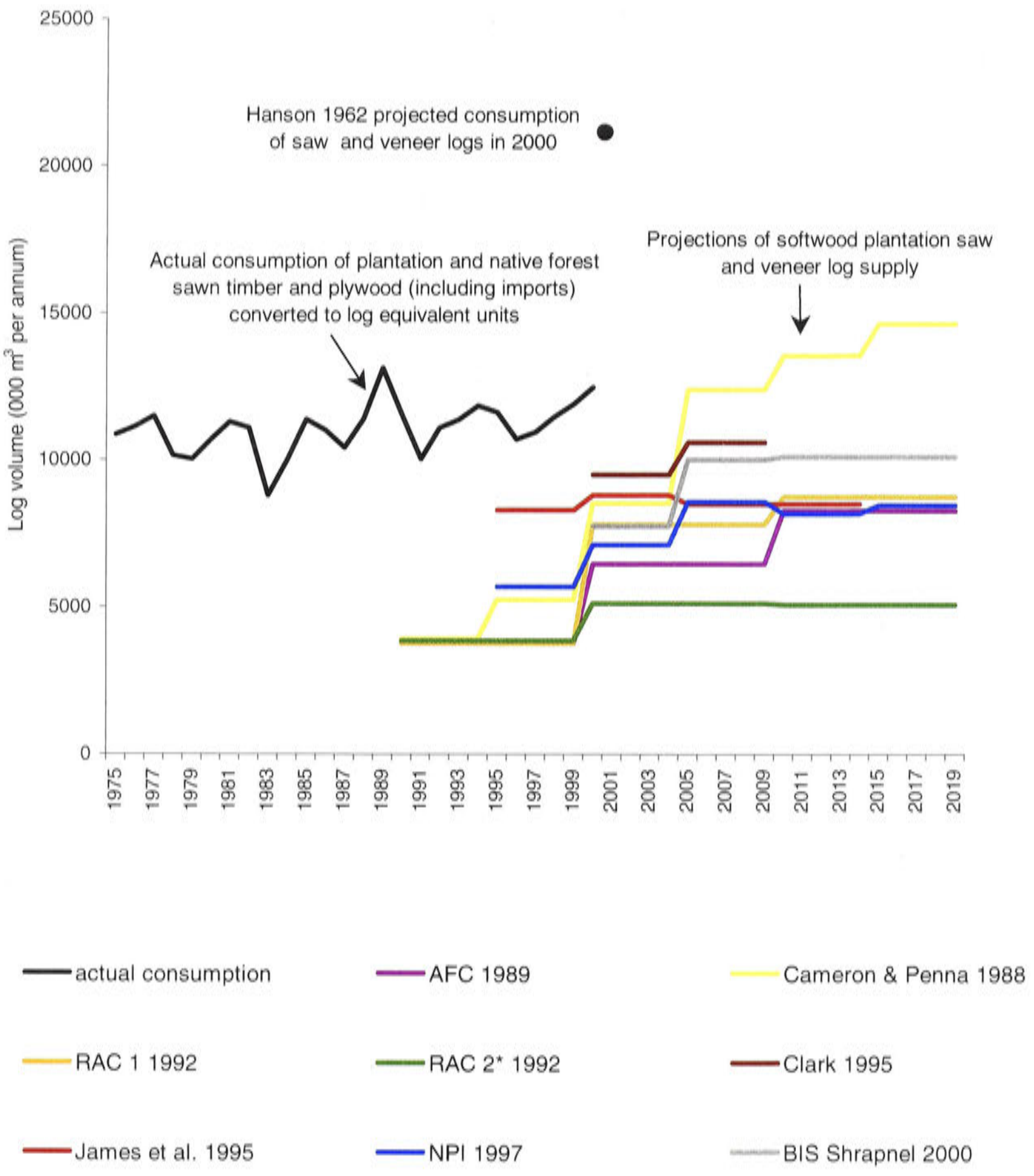
Projections of softwood plantation saw and veneer log supply vary significantly (see appendix E for a description of the projections). The reasons why are incorporated in the analysis presented in chapters 6 and 7. Projections by Cameron & Penna (1998), Clark (1995a) and BIS Shrapnel Forestry Group Pty. Ltd. (2000) indicate that softwood plantations can meet, or almost meet, Australia's requirements by around 2005 (figure 4.3).[52] The other projections indicate significantly lower supply in 2005.

Self-sufficiency based on plantation wood only was not the purported aim of the 1960s plantation policy. Native forest hardwood sawn timber was notionally allocated half the projected market. Because actual consumption in 2000 was half that projected by Hanson and the planting targets were largely met, the option exists for Australia to meet virtually all its sawn timber needs from domestically produced plantation sawn timber (together with wood-based panels). To a large degree, the inevitable supply driven competition has been generating such an outcome with plantation sawn timber increasing its market share (chapter 5).

The projections presented in Clark (1995a) and BIS Shrapnel Forestry Group Pty. Ltd. (2000) support the view that Australia can be virtually self-sufficient in sawn timber using plantation wood alone, thereby creating new public policy options for Australia's native forests and wood based industries. These policy options are less valid if the projections presented in the Resource Assessment Commission (1992a, RAC 2) and the Australian Forestry Council (1989), and to a lesser extent the National Plantation Inventory (1997) and James et al. (1995), are more realistic. The wood supply potential of Australia's plantations is a key piece of information for policy. Before examining the vexed issue of Australia's plantation wood supply potential (chapter 7), we must analyse the efficiency of growing wood as an agricultural crop (chapter 5).

[52] Wood based panels (e.g. medium density fibreboard, particleboard, oriented strand board) made from small particles of wood have been excluded from this saw and veneer log/sawn timber and plywood discussion. They are used largely as substitutes for sawn timber and plywood in many applications (Nelson & Kelly 1998; von Weizsäcker et al. 1997). From a self-sufficiency perspective, these products, together with traditional sawn timber and plywood, have enabled Australia to meet its entire commodity building needs since around 2000 (Clark 1995a).

Figure 4.4 Hanson (1962a) projected Australian consumption of saw and veneer logs in 2000 relative to actual consumption and projected Australian softwood plantation saw and veneer log supply. Actual consumption figures to 1991 are for year ending 30 June. All other figures are for year ending 31 December. Source: Appendix E; ABARE Forest Products Statistics & Commodity Statistical Bulletin various years; Hanson (1962a).



* RAC2 1992 are projections of sawn timber production (consumption) converted to sawlog equivalent units.

Chapter 5

Is it sensible to grow wood as an agricultural crop?

5.1 Introduction

A fundamental question for forest policy formulation is whether wood should be produced in an agricultural system. Debate over the question arouses strong views, and the arguments used by both supporters and opponents have often been based more on prejudice than on a balanced consideration of the information and issues (Poore & Fries 1985).

A core attraction of tree cropping is its productive use of land. For example, wood yields per hectare are generally higher than extensive use of native forests. The environmental impacts of sourcing wood from native forests can be reduced by shifting wood supply to a smaller land base using a cropping regime (Elliott 1992; Hawken et al. 1999). Against this benefit are the negative environmental impacts of intensive land management if native vegetation is cleared, native gene pools are contaminated by the introduction of other species, soils are disturbed during site preparation and their productivity deteriorates owing to repeated short rotation cropping, water quality and quantity in catchments containing large plantation areas deteriorates, and the use of herbicides, fertilisers and pesticides increases (Elliott 1992). Cadman et al. (1991) examined the potential negative environmental consequences of plantation expansion and weigh them up against the potential for tree planting to address land degradation problems flowing from earlier extensive forest clearing for other agricultural pursuits. Provided that environmental safeguards are implemented, they conclude that an increased plantation estate on cleared agricultural land can generate net environmental benefits compared to most other agricultural land uses. Research to underpin the necessary environmental safeguards is advancing, particularly in the areas of biodiversity conservation (see for example Lindenmayer at al. 1999; Lindenmayer & Pope 1999) and hydrology (see for example Vertessy & Bessard 1999; Petheram et al. 2000; Zhang et al. 2001).

Humphreys (1992) argued that the strong connection between land care programs and tree growing (see for example Prinsley 1992; Reid & Stewart 1994) may be the genesis of a merging of silviculture and agriculture to provide benefits to many land users in Australia. Conscious of the price-cost pressures of commodity production, Humphreys notes that synergies in plantation wood growing, land care and effluent management enable the sharing of fixed costs (e.g. land, fencing, rates, research and development, infrastructure) across multiple businesses. Where such synergies exist, multiple commercial use of agricultural land can relieve some of the price-cost pressure of commodity production and concurrently address environmental problems.

Church & Richards (1998) argue that shifting wood supply to plantations is negative from the perspective of ecological sustainability because plantations require the use of non-renewable resources whereas native forest wood is a potentially renewable resource. Whilst Church & Richards provide no comment on whether the wood in Australia's 1.5 million hectares of existing plantations should be used, they encourage research effort to establish the requirements for ecologically sustainable management of native forests for wood production. Significant resources have already been focussed on this task (see, for example, Robinson 1988, Ferguson 1996), but the implementation question remains poorly addressed.

In this chapter, I examine the commodity nature of the Australian wood and wood products industry and its implications for managing native forests for wood production. Can state (native) forest agencies maintain environmentally effective regulations for a cost-conscious commodity industry over the long term?

Social issues arise in growing wood as an agricultural crop. Plantation establishment raises local community concerns about population decline leading to reduced community services and increases in community servicing costs for the remaining population. The displacement of farming families and traditional agriculture is the core concern (Centre for Farm Planning and Land Management 1989; Courtney 2000; Schirmer 2000). Some rural communities have enjoyed significant manufacturing employment from processing plantation wood (Dwyer Leslie Pty. Ltd. & Powell 1995; Margules Groome Pöyry et al. 1995) whilst others have benefited less with the exporting of wood for processing outside the region.

Environmental, social and economic pressures are now introducing a greater complexity to plantation wood growing. Kanowski (1995) identified the major challenge for plantation wood growing, namely the design and management of production systems that acknowledge and address the economic and social dimensions of sustainability criteria as well as those that relate to the environment. The first aim of this chapter is to propose a framework to assist in meeting this challenge. Within this framework, two key strategies are identified as being critical for maintaining the sustainability of native forest ecosystems, wood production as an economic activity and rural socio-economic well being. These strategies are transformed into measurable indicators, which are used to complete the assessment of 1960s plantation policy before providing a detailed evaluation of the performance of Australia's wood and wood products industry over the 1990s.

5.2 Defining sustainability

The meaning of sustainability and sustainable development has received considerable discussion (Pezzey 1989; Costanza & Patten 1995; Common 1995; Sutton 2000). At its core, sustainability is the ability to maintain something over-time (Sutton 2001).

Costanza & Patten (1995) similarly argued that a sustainable system is one that survives or persists.

The concept of sustainability can be widely applied, for example to the environment, the economy, an organisation, a culture and a species. Selection of systems for protection over their life-time or over a specified life is obviously contestable. Democratic processes that can identify the public interest and also assist in developing a public consensus become important (see Dahl (1998) for a grounding in democratic theory, and Fishkin (1995) and Dryzek (2000) for an examination of processes for bringing deliberation to democracy).

Processes that threaten to cut short the expected life span of a system undermine sustainability. Identifying threatening processes, and strategies for their amelioration, is a core element of policies aimed at achieving sustainability. Sutton (2001) argues that, as the pursuit of sustainability has progressed, its meaning has shifted to one of integration of social, economic and environmental issues - even when these are traded-off against each other. The idea of maintenance as the core meaning of sustainability is displaced by the idea of integration despite maintenance and major trade-off being mutually exclusive. Sutton (2001) observes that this changed meaning is due to confusion about means and ends. The objective of sustainability is maintenance whilst the means to this end might be (amongst many other things) an integrated grappling with issues in the social, economic and environmental arenas, but without any major trade-offs.

The approach of Costanza & Patten (1995) and Sutton (2001), which focusses on system identification and developing strategies to enhance their capacity to persist (without major trade-off), underpins the framework for forest and wood industry policy developed below.

Identifying systems for sustaining

In this thesis, three systems associated with wood production have been selected for investigation of strategies to enhance their capacity to persist for their full-expected life span. They are:

- native forests as self-regenerating ecosystems,
- wood production systems to meet human needs for shelter, communication, packaging etc., and
- rural socio-economic systems.

Their selection is based on a subjective assessment of the main factors that historically have shaped native forest and wood industry policy in Australia. The analysis could be broadened to include ecosystem services such as carbon systems. The sustainability discussion for the wood production system is largely focussed on economic considerations. The framework can readily accommodate an extension to include environmental aspects (e.g. biodiversity, water and soil) of wood production in an agricultural regime.

Native forests are ecosystems dominated by tree species predominantly native to the locality and where natural regenerative processes operate to recover canopy structure following natural or artificial disturbance. Clearing native forests for large-scale infrastructure and to create an agricultural land base for growing food, fibre and wood obviously destroys these systems at a regional scale. Maintaining these ecosystems requires a cessation of processes that threaten their self-regenerating capacity.

The second group of systems are wood production systems to meet human needs for shelter, communication, packaging etc. These functions can also be met from non-wood products (Maddern & French 1989; Sedjo & Lyon 1990; Wood 1992; Lippke 1994; Clark 1995a). Alternatives to wood based production systems include by-products of other agricultural production systems (e.g. wheat straw, bagasse, and cotton linters); developing technologies using enzymes in non-wood pulping; and recycled wood-plastic composites. New products and processes (technological development) mean that the life span of any production system should be indeterminate - superseded by others having a positive social consensus that is also consistent with enhancing the capacity of the ecosystem to persist. Here I shall concentrate on wood production systems.

Rural Australia socio-economic systems make up the third group of systems in this inquiry. Population, communication, economic wealth, employment, culture, infrastructure and education contribute to rural community well being. The framework developed in this chapter focusses on employment and economic wealth because of their fundamental importance for rural communities (Commonwealth of Australia 1994).

5.3 Strategies to enhance system capacity to persist

Actions aimed at enhancing a system's capacity to persist are contestable and call for debate and on-going investigation. This thesis proposes two key actions aimed at enhancing the persistence capacity of the three selected systems, namely:

- shifting commodity wood production from native forests to an agricultural system, and
- adding value by domestic processing.

Shifting commodity wood production from native forests to agriculture

I argue that shifting commodity wood production from self-regenerating native forest ecosystems to agricultural systems can enhance the persistence capacity of native forest ecosystems as well as enhance the economic viability of wood and wood products production systems and therefore their capacity to persist. The significance and nature of commodity production is fundamental to the argument.

Commodity production

Commodity comes from the Latin word *commoditas* meaning benefit. Schaniel & Neale (1999) observed that five centuries ago commodities referred to imports from newly discovered lands (e.g. spices, cottons, silks, furs) and to the traditional commercial products of farms. They argue that Marx gave 'commodity' a new meaning, namely, products made in factories to sell at a profit in a market. Marx did not rule out unprocessed items, referring specifically to Australia being a colonial 'nursery' for the production of wool for Britain to process (Marx 1934, p. 485). His focus was on goods for sale to generate profits. Financial writers today (e.g. Wyatt 1999) use the word commodity in referring to market traded products like oil, coal, gold, wool and sugar that undergo varying degrees of processing.

These loose understandings call for a definition that draws out the distinguishing nature of a commodity in contemporary socio-economic systems. Both commodity products and, their opposite, specialty products are sold in the market. Commodities are different to specialties in that they are homogeneous products that usually meet established standards. Quality (and its consistency in production) is important for commodity producers, but the products' characteristics tend to be defined in terms of broadly accepted international standards (Industry Commission 1993, p. 74). Examples of these standards are the moisture content and strength of graded sawn timber, the thickness, tear strength and brightness of paper and the size and colour range of woodchips.

Homogeneity in commodities means that commodity producers compete largely on price because that is how buyers usually distinguish one company's product from others. It is this price-dominated competition that characterises commodity production. To capture more sales, commodity producers focus on selling their products at attractive prices, thereby putting constant downward pressure on commodity prices. Wyatt (1999), using the USA Commodity Research Bureau's price index of 17 commodities, reported that commodities lost 75 per cent of their real (inflation adjusted) value over the last 200 years. Ruthven (1995) reported that the real price of commodities in the 1990s global market place was a mere fraction of what they were in the industrial age and the agrarian age before that.

To maintain profit levels in an environment of long-term declining real prices, commodity producers adopt an on-going strategy of cost reduction. Technological change is the means by which profits can be maintained in an environment of long-term price decline. Clark (2001a) used the technology classifications of Sedjo & Lyon (1990) and a simple supply and demand price model to capture the price effect of technological change in the wood and wood products industry. An examination of the empirical evidence showed long-term downward trends in the real price for wood in three of the four major markets examined. The exception was the very high-growth Asian countries, where average real import prices for woodchips during the 1990s remained at their 1960s levels (Clark 2001a). Declining real prices for wood is an understood reality in the industry (Humphreys 1992; H.A. Simons & McLennan Magasanik Associates 1990), although some analysts (e.g. Food and Agricultural

Organisation of the United Nations 1997; Sedjo & Lyon 1990) more cautiously report finding no evidence of increasing real prices for wood.

The wood and wood products industry is highly exposed to the price-cost squeeze because of its highly commodified nature. Globally, commodities make up around 80 per cent of the output volume of the wood products industry (A.J. Leslie pers. comm. 1992) and an estimated 95 per cent of Australia's production (appendix B). Most sawn timber, structural beams and wood-based panels; much of veneer and plywood; pulp and most paper are commodities. The wood used in their manufacture is highly commodified. Most sawlogs and all chiplogs are commodities, as are woodchips.

A familiar cost reduction strategy is to configure plant size to capture scale economies and maximise plant operating time to spread fixed costs over a larger revenue base. Attention can then be given to developing strategies for on-going reduction of operating costs, namely wood, energy, labour, and other material inputs. Wood is a significant cost item and therefore target for cost reduction strategies. Wood costs comprise the price paid for standing logs (stumpage) and the cost of logging and cartage to the mill. For Australian-based commodity producers supplying the home market, wood accounts for slightly more than half the operating costs of a plantation saw mill; around one-third of the costs of a plywood mill and slightly less than one-quarter of the costs of a wood based panels plant (Industry Commission 1993). Wood costs account for around one-quarter of the operating costs of a bleached kraft pulp mill exporting its product to Japan (H.A. Simons & McLennan Magasanik Associates 1990).

Wood growing regimes and the cost reduction imperative

Old-growth native forests have provided the wood products industry with an *in situ* resource. The cost reduction effort has therefore concentrated on lobbying for lower stumpages and developing technologies to reduce logging and transport costs. Sedjo (1983) argued that, as the old-growth native forest resource diminishes, the cost reduction effort has shifted to the economics of growing wood and in particular growing wood in an agricultural regime. Australia's early foresters pre-empted this when they decided to shift the nation's wood supply to the global softwood standard (chapters 2 & 3).

Growing wood in an agricultural regime offers cost reductions through economising on time, land, logging and transport as well as scale economies and processing efficiencies (Sedjo 1983, 1990; Clark 1995a; Burns et al. 1999). Plantations are usually established with relatively fast growing species, generally on favourable sites, and usually with the intention of intensive management. This agricultural growing regime enables earlier income returns to growers; scale economies to harvesters, haulers and processors; processing and handling efficiencies through log uniformity; and processing efficiencies through tree breeding and selection. The potential for on-going cost reduction through research and development (for examples, see Boomsma & Boardman 1988; Robert Flynn and Associates & Economic Forestry Associates 1999) sustains industry interest in agricultural wood growing regimes. Alternatively, industry will remain focussed on Australia's native forest resource if low native forest stumpages can

compensate for their higher cost operations (for recent examples of low native forest stumpages, see Miller 1999; Paine 2001). Over time, however, as Sedjo (1990) argued, the economics of an agricultural regime relative to a hunter gatherer regime will widen.

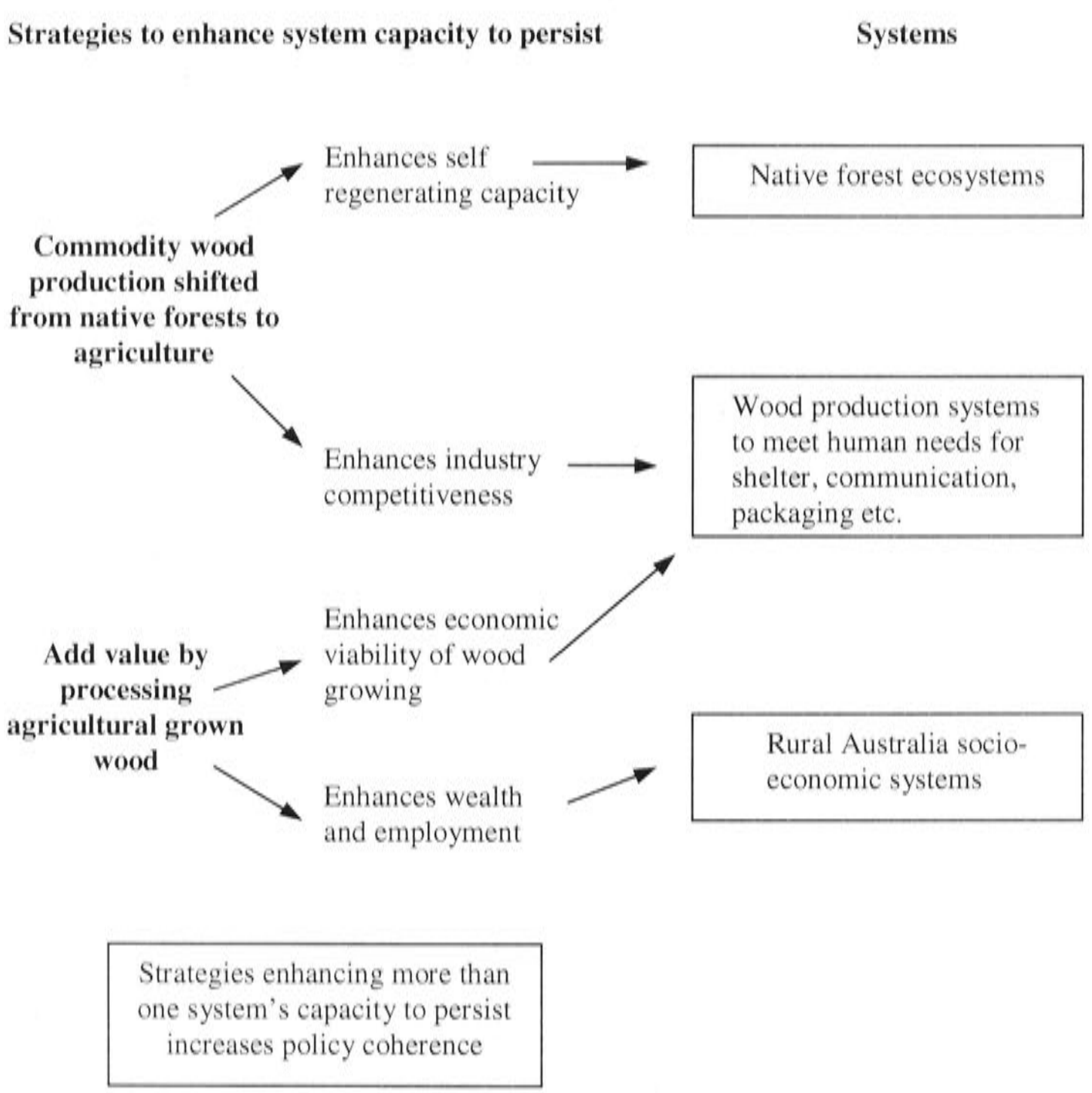
The price-cost squeeze of commodity production means that a native forest based industry is likely to lobby for intensification of native forest management to enjoy the same commercial advantages as their competitors using an agricultural regime (for a frank discussion, see Cross 2001). Opportunities for applying intensification technologies are greatest when old-growth forests are clear-felled and shift into a regrowth phase. Intensification practices include reducing rotation lengths, increasing wood yields using agricultural technology, and selecting non-indigenous tree species for replanting. Such intensification practices threaten biodiversity in native forest ecosystems (Ehrlich 1996; Lindenmayer 1996; Norton 1996).

Ironically, plantation wood, with its potential to relieve the ecological pressures of commodity wood production on native forests (if this does not entail clearing native forests), also contributes to the pressure for intensification technologies in native forests. With high substitutability between plantation and native forest commodity wood products (chapter 7, appendix F), the pressure to intensify native forest management will increase as more plantation wood comes on stream for processing. Shifting commodity wood production to an agricultural regime will remove a process threatening to native forest ecosystems and therefore enhance their persistence capacity (figure 5.1).

Although intuitively obvious to many, rarely is the nature of commodity production and its implications for native forest ecosystems acknowledged in policy (chapter 6). The changing structure of the wood and wood products industry suggests that the capacity of public forest agencies to resist adopting intensification technologies has diminished over the past three decades. Most of the many small, family owned sawmills are now concentrated into larger corporate structures and log sales to a small number of chip exporters has taken an increasing share of Australia's native forest wood (Dargavel 1995; Resource Assessment Commission 1992a).

State native forest agencies understandably have an interest in the commercial viability of their customers - mainly producers of commodity wood products. They are inevitably attracted to managing native forests to replicate the commercial benefits of growing wood as an agricultural crop. Government-imposed requirements on state (native) forest agencies to produce financial performance results more in line with the private sector adds to the intensification pressure. Revenue is most easily increased by selling more wood. Growing wood with similar attributes to a plantation resource reduces buyer pressure for lower wood stumpages to compensate for lower quality wood. The alternative is a run-down strategy of cost minimisation over an extensive native forest estate.

Figure 5.1 System framework for native forest and wood industry policy



For the above reasons, I argue that sourcing wood from native forests cannot jointly meet the interests of native forest ecosystems and producers of commodity wood products. A separation of function and land base is required (figure 5.1).

Adding value by processing

Value added is a measure of the economic value generated by the activities of a firm or industry in using its factors of production (i.e. land, labour, capital and knowledge). Broadly, it is the difference between the total value of a firm's production and the costs of all the material inputs and purchased services that it uses (Industry Commission 1993, p. 25).

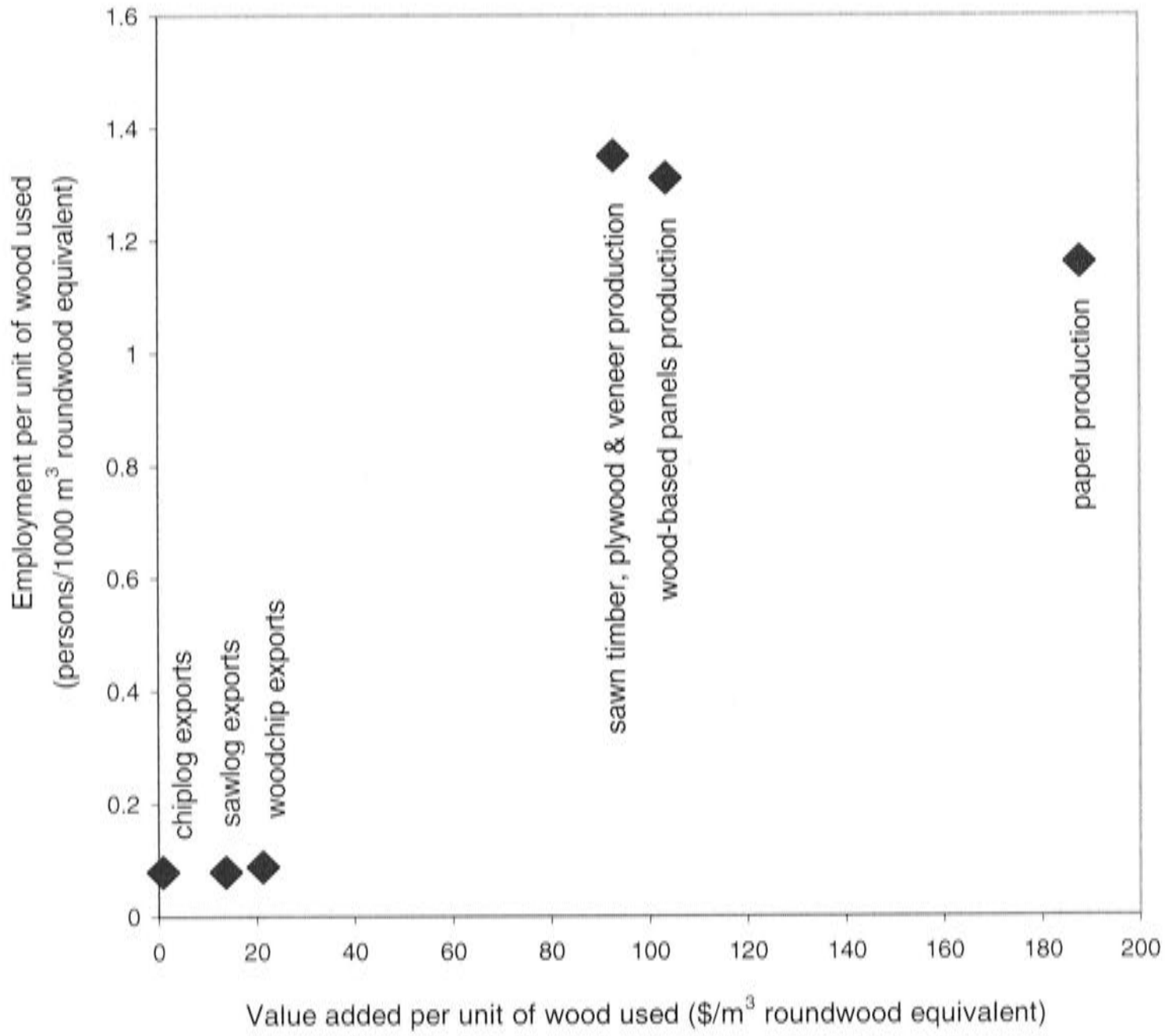
Income (as measured by value added) per unit of raw material usually increases with further processing. Processing sawlogs into sawn timber rather than exporting them unprocessed is estimated to boost income per m^3 of wood used sevenfold (figure 5.2 and Appendix C for data and methodology). Income per unit of wood used is even greater if the processing of sawmill residues into wood-based panels is included in the calculation.[53] The income returns per m^3 of wood used by the Australian paper industry are even greater (figure 5.2). This is because, as discussed below, recycling has significantly increased resource productivity in the paper industry. Significantly higher levels of income per m^3 of wood input are realised when commodity sawn timber, panels and paper are further processed into wooden components, roof trusses, door frames, paper containers, as so forth. Estimated income per m^3 of wood used (figure 5.2 and appendix C) should be treated as indicative given the data deficiencies.

An industry that undertakes a high level of domestic processing (i.e. wood growing and processing is highly integrated domestically) generates more national income per unit of wood grown than an industry that exports most of its wood unprocessed as logs or chips. This means that, from the perspective of Australian industry policy (leaving the issue of comparative advantage temporarily to one side), a highly integrated domestic industry has more scope and more items to factor into its cost reducing strategies relative to an industry that exports most of its wood unprocessed. Moving along the further processing path - shifting into semi-commodity and specialty products - also reduces the intensity of price competition and therefore the cost reduction imperative.

Integration raises the perennial issue of cost and revenue sharing arrangements between growers and processors. The tensions are readily observable in the agricultural sector generally and, as discussed in chapter 2, the intense debates amongst Australia's early foresters were largely caused by their differing views on the relationship between themselves as 'growers' and industry as processors. Perhaps it is time for this debate to be revisited as part of Australia's wood and wood products industry policy process.

[53] This calculation was not presented because the sawmill residues from a world scale sawmill need supplementation with small logs to provide sufficient wood for a competitive wood-based panels plant.

Figure 5.2 Value added and employment per unit of wood used in the Australian wood and wood products industry. Value added is revenue less costs. Employment is that generated inside mill gate and excludes employment that is general to all sectors of the industry, namely wood growing, logging and haulage. Roundwood equivalent is the volume of wood in log form required to produce the wood product. Source: Appendix C.



Industry structure has significant socio-economic effects, particularly for those rural communities in close proximity to plantations. Processing wood into sawn timber, panels and paper generates around fifteen times more jobs than exporting the equivalent log volume unprocessed (figure 5.2), enhancing rural Australian socio-economies through higher employment levels and increased economic wealth.

A wood and wood products industry policy aimed at securing a highly integrated industry structure is anathema to those advocating free market policies based on some notion of comparative advantage. Markets should be allowed to operate freely so resources will be allocated to areas where Australia enjoys a comparative advantage. I argue in chapters 6 and 7 that government policy has distorted the structure of Australia's wood products industry by discouraging investment in plantation processing. Removing these government-induced distortions - by ceasing commodity wood production in native forests - is likely to facilitate a more integrated plantation industry structure and therefore a commercially stronger wood growing industry over the long-term.

5.4 Comparison with native forest multiple use

Multiple use of native forests

The framework presented figure 5.1 is an alternative to the multiple use approach to wood production using native forests. Multiple use of native forests has gained increasing recognition in Australia since the 1930s (Frawley 1999, p. 43). From a forestry viewpoint, it was vital that the 'water-sensitive' Australian public accept multiple use of forested water catchments because Australia's more productive native forests were located in water catchments (Lawrence & Moulds 1960, p. 1697).

By the 1950s, foresters globally were becoming increasingly concerned about public pressure for the alienation of native forests from wood production. This was evidenced by the Fifth World Forestry Congress held in Seattle in 1960 adopting the theme *Multiple Use of Forested Land*. Richard McArdle, Chief of the USA Forest Service, in his Congress keynote address, spoke of forested land being excised for non-wood purposes, namely urban development, infrastructure, food and defence. Of great concern was the increasing pressure to set aside additional forested land exclusively for recreational use - no reference was made to wilderness. McArdle emphasised the need to apply multiple use management widely and intensively '*to lessen the pressures to divert forest lands*' (McArdle 1960, p. 144). It was hoped that a multiple use approach could reduce or resolve conflict by establishing a balance in the competing uses for native forests.

Multiple use is a loosely defined concept that has never sat comfortably with the primary initial function of public foresters to provide wood. Dargavel explained:

> '*They* [the foresters] *gathered the various other forest functions under a vague concept of 'multiple use', which acknowledged that plans for*

> *managing the forest to produce wood had to be adjusted sometimes for water production, grazing, recreation, scenic and other values. In theory 'sustained yield, multiple use' sought to maximise the net benefits to society from the combined uses.*' (Dargavel 1995, p. 76).

An attempt was made to ground multiple use of native forests in the theory of joint production developed by Carlson (1956). Joint production theory assists in addressing the distribution issues when a resource (e.g. forested land) can generate more than one service or product (e.g. wood production, water catchment protection, spiritual enhancement, biodiversity conservation). Ferguson (1996) used joint production theory to develop decision-making tools for the multiple use of native forests at a regional level. Implementation, as Ferguson acknowledges, was constrained by the cost and availability of data for modeling (Ferguson 1996, p. 97). He proposed another process and set of guiding criteria for decision making, identifying public participation, economic viability, environmental sensitivity and sustainability as key elements (Ferguson 1996, pp. 98-101). These elements do not constitute a forest or wood industry policy framework, rather they are largely a mixture of policy process attributes to deal with conflicting objectives for native forests.

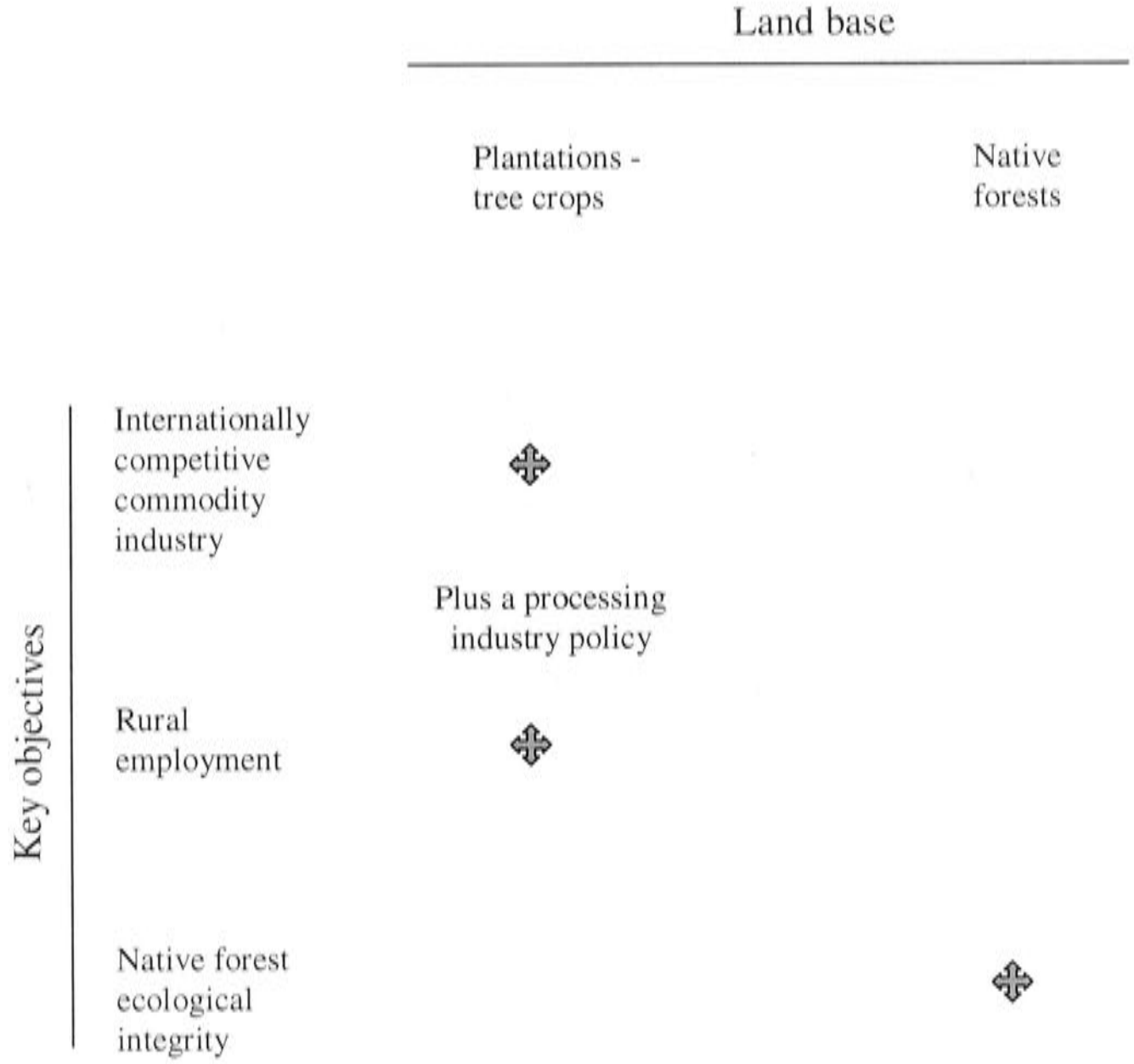
Comparing multiple use of native forests with a systems approach

The multiple use of native forests and the systems approach presented in figure 5.1 have fundamental differences and fundamentally different policy implications. The systems approach specifically includes an agricultural wood-growing regime that jointly accommodates the interests of commodity producers and native forest ecological integrity. The discussion above found that key strategies to enhance the persistence capacity of native forest ecosystems, wood production systems and rural socio-economic systems are not in conflict. The policy framework enables a high degree of policy coherence because each strategy enhances the persistence capacity of more than one system (figure 5.1).

In contrast, the multiple use of native forests appears to be unable to meet the needs of commodity producers without threatening the ecological integrity of native forests. Trade-off is required and conflict inevitable as long as government maintains a multiple use approach. The multiple use of native forests, by definition, excludes plantations (an agricultural system) and therefore the means to achieving policy coherence.

Under the approach presented in figure 5.1, the task is to align native forest and wood industry objectives to the appropriate land base - strategic choice land use decision making (figure 5.3). The task is made easier for Australia because commodity production accounts for 95 per cent of the nation's wood and wood products industry (appendix B). Virtually all wood production and rural employment should therefore be aligned to the plantation land base and superimposed by an industry policy encouraging investment in processing. This then would free native forests from commodity wood production, thereby removing a threat to their ecological integrity.

Figure 5.3 Strategic land use decision making



5.5 Australia's performance in enhancing system persistence capacity

The foregoing discussion presented two key strategies to enhance the persistence capacity of the three identified systems. The strategies can be readily formed into indicators measuring the probability of the systems successfully contending with the price-cost squeeze of commodity production. The two indicators are:

- the shift in commodity wood production from native forests to plantations, and
- the domestic integration in plantation wood growing and processing.

Using these indicators to evaluate Australia's 1960s plantation policy, I conclude that the policy was moving in the right direction if it had not entailed the clearing of native forests to establish the planting land base. Industry integration was effectively ensured because self-sufficiency in wood products dominated the political, bureaucratic and industry agenda and most of the plantation resource was publicly owned. I argue for integration on industry policy grounds not simply for nationalistic self-sufficiency reasons. The 1960s shift in commodity wood production to plantations had contradictory implications for native forest ecological integrity. It resulted in native forests being destroyed to create a planting base, but the large volumes of wood that plantations can supply, relative to native forests, mean that commodity wood production can now be shifted out of native forests (chapter 7). The remainder of this chapter evaluates Australia's 1990s performance against the two criteria.

Neither the ABS nor ABARE provides data that enable the indicators to be measured directly. This is because wood supply is reported as either softwood or hardwood, not by growing regime,[54] and wood products are classified using an industrial classification that is also not related to the growing regime. Estimates of Australia's production of wood and wood products disaggregated by wood source for 1999/00 and 1989/90 are presented in table 5.1. The methodology, assumptions and data sources are presented in appendix D.

Shift in commodity wood production from native forests to plantations

Over the decade ending 2000, Australia's wood products industry has substantially increased its dependence on plantation wood. Plantations accounted for approximately 75 per cent of Australia's production of wood products in 1999/00 - native forests for only 25 per cent (table 5.1). Of significance was the 20 percentage point increase in the plantation share of Australia's sawn timber and wood panels production over the decade ending June 2000 (table 5.1).

[54] Australian Bureau of Agricultural and Resource Economics (2001a) provides, for the first time, Australian wood production data that disaggregates hardwood removals into native forest and plantation sources. The disaggregation applies to 1999/00 and will be useful as a performance indicator over time. Softwood removals were not similarly disaggregated.

Despite the displacement of native forest wood in domestic processing, there has been no decline in native forest wood production over the decade ending June 2000. Native forest wood production has remained constant at approximately 11 million m^3 per annum despite the near doubling in plantation production (table 5.1). Native forest wood production has been maintained by increased exports of unprocessed woodchips (table 5.1).

The fact that native forest wood production remains unchanged even though plantation supplies have increased significantly means that Australia is dismissing opportunities to reduce the commodity wood production threat to native forest ecological integrity.

Table 5.1 Australian production of plantation and native forest wood and wood products and exports of unprocessed wood 1989/90 and 1999/00. Figures in bold are percentages. All other figures are million m^3. Sawn timber and wood panels production is reported as the finished product volume. All other production is reported as the roundwood equivalent volume. Source: Appendix D.

	Plantation		Native forest		% plantation	
	1989/90	1999/00	1989/90	1999/00	**1989/90**	**1999/00**
Wood production	6.7	13.0	10.9	11.0	**38**	**54**
Sawn timber and wood panels production	2.3	4.3	1.9	1.4	**55**	**75**
Wood used for Australian pulp production	2.1	2.0	1.1	0.7	**65**	**73**
Other wood products production (poles, posts, etc)	0.3	0.5	0.5	0.2	**42**	**69**
Unprocessed wood exports (chips and logs)	0.3	4.3	4.5	6.1	**6**	**41**

Integration in plantation wood growing and domestic processing

The Australian plantation sector has become less domestically integrated over the decade ending 2000. At the start of the 1990s, virtually all the plantation resource was processed domestically. At the end of the decade, one-third was exported unprocessed as chips or whole logs (table 5.2). The increased use of plantation wood for domestic processing (into sawn timber and wood panels) was outstripped by strong growth in exports of unprocessed plantation chips and logs. Increased exports of unprocessed wood accounted for three-quarters of the per annum plantation wood production increase over the 1990s (table 5.2).

Table 5.2 Australian production of plantation wood and wood products and exports of unprocessed plantation wood 1989/90 and 1999/00. Sawn timber and wood panels production is reported as 000 m^3 of finished product. All other production is reported as 000 m^3 roundwood equivalent. Source: Appendix D.

	1989/90	1999/00	% change
Wood production	6 700	13 000	94.0
Sawn timber and wood panels	2 304	4 307	86.9
Sawn timber	1 274	2 544	99.7
Plywood	107	163	52.3
Wood-based panels	923	1 600	73.3
Wood used in Australian pulp production	2 080	1 976	-5.0
Other wood products (poles, posts, etc)	334	484	44.9
Log exports	3	1 032	34 300
Chip exports	280	3 247	1 060
% wood exported unprocessed	4	33	

The softwood sector, which overwhelmingly dominated plantation wood production during the 1990s, accounts for most of the deteriorating domestic integration. Softwood woodchip exports increased significantly during the first half of the 1990s (table 5.3). The second half of the 1990s saw a levelling out in chip exporting and a rapid increase in softwood plantation sawlog exports (table 5.3).

Table 5.3 Australian softwood plantation wood production and exports of unprocessed wood 1990-2000. Source: Australian Bureau of Statistics, International Trade Statistics; Australian Bureau of Agricultural and Resource Economics (2001b) and earlier editions with adjustments as detailed in the notes.

Financial year ending June	Wood production	Woodchip exports	Sawlog exports	Chiplog exports	Total log exports	Per cent of plantation wood exported unprocessed
	(million m^3)[a]	(million m^3)[b]	(million m^3)[c]	(million m^3)[c]	(million m^3)	(%)
1990	6.70	0.31	0.00	0.00	0.00	4.6
1991	6.26	0.35	0.01	0.04	0.05	6.4
1992	6.86	0.91	0.00	0.10	0.10	14.7
1993	7.58	1.11	0.05	0.18	0.23	17.7
1994	8.66	1.44	0.15	0.25	0.40	21.3
1995	8.40	2.47	0.09	0.16	0.25	32.4
1996	9.03	2.36	0.10	0.24	0.34	29.9
1997	10.29	2.45	0.48	0.12	0.60	29.6
1998	10.78	2.76	0.33	0.05	0.38	29.1
1999	10.71	2.73	0.63	0.05	0.68	31.8
2000	12.20	2.76	1.02	0.01	1.02	31.1

a. Calculated, using ABARE data, by deducting production of native forest softwood sawn timber (converted to roundwood equivalent by multiplying by 2.5) from softwood log removals.

b. Softwood figures reported in bone dry units converted to m^3 by multiplying by 2.69 and in bone dry tonnes by multiplying by 2.47 (Neilson & Flynn 1998, p. xiv) and allowing 6.5 per cent for chip losses and fines (Australian Forest Growers 1996).

c. Assuming all softwood logs are sourced from plantations. Data are presented by log grade as reported to the ABS. Industry advises that some logs are too poor for sawmilling but that the leakage of good quality sawlogs is considerable and increasing.

Plantation woodchips and small logs

Increased domestic processing of pulp and paper and wood based panels (e.g. particleboard and medium density fibreboard) is currently the main alternative to exporting unprocessed plantation chips and small logs. Australia's production of wood-based panels increased strongly over the 1990s (table 5.2), and Australia is now a net exporter of these products. Market prospects are favourable over the long term with developing country consumption of wood-based panels being the fastest growing sector of the global wood products industry (Clark 2001a).

Australia's production of pulp declined over the 1990s, and so, therefore, did wood used for pulp and paper production. This is in spite of strong growth in Australian paper production (table 5.4). Paper producers, seeking to avoid the high costs of wood pulping, have increased their use of recycled paper, now the most important material input for Australian paper production (table 5.4). More efficient pulping is also dampening the demand for wood by an average 0.6 per annum over the 1990s (calculated using the data in table 5.4). In combination, increased paper recycling, pulping efficiencies and increased use of fillers means that Australia's paper industry has significantly reduced its dependence on wood. In 1991/92 the Australian paper industry, on average, required 1.76 tonnes of wood to make a tonne of paper. By 1999/00 the industry required 1.17 tonnes of wood to make a tonne of paper (calculated using data in table 5.4 and deducting the volume of pulp imported from the volume of paper produced in both years). The Australian paper industry's wood resource productivity increased by an average 6.2 per cent per annum over 1991/92 to 1999/00. Significant resource productivity improvements are also observed in the global paper industry (Clark 2001a).

These trends work to dampen the demand for new pulping capacity, but extra capacity is still required as paper consumption grows and to replenish the paper stock as it deteriorates with continuous recycling. Australia's pulp production has declined over the 1990s, leaving imports to meet the requirement (table 5.4). Most of Australia's declining pulp production is due to pulp mill rationalisation following PaperlinX's (previously Amcor) 1993 acquisition of APPM Ltd.'s Tasmanian pulp, paper and distribution assets.

Table 5.4 Australian production of paper and material inputs 1991/92 and 1999/00 (000 tonnes). Data on recycled fibre content were not published until 1991/92. Source: Pulp and Paper Manufacturers Federation of Australia (2001).

	1991/92	1999/00	% change
Paper production	2 072	2 649	27.8
Australian pulp production less exports	981	884	-9.9
Australian exports of pulp	3	4	
Imported pulp	221	275	24.4
Australian recycled fibre	841	1 379	64.0
Australian wood input	3 251	2 789	-14.2
Fillers and additives	na	na	

The commissioning of the Visy Industries pulp and paper mill in Tumut, New South Wales, which will process 0.8 million tonnes of softwood plantation wood per annum (Visy Industries 2000) will reverse the downward trend in Australia's pulp production. In the absence of significant additional investment in plantation processing capacity (e.g. pulp mills, wood panels plants and new product development), however, much of Australia's increasing plantation wood supply will be exported unprocessed and industry integration will continue to deteriorate (table 5.5).

Table 5.5 Softwood and eucalypt plantation chip and small log supply 2000-10 and domestic processing using plantation wood in 1999/00 - Australia. The notes present the methodology, assumptions and sources used in the calculations.

	Million m^3 wood per annum	Notes
Projected plantation chip and small log supply	10.6 in 2000 increasing to 18.3 in 2010	
▪ Softwood plantation supply	8.5 average over 2000-10	Applying a MAI of 16 m^3 per hectare per annum to Australia's 972 165 hectares of softwood plantations and assuming that over the rotation 65% of the yield is used for saw and veneer logs and sawmill residues are 30% of saw log volume.
▪ hardwood plantation supply	2.1 in 2000 increasing to 9.8 in 2010	Duggie (2000).
Domestic processing of chips and small logs from plantations and native forests in 1999/00	**6.8**	
▪ for pulp	2.7	Appendix D, table D2.
▪ for wood-based panels	2.6	Appendix D, table D1 converted to round wood equivalent assuming a 65% recovery factor.
▪ for other products (e.g. poles and posts)	0.7	Appendix D, table D3.
▪ Commissioning of Visy pulpmill	0.8	Visy Industries (2000).

Softwood plantation sawlogs

From an integration perspective, the softwood plantation sawlog/sawn timber sector has performed relatively well. Annual sawn timber production nearly doubled over the decade ending June 2000 (table 5.2). Virtually all of the production has been sold in the slow-growing Australian market, displacing imports and domestically produced native forest sawn timber. Displacement of native forest sawn timber by Australian plantation sawn timber has been evident since the mid 1950s (figure 5.4). A native forest sawlog short-fall created by past over-logging or conservation reserves could explain the declining market share of native forest sawn timber. The evidence suggests that such supply constraints account for less of the displacement than plantation based market competition. Native forest sawn timber production tends to fall more deeply in a

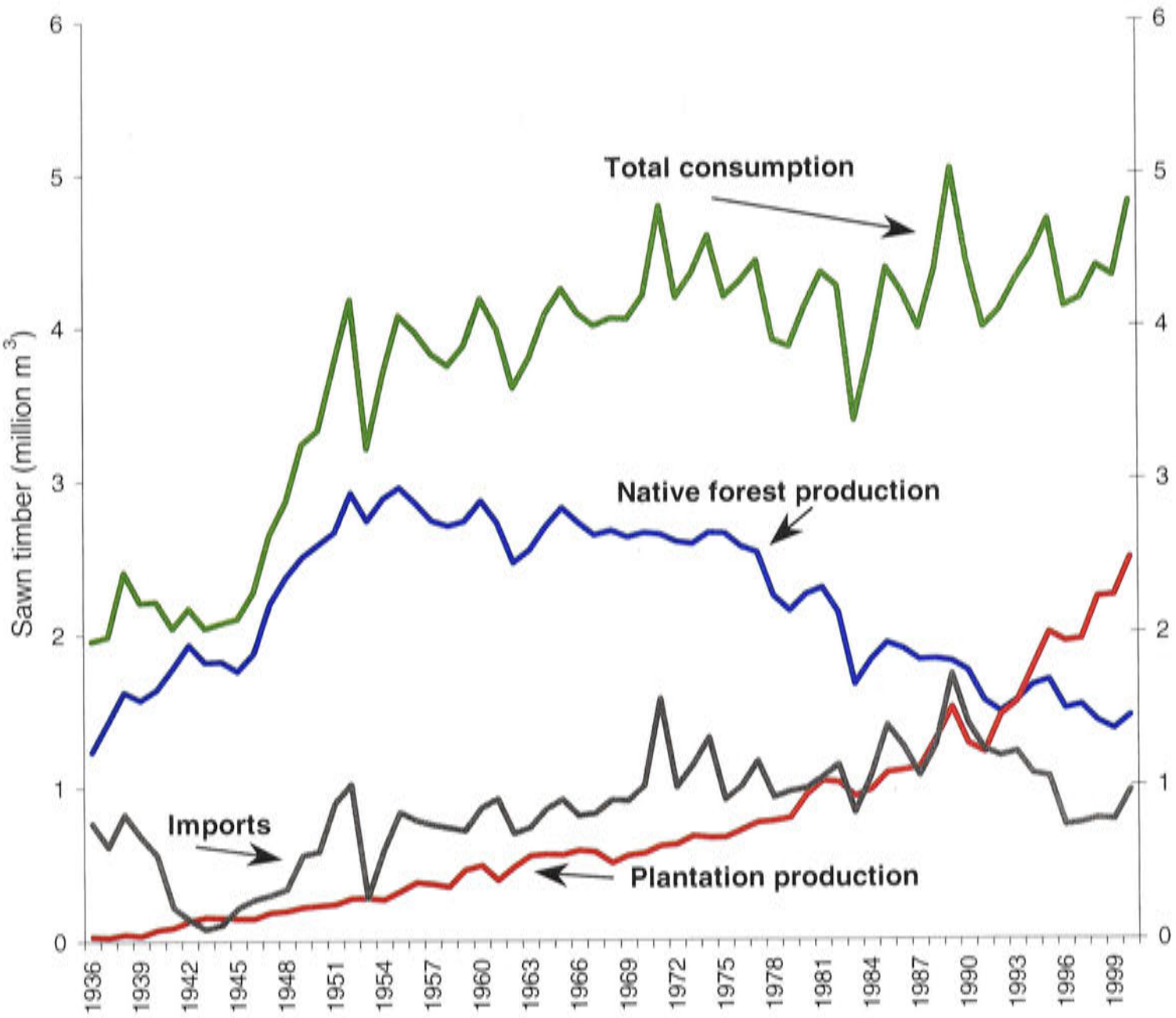
housing downturn relative to plantation sawn timber (figure 5.4). The existence of unutilised native forest sawlog allocations lends further weight to the competitive displacement view (see, for example, Board of Inquiry into the Timber Industry in Victoria 1985, p. 137).

Australia's plantations could support a higher level of sawn timber production than is currently occurring. Increasing volumes of plantation sawlogs are being exported unprocessed (table 5.3) and a significant sawlog stockpile (standing sawlogs in plantations past their commercial clearfell harvest age) exists in many plantation regions (see Clark (1995b) for Australia wide estimates, Cox (2000) for Western Australian estimates). There is debate about whether the exported sawlogs (as classified by the ABS) are of sawlog quality. Australia's largest softwood plantation log exporter (accounting for well over half the sawlog exports) sells half its log volume as saw and veneer logs with the other half as chip logs (Ian Sedger pers. comm. 2001). The softwood plantation sawmillers are not concerned about the exporting of low quality logs, but they do perceive a large and increasing leakage of good quality sawlogs (Geoff Bankes, pers. comm. 2001).

Australia's softwood plantation estate has entered its mature phase, yet the area of radiata pine plantations (now managed over rotations of approximately 30 years) established before 1970 and still standing is significant (figure 4.2). The standing sawlogs in these plantations are a stockpile - a warning that processing capacity or market demand is slipping behind supply. Australia's softwood plantation sawlog stockpile is the combined result of insufficient investment in processing and cautious public plantation management (Clark 1995b). Corporatisation and privatisation are now exposing these older plantations to the pressures of cash flow. In times of low domestic demand for sawlogs - either structurally because of insufficient processing capacity or cyclically because of a housing downturn - export markets for 'surplus' sawlogs are increasingly being sought. This raises policy issues about trading-off short-term financial gains for wood growers against securing increased domestic processing capacity for longer-term gains. Chapter 6 extends the discussion.

There is no consensus about the production potential of Australia's plantation sawn timber industry because debate about projected plantation sawlog supply remains unresolved (chapter 7). A sustainable softwood plantation sawlog supply of around 10 million m^3 per annum is a reasonable approximation (applying a MAI of 16 m^3 per hectare per annum to Australia's 972 000 hectares of softwood plantations and assuming that over the rotation 65 per cent of the yield is used for saw and veneer logs). Australia produced 2.6 million m^3 of softwood plantation sawn timber and plywood in 1999/00 (appendix D) requiring an estimated 6.6 million m^3 of logs. Significant additional investment in plantation saw and veneer log processing is required from an industry integration perspective.

Figure 5.4 Australian production, imports and consumption of sawn timber 1936 to 2000. Exports are not charted because of their insignificance. Source: ABARE Australian Forest Products Statistics and earlier versions; Forestry and Timber Bureau (1969) & Timber Supply Review various issues.



Summary

Shifting commodity wood production from native forests to plantations and achieving high domestic integration in plantation wood growing and processing are key strategies to enhance concurrently the persistence capacity of native forest ecosystems, wood production systems and rural socio-economic systems. The strategies can be readily transformed into measurable indicators to evaluate policy and assist develop policy.

In my opinion, Australia's 1960s plantation policy would have been a move in the right direction if it had not entailed the clearing of native forests to establish the planting land base. The legacy was a significantly increased plantation supply that enables Australia, from a wood supply perspective, to meet its consumption of commodity wood products from its plantation estate alone.

However, an evaluation of the Australian wood and wood products industry's performance over the 1990s identified significant unrealised opportunities to enhance the persistence capacity of native forests, plantation wood production and rural socio-economies. While the wood products industry is well advanced in shifting from a native forest to a plantation base, native forest wood production has not declined. Instead, new, lower-value markets have been found for the native forest resource, namely woodchips for export, and opportunities for removing the threatening process of commodity wood production on Australia's native forest ecosystems have been lost. Australia's plantation industry has become significantly less integrated over the 1990s. Processing capacity in all sectors, particularly pulp and paper, has not kept up with Australia's rapidly increasing plantation wood supply. Plantation growers have become more exposed to the highly competitive global wood market and, with most of the increased plantation supply exported unprocessed, rural regions are realising considerably less economic wealth and employment than they otherwise could enjoy. Securing the benefits of Australia's plantation resource requires a policy of strategic choice land use decision making and high domestic industry integration. The following chapter investigates Australia's 1990s forest and wood industry policy from this perspective.

Chapter 6

Australian wood and wood products industry policy in the 1990s

6.1 Introduction

This chapter evaluates the Federal Government's 1990s forest and wood industry policy. It commences by placing Australia's wood and wood products industry policy in the wider context of Australia's changing approach to manufacturing industry policy. When tree planting under the 1960s softwood plantation program commenced Australia's manufacturing industry policy was well regarded. By the time these trees matured, approximately three decades later, protectionism had been dismantled and manufacturing industry policy was in limbo (Brain 1999). Disengagement also characterises the Federal Government's 1990s native forest policy. The Federal Government had to establish its constitutional legitimacy to act in the environment policy arena. By the mid 1990s, however, it appeared to be retreating from native forest environment policy. The background to, and the reasons for, the exit are examined here.

The Federal Government's 1990s native forest and wood industry policy was manifested in two actions - the Regional Forest Agreement (RFA) process and the 2020 Vision for plantations. The RFA was focussed primarily on native forest land use decision making and the 2020 Vision on a significant increase in plantation establishment. This means that 1990s policy represents a decision to not facilitate major investment in plantation processing. After describing the key elements of the RFA process and 2020 Vision, this chapter uses the indicators developed in chapter 5 to evaluate 1990s policy. The indicators are examined for correlation with 1990s native forest and wood industry policy, and causal relationships between the trends in the indicators and the RFA process and 2020 Vision are investigated.

Queensland and Western Australia are distinguished from the rest of Australia in that their native forest and wood industry policies fit more within the strategic choice land use decision-making framework developed in chapter 5. Queensland does not have a signed RFA for its south east native forests. Instead, it has a plantation transition policy. The policy - implemented as a stakeholder agreement signed in 1999 - is too recent to evaluate, so the discussion presents the context for the decision and its core components. Western Australia is also an exception in that, shortly after signing its RFA with the Federal Government, it discarded major elements of the agreement and also pursued a partial transition to plantations. The context for, and nature of, the decision are discussed.

6.2 Manufacturing industry policy

The 1960s softwood planting program was conceived at the pinnacle of Australia's manufacturing protection era. Four decades later, with softwood plantation wood coming fully on stream, import protection has been substantially dismantled and manufacturing industry policy is in tatters (Brain 1999; Sheehan et al. 1994). Australia's wood and wood products industry policy was cast in this wider manufacturing industry policy vacuum in the 1990s. In the wood-based industries, resource issues dominated the policy agenda with the direct commercial relationship between private industry and state forest agencies having clipped the involvement of manufacturing industry departments in wood and wood products industry policy. I argue that the timing and nature of Australia's changed approach to industry policy, discussed below, made it even more difficult for manufacturing issues to gain a hearing in the wood and wood products industry policy agenda.

Federation linked Australia's emerging national identity and fledgling manufacturing industry. Customs barriers between the states were dismantled to widen the market for Australian manufacturers, and a combination of tariffs, quotas and subsidies was introduced to reduce the risk involved in investing in Australian manufacturing. This infant industry model brought together a market strategy based on import substitution, an investment strategy based on attracting overseas direct investment, technologies transferred usually from the United States of America (USA), and new skills through training and immigration, to provide profitable investment opportunities and generate economic growth (Brain 1999, p. 75). Protectionism reached its heyday in the mid 20th century, championed at that time by John McEwan, Leader of the Country Party and Deputy Prime Minister - although, as discussed in chapter 3, McEwan also forcefully advocated a New Zealand-Australia Free Trade Agreement. Despite opposition from his own party, many of whom saw tariffs as benefiting cities at the expense of agriculture, McEwan argued that Australia had no future if it continued solely on an agricultural base (Whitington & Chalmers 1971, p. 184).

The infant industry model successfully increased investment in manufacturing but at a scale suited, at best, to the size of the Australian market. State Government decentralisation policies and interstate rivalry for manufacturing investment worked to fragment industries with companies establishing less than optimal-sized plants in different states to reap the State Government assistance. This can be observed in the textiles, clothing and footwear industries and also contributed to APM's nation-wide scattering of investment in plantations and processing (chapter 3).

Brain (1999, pp. 75-6) argued that the infant industry model crumbled under the global economic pressures of the 1970s. Australian manufacturers needed export markets to reach optimal plant-use levels to remain competitive against imports. Furthermore, tariff policy had become counterproductive. By protecting all products of an industry, it discouraged Australian manufacturers from specialising in niche markets that often require export to gain scale economies. Blanket tariff protection was adding to the cost of inputs of these industries and undermining their competitiveness.

Australia's central policy agencies were keen to eliminate protectionism that, over seventy years, had built up a network of powerful industry groups cemented into a closed policy community that turned industry assistance into a political art form (Wanna & Withers 2000, pp. 70-2). Pressure politics determined which industry sectors and regions received assistance and the nature of the assistance. Protectionism was replaced by economic rationalism[55] which, up to a point, was simply a reflection of mainstream economic thinking and therefore easily established in the central policy agencies (Argy 1998, p. 233). Dismantling of industry protection's institutional framework commenced in the 1970s with the reform of the Tariff Board into the Industry Assistance Commission (now Productivity Commission) and extended to the establishment of the National Competition Council in 1995 - a federal statutory body advising all governments on the implementation of national competition policy reforms.

Brain (1999, pp. 214-5) described Australia's economic rationalism as the child of the USA parent first arriving in academic form to dismantle the fortress and open Australia to growth through exporting. Pastoralists and the mining industry were enthusiastic advocates of economic rationalism because it provided an economic regime suited to their commercial interests as sellers of mining and agricultural commodities in global markets. For economies such as Australia's, where the exchange rate tracks movements in commodity prices (Sicklen 1998, p. 34), a freely floating exchange rate - a core component of economic rationalism - protects the income of established mining and agricultural industries against declining commodity prices. In addition, the mining and agricultural industries were attracted to the cost reduction implications of economic rationalism, including the elimination of tariff-induced costs. The mining industry argued that, with economic rationalist policies, it could underpin Australia's continuing economic prosperity. The industry at the time was riding on a surge in the prices of goal and coal following the 1970s oil price shock (Brain 1999).

The alternative argument put by manufacturing industry advocates was that Australia's economy would under-perform with a high reliance on agricultural and mineral commodity exports. As the Australian economy develops, net imports (increasingly favouring highly income elastic,[56] high value, elaborately transformed products) increase whilst our exports of primary products remain constrained by relatively slow growth in global consumption and declining commodity prices over the long term. Australia's current account will remain in deficit, and Australia's freely floating exchange rate will be locked into long-term decline. A low exchange rate increases the costs and risks for new high value-adding industries that require imports of skills, capital, components and technology, as well as the retention of skills in Australia, the development of marketing funds to be spent overseas and the protection of the

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[55] Economic rationalism has been variously referred to as hard economic liberalism, neo-liberalism, economic fundamentalism, free-market economics, economic libertarianism, dry economics and monetarism. Argy (1998, p. 54) argued that it is economic liberalism taken to extreme and is more a social philosophy than an economic doctrine.

[56] Income elasticity of demand measures the responsiveness of demand for a good or service to changes in income. Income elasticity is positive if demand increases with income.

industry's capital base from takeover and elimination (Brain 2001). Brain argues that a policy favouring mining and agricultural interests is directly undermining investment in new, high value-added industries. Avoiding this outcome requires a policy framework supportive of a larger manufacturing sector and, in particular, one producing elaborately transformed products for export (Pappas Carter Evans & Koop/Telesis 1989; Sheehan et al. 1994; Sheehan 1998; Gebler 1998; Sicklen 1998; Brain 1999).

Australia's manufacturing industry policy currently remains in limbo although a stream of national reports on industry policy since 1997 has maintained the policy debate (Sheehan 1998, p. 236). Brain forcefully argued that:

> '*The process of de-industrialisation will continue until the government develops enough political courage to face up to the dilemma embedded in current economic policy, and initiates the necessary battles which, for the national interest to be protected, have to be won.*' (Brain 1999, p. 221).

This means establishing priorities for industry policy where the interests of status quo raw material exporters do not come at the expense of new industries seeking to move up the value adding chain to elaborately transformed products for export.

Australia's wood and wood products industry policy in the 1990s favoured the growing arm of the industry at the expense of manufacturing - replicating Australia's industry policy generally. From the perspective of the grower/processor integration argument presented in chapter 5, it was unfortunate that Australia's industry policy agenda appears to have been captured by the short-term, narrowly perceived interests of the agriculture and mining industries as increasing volumes of plantation wood were coming on stream for processing in the 1990s.

6.3 Federal Government native forest environment policy

Introduction

During the 1970s and 1980s, the Federal Government established its constitutional legitimacy over land use and management issues. However, its actions to protect high conservation and heritage value areas from economic development disenfranchised the mining and native forest industries, and, by the late 1980s, the Federal Government was manoeuvering to address the political ramifications (Fenna & Economou 1998, pp. 345-9). The result was diminished Federal Government engagement in native forest environment policy in the 1990s. This section aims to reconstruct the events generating this outcome.

Building Federal Government environmental legislation

The Australian constitution did not grant the Parliament of Australia powers to make laws with respect to the environment. If the Federal Government wanted to respond to rising public expression of environmental values, it needed to establish its legitimacy to

act using other constitutional powers, namely its responsibility for trade and commerce with other countries and external affairs. This required testing of the legislative powers of the two levels of government. Stimulated by the Lake Pedder dispute,[57] the Whitlam Labor Government commenced the testing process in the early 1970s by establishing an inquiry into the National Estate. The Government acted on the inquiry's key recommendation and, used its external affairs power to ensure Australia became a signatory to the United Nations Educational, Scientific and Cultural Organisation (UNESCO). *The Australian Heritage Commission Act 1975* established the Australian Heritage Commission (AHC) as the statutory authority responsible for identifying and registering national heritage sites. It requires the responsible Minister to avoid any action that adversely affects the National Estate unless satisfied there is no feasible and prudent alternative and all reasonable measures to minimise adverse effects are undertaken. The legislation was later used as one of the three environmental obligations imposed on the Minister for Primary Industries and Energy in considering the issuing of licences to export woodchips.

Federal Cabinet decided in 1968 to use its external affairs power under the Constitution to regulate, through the issuing of licences, the export of native forest woodchips. National economic interests motivated the policy with the Government concerned by the potential loss of domestic pulp and paper opportunities and under-pricing of wood (Fairbairn 1968). The states generally welcomed the Federal Government's regulatory involvement and did not challenge the Australian Parliament's constitutional power to veto state located resource projects by licencing exports under its external affairs power. Confirmation of the Australian Parliament's power came in the mid 1970s with a dispute over issuing export licences for sand mining. The High Court ruled as valid the Fraser Liberal Government's refusal to issue an export licence, thereby blocking the Murphyores Fraser Island sand mining proposal (Fenna & Economou 1998, pp. 345-6).

The *World Heritage Properties Conservation Act* (1983) provided the legislative backing for the Federal Government's obligations under the World Heritage Convention to identify and protect its natural and cultural heritage. The legislation challenged State Government authority over land use and land management and was used by the Hawke Labor Government in the year it was enacted to prevent the Gordon below Franklin River dam. The legislation was tested in the High Court, which ruled that it was a valid use of the Australian Parliament's external affairs powers (Hawke 1989; Fenna & Economou 1998, pp. 345-7).

Earlier legislation, namely *The Environment Protection (Impact of Proposals) Act 1974,* applied to actions by the Federal Government that might significantly affect the environment. It enabled the Minister for the Environment to request the preparation of an environmental impact statement, initiate a public inquiry or provide advice and recommendations to the relevant Minister on the environmental aspects of proposed actions. The Act was used to make approval of the Wesley Vale, Tasmania, native

[57] The Lake Pedder dispute was triggered by the Tasmanian Hydro-Electricity Commission's proposal in 1967 to construct a power scheme on the Gordon River that would flood Lake Pedder. The unsuccessful campaign to prevent Lake Pedder's inundation resulted in a more forceful environment movement with less patience for government consultation (Hutton & Connors 1999, pp. 118-24).

forest pulpmill proposal (for background see Hutton & Conners 1999, pp. 204-7 and Fenna & Economou 1998, pp. 348-9) conditional on satisfactory completion of further environmental studies and agreement on appropriate operating guidelines (Hawke 1989).

The Federal Government continued through to the early 1990s to build on this legislative framework to protect environmental values. The *Endangered Species Protection Act 1992* aimed to protect nationally endangered or vulnerable species and ecological communities and prevent other species from becoming endangered. The Act enables a scientifically based listing process of species, communities and threatening processes; the use of recovery and threat abatement plans; and prevents actions by Federal Government agencies that contravene an approved plan. The *Environment Protection (Impact of Proposals) Act 1974* was amended to include in the definition of 'environmentally significant' any project that could threaten with extinction a species or community listed under the *Endangered Species Protection Act 1992*. These two pieces of legislation, together with the *National Heritage Commission Act 1975*, became the triumvirate imposed on the Minister for Primary Industries and Energy in considering the issuing of licences to export native forest woodchips. The dismantling of this legislative framework dominated Australia's native forest policy agenda in the second half of the 1990s.

Federal ALP woos the environment vote

With demonstrated power to affect land use and land management in the states, Graham Richardson, Labor's Federal Minister for the Environment, adopted an active environmental protection agenda in the late 1980s. Richardson was the party's key numbers man, a member of the right and close to Prime Minister Hawke (Richardson [G] 1994). He identified the importance of a strong environment policy to maximise preference flows from the minor parties in the forthcoming federal election. Richardson's interventions were environmentally bold, highly publicised and challenging, particularly to his right wing ALP colleagues. Environment protection initiatives, dominated by native forests, crossed the nation. The East Gippsland native forest conflict was temporarily halted in 1990 by a moratorium on logging national estate forests; the process commenced to list Tasmania's Southern and Lemonthyme forests as World Heritage; Queensland's Daintree forest was listed as World Heritage (a visit in 1987 to Ravenshoe, Queensland saw Richardson swamped by angry native forest timber workers and secured widespread media coverage); proposals for uranium mining neighbouring the Kakadu National Park Conservation Zone were delayed; and proposals for a native forest based pulpmill at Wesley Vale, Tasmania, were frustrated. Labor won the 1990 federal election and Richardson's strategy appeared to be justified (Economou 2000, pp. 286-9).

Richardson's highly confrontational, and therefore high-risk, political strategy ran counter to Prime Minister Hawke's consensus style and the interests of 'pro-development' Ministers. As Richardson engaged directly with the public securing the green preference flows, the Federal Government developed an alternative approach to environment policy and a shift in the mix of issues on the environment agenda. New

processes and institutional arrangements were introduced that enabled unions, industry and environment interests to participate formally in policy development (Economou 2000).

The Resource Assessment Commission and ecologically sustainable development

The Resource Assessment Commission (RAC) was established in 1989 with a broad mandate to investigate both the environmental and economic dimensions of resource industries referred to it by the Federal Government (Hawke 1989). The Government's first reference to the Commission was to investigate options for Australia's native forests and wood-based industries. The Government, by creating a barrier between itself, the public and interested players, had reduced the pressure for ad hoc policy making. Justice Stewart, the Chair of the RAC, spoke of natural resource based conflicts as characterised by:

> '*...incomplete communication between the parties, by lack of agreement over basic facts, over-simplification of the issues, irrational argument and distortion of information on both sides, and have sometimes resulted in unnecessary violent confrontation.*' (Stewart 1989, p. 4).

By directing the forest issue into the well resourced and multi-disciplinary RAC, the Hawke Government hoped for fresh advice on the then unsolvable forest conflict. The RAC reported on forests and the wood based industries in 1992. The Keating Labor Government wound up the Commission in 1993 with pro-development Ministers angered by its recommendation that mining be disallowed at Coronation Hill because of its violation of Aboriginal spiritual values (Economou 2000, p. 293).

The RAC was the research and policy arm of the Hawke Labor Government's wider ecologically sustainable development (ESD) framework for addressing the tensions between ecological and economic development. The task of developing a national ESD strategy commenced in 1989 with the Government writing to industry, union and environment movement representatives proposing the establishment of a forum to discuss environment/development concerns (Hawke 1989, p. 13). The summit led to the establishment in 1990 of ESD working groups, including a forest working group - the only working group that the environment movement refused to participate in. The Government was seeking strategies from the working groups for the sustainable development of Australia's major industry sectors with measures to encourage the integration of environmental considerations into decision making (Hawke 1990). The establishment of an ESD Sub-committee of Cabinet chaired by the Prime Minister indicates the priority the Hawke Labor Government put on ESD and the process.

Accompanying these new institutional arrangements and processes, was a strategic change in the environment agenda with tree planting and land care forming high environmental priorities. The ACF under the leadership of Philip Toyne, who enjoyed a close working relationship with Hawke and Richardson (Richardson [G] 1994, p. 214), played an important agenda-setting role. Through its reports, *The Wood and the Trees*

and *Recovering Ground*, the ACF had signalled its interest in additional plantation establishment and agricultural land regeneration. These issues generated less conflict between developers and environmentalists (Economou 2000, p. 288) than native forests and wilderness, which appeared to be intractable and therefore politically undesirable.

The Government's new approach - embracing new processes, new institutions and new agendas - was announced in Prime Minister Hawke's July 1989 statement on the environment, *Our Country our Future* (Hawke 1989). It signalled a new era of dialogue between government and interested players, increasingly referred to as stakeholders, and a diminution in policy driven by the public interest.

Native forest conflict remains intractable

The Hawke Government's strategy of referring the forest issue to the RAC for investigation, establishing an ESD Forest Working Group and broadening the environment agenda failed to diffuse the conflict. Conflict was reignited when Hawke introduced the *Forest Conservation and Development Bill 1991* to provide resource security with compensation for loss of native forest land or wood. Environment interests have consistently and vigorously opposed native forest resource security. Hawke's surprising move was rationalised by Economou (2000, p. 293) as the Prime Minister taking on the development agenda in response to Treasurer Keating's push for him to implement an agreed mid-term leadership change.

Keating, who became Prime Minister on 20 December 1991, extended and formalised an approach of intergovernmental cooperation. By negotiating agreements with State Governments, the Federal Government hoped it would become less vulnerable on difficult environment issues. The Australian Heritage Commission (AHC) and Western Australia's Department of Conservation and Land Management (CALM) had previously investigated and reached agreement over the state's national estate forests. Their model was formalised in the 1992 *Intergovernmental Agreement on the Environment*. The objective was to reduce uncertainty about land use decisions by adopting a co-operative decision-making approach that took into account the interests of both levels of government (Commonwealth Interdepartmental Committee on Regional Forest Agreements 1994, p. 1).

In December 1992, the Government released the *National Forest Policy Statement* (Commonwealth of Australia 1992) developed within the framework of the *Intergovernmental Agreement on the Environment*. The Statement was endorsed by the Federal and all State and Territory Governments except Tasmania. Tasmania resolved to manage its forests as set out in the Tasmanian Forests and Forest Industry Strategy, thereby avoiding the Statement's moratorium clause on logging old-growth forests and wilderness. The Tasmanian Government eventually signed the agreement in 1995.

The *National Forest Policy Statement* was primarily about establishing processes for regional land use allocation enabling the Federal and State Governments to reach a single agreement on their obligations for native forests in each region (Commonwealth of Australia 1992, p. 24). With the pressure of unfolding events, the Federal

Government's policy was clarified to mean that regions with an agreement (RFA) would be freed from the environmental legislation built up by the Federal Government over the previous three decades and, in particular, the regulations requiring a licence to export native forest woodchips.

In July 1994, forest activists met in Canberra and decided to promote the native forest issue in the public arena and pressure the Keating Government to implement the *National Forest Policy Statement*. This required state forest agencies to avoid activities that could significantly affect those areas of old-growth forests or wilderness that were likely to have high conservation value. In September, a forest embassy was set up on the lawns of Parliament House coinciding with a national day of action with rallies and native forest blockades around Australia (Hutton & Conners 1999, p. 255). The activities were a preliminary to the end-of-year Federal Government consideration of licences to companies to export woodchips during the following year.

Ros Kelly's resignation as Minister for the Environment saw John Faulkner, from the socialist left, appointed to the position in March 1994.[58] Faulkner decided to implement the *National Forest Policy Statement's* moratorium clause on old-growth and wilderness forests and provided financial assistance to the environment movement to identify forest areas they considered of high conservation value. The Department for the Environment's subsequent evaluation of the nominated areas identified 1 311 forest areas of high conservation value to be excluded under the moratorium clause of the *National Forest Policy Statement* (Hutton & Conners 1999, p. 256). Faulkner presented these areas as ones that should be excluded as sources of export woodchip supply for the forthcoming 1995 licence period to the Resources Minister, David Beddall. Faulkner's request was largely dismissed and, on 19 December 1994, export licences were issued for most of the areas. All previous licences were renewed and three new licences issued. The public responded negatively to the decision; a December 1994 Newspoll showed that 80.3 per cent of Australians supported an end to native forest woodchipping (Newspoll results released by conservation groups in Parlane et al. 1994). On 22 December, Prime Minister Keating announced the phase-out by the year 2000 of native forest woodchip exports not covered by a RFA or where significant progress towards one had not been made (Commonwealth of Australia 1995a, p. 6). Some interpreted the statement as a blanket phase-out (Hutton & Conners 1999, p. 256).

The native forest industry was in crisis with the Prime Minister threatening its lifeblood, namely the large and highly profitable export woodchip industry (chapter 5 and discussed below). Even if the Government reneged on the woodchip phase-out, the industry remained vulnerable as long as the annual export licence renewal process remained. Another perceived threat also faced the native forest industry. In late 1994, Faulkner approved funding to the State Conservation Councils to investigate the plantation processing industry's production and employment growth potential. The

[58] Ros Kelly became Minister in April 1990, taking over from Graham Richardson, who returned as Minister for the Environment in a caretaker capacity for approximately three weeks until Faulkner's appointment.

Australian Council of Trade Unions (ACTU) and the Construction, Forestry, Mining and Energy Union (CFMEU) were unhappy about the funding decision but were unsuccessful in preventing it (chapter 7). They were concerned that the study would argue that Australia's wood and wood products industry should shift out of native forests and into plantations (Richardson B. 1994, p. 3). This and other reactions to the study are investigated in chapter 7. The threat of further restrictions on the native forest industry was clear by the end of 1994.

Just as the *National Forest Policy Statement* contained an initiative favourable to the environmental movement, it also contained the beginnings of a way through the crisis for the native forest industry and unions. The Statement indicated that regional forest assessments provided the basis for the Federal and State Governments to reach a single agreement relating to their obligations for forests in a region (Commonwealth of Australia 1992, p. 24). This phrase was sufficiently general to include the abolition of the export woodchip regulations, thereby significantly reducing the industry's vulnerability to public opposition. The *National Forest Policy Statement* required the states to first invite the Federal Government to participate in a comprehensive regional assessment. The Regional Forest Agreement (RFA) process had languished for two years and initiating it was now a priority.

Abolishing the export woodchip regulations required the Keating Labor Government to provide more incentives for the states to participate in the RFA process and to clarify that a '*single agreement relating to their obligations for forests in a region*' included the removal of the export woodchip regulations. The catalyst was the log truck blockade of Parliament House, Canberra, in January 1995.[59] The blockade, organised by the Forest Protection Society (FPS)[60] and the CFMEU, unsettled Prime Minister Keating (Economou 2000, p. 294), and his meeting with the demonstrators and the damage to Parliament House guaranteed high media coverage. Collins, the Minister for Primary Industries, was handed the task of solving the problem, and the Department of the Prime Minister and Cabinet took responsibility for forest policy and overseeing the RFA process. In the immediate term the Keating Government provided interim protection for 509 (later reduced to 452) of Faulkner's 1 311 proposed high conservation areas (Hutton & Conners 1999, p. 256).

Over the year, the Federal Government developed incentives to engage the states and processes for identifying native forest areas for long-term conservation. Areas outside conservation reserves were to be managed under ecologically sustainable forest management (ESFM) principles. A wood and paper industry strategy was developed, as was a new policy on woodchip export licences. Prime Minister Keating announced the package in *The Future of Our Forests* statement on 30 November 1995. Keating's assessment was that there was no politically palatable solution to the native forest

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[59] I thank Linda Parlane, then Director Environment Victoria, for her view that the blockade was a defining moment for Australia's native forest environment policy.

[60] The FPS was formed in Victoria in 1987 as a grassroots organisation involving people in the wood and wood products industry threatened by the loss of native forests to conservation uses. It was closely associated with the National Association of Forest Industries (NAFI) (Dargavel 1995, p. 192).

conflict and that the problem should be passed back to the states. He expressed this not as a Federal Government failure, but a failure of the environment movement:

> '*The* [public's] *recourse to the Commonwealth Government* [to take more responsibility for Australia's native forests] *underlies the failure of interest groups to secure the appropriate undertakings from those who do manage forests in Australia and that, of course, is the State governments.*' (Keating 1995).

The Federal Government's strategy was to use the RFA process to become free of its self-generated legislative commitments and hopefully to redirect public pressure for native forest protection onto the states. The woodchip export regulations were used to 'encourage' state participation. A ceiling was placed on native forest woodchip exports preventing an increase in the volume exported without a signed RFA. The licenced export volume would be reduced by 20 per cent per annum unless there was significant progress towards an RFA and would cease in regions without an RFA by the end of December 2000 (Forest Taskforce 1995a). The Federal Government remained silent on the politically sensitive issue of removing the export regulations on native forest woodchips when a RFA was in place.[61]

The RFA policy signaled the Federal Government's intention to extract itself as much as possible from the native forest policy arena - a conclusion also made by Dargavel et al. (2000) and Hutton & Conners (1999, p. 257). Prime Minister Keating in his parliamentary statement couched the exit strategy positively:

> '*Mr Speaker, no Australian government has ever made such a conscientious attempt to resolve this huge and vexed issue. Most governments would run a million miles from it.*' (Keating 1995).

The RFA process, continued under the Howard Liberal Coalition Government when it won office in March 1996,[62] is estimated to have cost the Australian public $0.5 billion (Mobbs 2000). An evaluation of the public benefit from this expenditure is yet to be undertaken. The Federal Government's use of the RFA as the means for exiting the native forest environment policy arena meant that other policy approaches, such as that proposed in chapter 5, had little chance of being put on the agenda. Alternative uses for the $0.5 billion expenditure that arguably could deliver superior outcomes for industry, rural communities and the environment also had little chance of being considered.

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[61] A Commonwealth Position paper dated February 1995 interpreted the National Forest Policy Statement to mean that, where a Regional Forest Agreement (RFA) was in operation, the Federal Government would consider extending export approvals for unprocessed wood (chips and logs) beyond the current annual renewal cycle (Commonwealth of Australia 1995a, p. 7).

[62] Relations between the environment movement and the Federal Labor Government deteriorated with the Government's desire to avoid any conservation action that might trigger another union backlash prior to the election. The Wilderness Society chose to support the Liberal Party in the March 1996 federal election, arguing that the environment movement's power was diminished if it continued to rubber stamp the ALP when little separated the two main parties on environment policy (V. Young pers. comm. 2001).

On 8 October 1996 the Liberal National Party Coalition Government began the formal process to abolish the export controls on native forest woodchip exports by presenting to the House of Representatives the Export Control (Hardwood Wood Chips) (1996) Regulations and the Export Control (Unprocessed Wood) Regulations (Amendment) contained in Statutory Rules 1996 No's 206 and 207. Senator Brown's (Australian Greens Party) move to disallow the changes was voted down by both major parties.

6.4 Multiple use policy framework

Fenna & Economou (1998, pp. 338-47) argue that the Federal Government's attempts to reconcile contentious environmental issues (like native forests) by establishing mechanisms (such as the RAC and the ESD process) to remove them from the immediate political sphere and subject them to neutral scientific analysis has been a failure. This view is based on an understanding that the objectives of wood production and native forest ecological integrity are competing and probably irreconcilable, and therefore native forest land use allocation requires a political rather than technical process.

An examination of the major forest reports to the Federal Government during the 1990s found an unquestioning acceptance of the multiple use (later ESD) framework for native forests and a lack of attention to intensification technologies that threaten native forest ecological integrity (table 6.1). For the reasons argued in chapter 5, this meant that the advice the Federal Government received from its public service on native forests and the wood-based industries during the 1990s, if adopted, would continue to lock it into conflict. The failure identified by Fenna & Economou (1998) may be in the capacity of the public service to critically analyse and present policy options to government.

The approach, findings and recommendations on multiple use and intensification technologies presented in each of the 1990s reports to the Federal Government is examined below and summarised in table 6.1. For completeness, the major policy documents generated by the Federal Government (e.g. the *National Forest Policy Statement* and the Wood and Paper Industry Strategy) are included in the discussion and table 6.1. The discussion below uses the common title to the documents and their reference is presented in table 6.1.

ESD Forest Use Working Group Report - 1991

The Working Group used an ESD framework viewing ecologically sustainable forest[63] use as the maintenance of ecological processes and biodiversity within forests, with the benefits to the community from forest use optimised within these ecological constraints (Ecologically Sustainable Development Forest Use Working Group 1991, p. 35, box

[63] The Working Group did not separate forests into their native forest and plantation components, but it is probably correct to assume that in most cases their use of the word 'forest' means 'native forest'.

4.1). Other parts of the report contradict this view. In discussing the management of conflict, the Working Group states:

> '*The maximisation of community benefits from forests necessarily involves an assessment of the competing values of a range of forest uses, and the allocation of property rights to the highest value mix of uses. That may mean to conservation for biodiversity in some cases, and in other cases, to multiple use, including integrated wood production operations producing sawlogs and woodchips.*' (Ecologically Sustainable Development Forest Use Working Group 1991, p. 33).

The Working Group saw multiple use as a valid management approach, finding support in the extensive areas used for wood production over undefined 'long periods' that have retained their high conservation value, water quality and recreation values (Ecologically Sustainable Development Forest Use Working Group 1991, p. 43). As to whether the ecological integrity of native forests is threatened by intensification technologies, divergent messages are provided in the body of the report, its executive summary and its funding recommendations. The body of the report recognises the reality of intensification and argued a precautionary approach:

> '*The effects of intensive management of native forests, through thinning, improved genetic stocking, and fertiliser application, on the ecological processes are not fully understood, although there are likely to be changes in the energy and nutrient flows. The extent to which intensive management affects forest processes and productivity is open to conjecture, and should be studied further before intensive management in native forests is undertaken on a broad scale.*
>
> *The use of chemical fertilisers, pesticides and weedicides in forest management has the potential to affect soil microbiology and water quality. Due care is needed to ensure that adverse effects are avoided. It is still unknown what the long-term effects on ecological processes in forests may be from regular and frequent application of chemical fertilisers, weedicides and pesticides. In such circumstances, a cautious approach to their application is appropriate.*' (Ecologically Sustainable Development Forest Use Working Group 1991, p. 59).

Further cautionary remarks are made in the body of the report:

> '*A potential risk to the biodiversity of native forests, albeit difficult to gauge, may arise from intense management...*' and '*In line with the principle of dealing cautiously with risk and irreversibility, such intensive management approaches need to be thoroughly tested and monitored before being widely adopted.*' (Ecologically Sustainable Development Forest Use Working Group 1991, p. 89).

The scientific work required to ascertain the ecological risk of intensification was not included in the 41 recommendations (costing $54.5 million in Federal Government funding) made by the Working Group (Ecologically Sustainable Development Forest Use Working Group 1991, pp. 199-206).

In its executive summary, the Working Group contradicts the main report on the issue of intensification. It makes no reference to the need for intensive management systems to be '*thoroughly tested and monitored before being widely adopted*,' rather it considers that:

> '*Plantations and intensively managed regrowth forests hold prospects for greatly improved productivity in comparison with the more extensive harvesting operations in native forests. However, they will be substantially different in structure and floristics from natural forest, and will not provide the same levels of biological diversity and fauna habitat as is the case in natural forests.*' (Ecologically Sustainable Development Forest Use Working Group 1991, p. xxxiii).

The Working Group's executive summary viewed logged native forests as a resource that could be managed as an agricultural regime.

The Working Group saw the native forest issue as forcing a polarisation of views on conservation and development, which inevitably resulted in conflict because, they argued, positions on these issues are ultimately based on personal values and judgements (Ecologically Sustainable Development Forest Use Working Group 1991, p. 171). The Working Group's accounts of ESD, multiple use and intensification technologies meant that it could not present a coherent policy framework to government. Although it claimed that the ESD approach would resolve much of the conflict over competing forest uses (Ecologically Sustainable Development Forest Use Working Group 1991, p. 37), none of the initiatives presented by the Working Group to minimise the conflict (Ecologically Sustainable Development Forest Use Working Group 1991, p. 172) dealt with the heart of the problem - the multiple use framework and intensification pressures on native forests.

National Plantations Advisory Committee Report - 1991

The National Plantations Advisory Committee was established in December 1990 by the Federal Minister for Resources, Alan Griffiths, in consultation with the Minister for the Environment, Ros Kelly, to consider the prospects for commercial wood production on cleared agricultural land. The Government viewed plantations as providing another source of wood for the industry, thereby reducing its reliance on native forests whilst also addressing the problem of degraded agricultural land (National Plantations Advisory Committee 1991, p. 1). Investigating the prospects for using the significant existing plantation resource (chapter 5) was not in the Committee's brief.

Competition between plantation and native forest wood means that the tendency to intensify native forest management to increase wood yields should have been of direct

interest to the Committee. However, it was silent on this issue in its recommendations concerning financial disincentives and incentives and other impediments to plantation establishment and the need for environmental protection (National Plantations Advisory Committee 1991, pp. ix-xiv).

Resource Assessment Commission Forest and Timber Inquiry - 1992

The RAC argued that ecologically sustainable forest use requires the maintenance of basic ecological processes and biological diversity of forested systems (Resource Assessment Commission 1992a, p. 105). Their literature surveys identified five key claims about the effects of wood production on native forest ecosystems, and these were exposed to examination. These claims were that:

- logging does/does not increase the risk of species extinction and does/does not decrease forest biodiversity,
- clear-felling is/is not equivalent to the natural fire regime and therefore is/is not an acceptable disturbance regime,
- converting old-growth forest to regrowth forest will/will not favour a net decrease in atmospheric carbon dioxide,
- current practices designed to reduce the impacts of wood production activities are adequate/inadequate, and
- the use of fuel reduction burning is/is not a significant threat to the environmental value of forests (Resource Assessment Commission 1992a, p. 161).

The trend to intensification of native forest management for wood production was not included. Intensification issues could be partially examined through the concern listed as 'Current practices designed to reduce the impacts of wood-production activities are adequate/inadequate.' On this, however, the RAC undertook a temporally static analysis focussing mainly on logging impacts. The trend to intensification technologies (i.e. managing forests for wood production) was not examined (Resource Assessment Commission 1992a, pp. 161-70).

The RAC concluded that there was insufficient factual information to support general claims about whether impacts of wood production are benign or deleterious to environmental values in Australia (Resource Assessment Commission 1992a, p. 177). It argued, on the grounds of inter-generational equity, against applying the precautionary principle to cease logging of native forests until the impacts were determined.[64] It nevertheless strongly emphasised the importance of the precautionary principle and adaptive management, noting that:

> '*This is particularly important given the current trends towards increases in the intensity of harvesting and silviculture.*' (Resource Assessment Commission 1992a, p. 178).

[64] Presumably the RAC considered that there was little processing growth potential using Australia's existing plantation resource. The RAC's plantation resource projections supporting this view are examined in chapter 7.

However, the RAC excluded intensification technologies in native forests from its list of key concerns for critical examination.

It could be argued that the RAC did investigate the environmental effects of intensification technologies in its scenario analysis using the Integrated Forest Model (INFORM).[65] The high industry investment scenario dedicated a proportion of public native forest to intensive management for wood production (Resource Assessment Commission 1992a, p. 378). Intensification was defined using the CSIRO's young eucalypt program (Kerruish & Rawlins 1991), which researched changes in wood yield using different native forest thinning regimes.[66] This approach provides an inadequate assessment of the environmental effects of intensification because of its limited interpretation of intensification technologies, crude modeling of the environmental effects and poorly specified environmental indicators. The RAC acknowledged the limitations (Resource Assessment Commission 1992a, S15 and S33).

The RAC were aware of the commercial benefits of intensification technologies. It observed that, if, after a native forest area is logged, standing trees of lesser commercial value are removed and the area subsequently thinned, the forest may come to resemble a plantation with relatively high growth rates. Fertilisers could generate an additional substantial growth response as occurs in eucalypt plantations (Resource Assessment Commission 1992a, Appendix N, p. 18). The RAC also understood that financial pressures on public native forest agencies could lead to them adopting intensification practices:

> '*...the Inquiry has concluded that there will be strong pressures, arising from the economics of forestry operations, for agencies to adopt more intensive management practices, involving predominantly pulplog production on short rotation pulplog-sawlog regimes in public forest areas.*' (Resource Assessment Commission 1992a, p. 20).

The RAC supported the ecologically sustainable native forest management approach but failed to identify, and therefore research, intensification as a threat to native forest ecosystem health. Such an omission makes it difficult to present a policy framework to government that addresses a major component of the native forest conflict.

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[65] INFORM was developed principally to assess log yields under different forest management regimes and the effects on downstream processing. The model's evaluation of the environmental effects of different scenarios was limited to stating the percentage of different forest types in conservation reserve tenure, percentage of forests unavailable for logging, area of old growth forest remaining, a regrowth indicator showing the standard deviation in the distribution of age and size classes of all forest groups in each land tenure and relative changes in soil and water quality (Resource Assessment Commission 1992a, p. 399 and Appendix S, p. 15).

[66] The program researched the potential to enhance native forest wood yields through thinning. The researchers considered that adding treatments such as pest control and fertilising could significantly increase the potential for wood production from some regrowth forests, but supporting data are limited (Kerruish & Rawlins 1991, p. 9) and these intensification practices were excluded from the study.

National Forest Policy Statement - 1992

In this Statement the Federal and State Governments shared a vision of ecologically sustainable management of Australia's 'forests'.[67] They adopted the ESD Forest Use Working Group's definition of sustainable forest use (see above). To implement this vision, the Governments agreed that the AFC's set of national principles for native forest management for wood production (reproduced in Commonwealth of Australia 1992, Attachment A) should be applied to all public and private native forests in Australia. The principles provide a reasonable introductory statement. Their general and limited nature, however, means that implementation runs the risk of ignoring the need to maintain natural processes that sustain native forest ecosystems, particularly the competitive and correlated behaviours of species, and water and carbon functions (B. Mackey pers. comm. 2001).

The AFC's principles allow for the intensification of native forest management. Designated native forests can be reforested with selected species, provenances or populations to increase the productivity or value of the forest. Intensive management practices, such as site preparation, fertilising, weed control, pest and disease control, and other operations can be carried out but must be consistent with the specified principles of environmental care (Commonwealth of Australia 1992, pp. 43-6). It is difficult to comprehend how these intensification practices do not violate the AFC's first principle of environmental care, namely to maintain the floristic and faunal diversity of public native forests including their successional stages. Although the *National Forest Policy Statement* is set in an ESD framework where ecological processes and biodiversity within forests are ecological constraints and other 'uses' are optimised within this constraint, the operating guidelines for wood production allow practices that are potential threats to ESD.

Industry Commission Report on Adding Further Value to Australia's Forest Products - 1993

The Industry Commission recognised the attraction of a plantation resource for cost competitiveness in commodity production and also that plantations should reduce the wood supply pressure on native forests (Industry Commission 1993, pp. 12, 74, 131). Its terms of reference required it to investigate the industry's potential within the principles of ESD. This meant that the Commission's recommendations to improve efficiency in wood production, most notably through corporatising public (native) forest agencies, did not trigger a discussion on the implications for native forest ecological integrity. The Commission did not ask the question: what is the need for native forest agencies when, as the Commission indicated, plantations are a superior resource option for a commodity industry? The same contradiction was made in the Commission's first recommendation, namely to improve native forest resource security by accelerating the process identified in the *National Forest Policy Statement*.

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[67] The document (including the glossary) does not define 'forest' but it does define 'native forest' and 'plantation'. In most cases the two resources are referred to separately.

Wood and Paper Industry Strategy - 1995

This strategy formed the industry policy component of the new arrangements announced by Prime Minister Keating in November 1995. The Strategy aimed to increase the level of domestic wood processing with a particular emphasis on pulp and paper given the size of the trade deficit for these products. The strategy encouraged processing both plantation and native forest wood.

The *National Forest Policy Statement's* ESD framework and definitions provided the umbrella for the strategy. It noted that the Australian public expects that where logging of native forests is permitted (i.e. has a signed RFA in place) it will be ecologically sustainable. The Strategy reported that the RFA process would clarify the native forest (mostly regrowth) wood availability, and its use would maximise financial returns from native forests (Commonwealth of Australia 1995c, p. 18). There was no discussion on how conflicts between ESD principles for native forests and maximisation of financial returns would be reconciled. An earlier draft of the Strategy allowed for the application of intensive management practices to increase wood production in regrowth forests (Commonwealth of Australia 1995b, p. 8) but this initiative was removed in the final document. The Strategy did recognise that plantations would reduce the dependence on native forest resources but did not elaborate on when and to what extent.

The 2020 Plantation Vision - 1997

In 1996, the Ministerial Council on Forestry (previously the AFC), Fisheries and Aquaculture endorsed an industry-developed target of trebling Australia's plantation estate by the year 2020 and asked its standing committee to report on how this might be achieved (Ministerial Council on Forestry, Fisheries and Aquaculture et al. 1997, p. 1). The Centre for International Economics (CIE) was commissioned to prepare a plan to achieve the vision (Centre for International Economics 1997). The Minister for Primary Industries and Energy launched this reference document, together with a framework for action as government policy, in October 1997 (Anderson 1997). The policy's resource implications were briefly discussed in chapter 3.

The 2020 Vision and the CIE identified the need to strengthen the commercial incentive to invest in plantations by making them more profitable and less risky. Neither the 2020 Vision nor the CIE identified the competing native forest resource as undermining plantation profitability. By defining the industry exclusively to the plantation sector (Ministerial Council on Forestry, Fisheries and Aquaculture et al. 1997, p. 1), the 2020 Vision virtually ignored the native forest industry. None of the 28 actions and 11 goals listed in the 2020 Vision refers to competition from native forests including the supply implications of native forest intensification.

Action 27 encouraged native forest commodity wood production by recommending the removal of quotas on exports of woodchips from private native forests (Ministerial Council on Forestry, Fisheries and Aquaculture et al. 1997, p. 23). This was to enable a major expansion of the Tasmanian plantation estate using 'badly degraded' private native forest land and using the chip export revenue to provide the cash flow to fund

plantation establishment (Centre for International Economics 1997, p. 31). The commercial implications for plantation investors in other states of this Tasmania-only arrangement were not discussed.

Regional Forest Agreement (RFA) - ecologically sustainable forest management (ESFM)

The principal ecological objectives of the National Forest Policy Statement were to protect native forest communities, wilderness and old-growth forests in comprehensive, adequate and representative reserves and to use ecologically sustainable forest management (ESFM) approaches to wood production outside this reserve system. The RFAs incorporate guidelines and practices for ESFM agreed to by the Federal and State Governments. Advisory groups were established in each state to lay the foundations for ESFM - developing the methodology for assessment, frameworks and values. The process generated the indicators for sustainable forest management, thereby fulfilling Australia's obligations under the Montreal Process (Raison 2000).[68]

Maintaining 'forest' ecosystem health and vitality was identified in the Montreal Process as one of the values society seeks to maintain (criteria). The key indicator (measure of change in the criteria over time) developed by Australia is the area and per cent of forest (there being no distinction between native forests and plantations) affected by processes or agents that may change ecosystem health or vitality. The cost-price squeeze of commodity production and the associated pressure for intensification was not identified as a threatening process or agent. Processes and agents that were identified included fire; climatic events; river regulation; salinisation; grazing; and introduction of exotic biota, insects and diseases (Commonwealth of Australia 1998, pp. 27-8).

The processes and reports the Federal Government had commissioned from the public service failed to provide a policy framework that tackled the core of the problem, namely the multiple-use approach to native forest commodity wood production. In so doing, all reports failed to present to Government the policy option of distinguishing plantations from native forests and aligning environment and industry objectives to the most appropriate land base. Each report made its own judgement about the centrality of multiple use in the policy approach (or took it as a given) thereby limiting the range of policy options for government consideration and public debate. Without a policy approach that could resolve the conflict, exiting the native forest environment policy arena became an attractive option for the Federal Government.

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[68] The Montreal Process followed the development of international criteria (values society seeks to maintain) and indicators (measures of change in criteria over time) for forest management at the Rio Earth Summit in 1992.

Table 6.1 The multiple use framework and treatment of intensification technologies in reports to the Federal Government and major policy documents generated by Government on forest and wood industry policy in the 1990s.

Document	Does the document use a multiple use framework for public native forest policy?	Does the document recognise intensification practices in native forests?	Does the document present recommendations to ensure intensification does not undermine the ecological integrity of native forests?
ESD Forest Use Working Group 1991	Yes	Yes	The main body of the report advises that intensification practices be thoroughly tested and monitored before being widely adopted. The Executive Summary takes intensification as a given and remains silent on a precautionary approach. No funding for research recommended.
National Plantations Advisory Committee 1991	Not applicable	No - despite intensification increasing native forest wood supply and therefore the competitive pressure on the plantation industry.	No
Resource Assessment Commission 1992a	Yes	Yes	Intensification not identified as a key concern and not exposed to critical examination.
Commonwealth of Australia 1992 (National Forest Policy Statement)	Yes	Yes	Contradictions in principles for wood production and the ESD framework.
Industry Commission 1993 (Adding Further Value to Australia's Forest Products)	Not discussed. Terms of Reference required recommendations consistent with the principles of ESD	No	No
Commonwealth of Australia 1995c (Wood and Paper Industry Strategy)	Yes	No - draft document approved intensification practices in regrowth native forests.	No
Ministerial Council on Forestry, Fisheries and Aquaculture et al. 1997, and Centre for International Economics 1997 (The 2020 Plantation Vision)	Not applicable	No - despite intensification increasing native forest wood supply and therefore the competitive pressure on the plantation industry.	No
Commonwealth of Australia 1998 (ESFM indicators for the Montreal Process)	Yes	Not identified as a threatening process to ecosystem health and vitality.	Identification of threatening processes to ecosystem health and vitality recognised as requiring further research.

6.5 Plantation expansion - 2020 Plantation Vision

Introduction

More tree planting, primarily to supply wood, is widely understood in Australia to be necessary and desirable. Perceptions of a looming global wood shortage create a healthy price outlook for investors (Clark 2001a, p. 62); the wood presents an alternative to native forest logging (Cameron & Penna 1988); tree planting provides opportunities to address land and water degradation through integration with traditional farming (National Plantations Advisory Committee 1991); and carbon sequestration by trees helps alleviate climate change (Centre for International Economics 1997, p. 19). Because tree planting appears to meet such diverse interests (leaving aside the rigour of the individual arguments), the existing plantation resource tends to be ignored and so the spotlight on processing issues is dimmed. As briefly discussed in chapter 3, a plethora of assistance measures emerged following the cessation of Federal Government financial assistance to the states for softwood planting. The 2020 Vision was launched in 1997 to drive a greatly increased planting effort. Together with the RFA process, it dominated Australia's native forest and wood industry policy in the 1990s. The background to the 2020 Vision and its implementation are discussed below.

The 2020 Vision

The *National Forest Policy Statement* supported an increased plantation estate and announced measures to encourage private sector investment (Commonwealth of Australia 1992, pp. 28-30). Like the regional forest assessment process, this initiative lay dormant until 1995. In that year Plantations Australia[69] met with Federal Ministers and presented a vision of trebling Australia's plantation estate (National Association of Forest Industries 1995c).

In April 1996, the Standing Committee of Forestry (the same Committee that Jacobs had chaired in the 1960s) agreed that a national vision for the plantation industry should be developed to encourage private investment in plantations. The Ministerial Council on Forestry, Fisheries and Aquaculture (the forestry arm being the AFC) was asked at its meeting on 27 July 1996 to endorse the trebling of Australia's plantation estate to three million hectares by 2020 (Ministerial Council on Forestry, Fisheries and Aquaculture 1996, p. 27). It was an almost exact repeat of three decades earlier when the AFC was presented with a proposal from its Standing Committee to expand Australia's plantation estate to three million acres (chapter 3). The Council endorsed the national goal and requested the Standing Committee on Forestry to develop an implementation plan and presentation on the opportunities for, and obstacles to, plantation development (Ministerial Council on Forestry, Fisheries and Aquaculture

[69] Plantations Australia was formed in 1994/95 to represent the interests of the plantation industry and in particular the processing arm of the industry. It was effectively shackled by the National Association of Forest Industries (NAFI) and in 2001 its role was subsumed by the newly formed Plantation Timber Association Australia.

1996, p. 27-8). John Anderson, Federal Minister for Primary Industries and Chair of the Ministerial Council (Forestry), announced the target on 29 July 1996 (Anderson 1996).

The plantation policy was launched as the 2020 Vision (Ministerial Council on Forestry, Fisheries and Aquaculture et al. 1997) by the Minister for Primary Industries and Energy in October 1997. It was prepared by the Ministerial Council, its Standing Committee, Plantations Australia, Australian Forest Growers and the National Association of Forest Industries (NAFI) and, as discussed earlier, included a reference document prepared by the CIE. The document presents a strategy for government and industry collaboration to attract private investment to realise the planting target. The benefits of the program are listed as increased plantation investment, increased farm income, conversion of Australia's wood deficit into a surplus and rural employment growth (Ministerial Council on Forestry, Fisheries and Aquaculture et al. 1997, p. 3).

The planting target shifted the market focus to the global arena because the existing estate could largely meet Australia's wood requirement (chapter 4). The reference document to the 2020 Vision (Centre for International Economics 1997) presented a superficial two-page analysis of the global market prospects. Its conclusion, that global market conditions appeared favourable, was referenced to one paper prepared by the Manager - Group Development of Australian Paper (previously APM and now PaperlinX). That paper (Cameron 1996), using the global wood supply projections presented in Apsey & Reed (1994) and wood demand projections prepared by Simons Consulting Group (1994), concluded that by 2010 there would be a significant global wood shortage and that Australian plantations would become more attractive investments. Cameron (1996) did not consider alternative projections. The significant qualifications that Apsey & Reed (1994) made on most of their country-based wood-supply projections were ignored.

In investigating Australia's trade balance in wood and wood products, the CIE did not include Australia's significant export woodchip industry (appendix D). This meant that the CIE incorrectly reported Australia as having a large trade deficit (in wood volume terms) when it actually had, and still has, a slight wood surplus (Australian Bureau of Agricultural and Resource Economics 2001b, pp. 62-3). With this significant omission, the CIE misrepresented the commercial outlook for prospective plantation investors.

The CIE's superficial analysis of the market prospects for Australian plantation wood led it to conclude that:

> '*Because of the healthy long term price outlook finding markets for wood before planting should not be a priority.*' (Centre for International Economics 1997, p. 11).

This outlook contradicts the findings of other reports (e.g. Food and Agricultural Organisation of the United Nations 1997; Sedjo & Lyon 1990) based on research showing that native forests, plantations and other fibre sources are likely to be sufficient to meet demand in the near future at least. A later examination of the global wood market by Clark (2001a) found no evidence of a looming global wood shortage

and argued that wood prices are likely to continue their downward trend over the long term.

The CIE's superficial treatment of the market prospects for plantation investment is as challenging as Hanson's (1962a) consumption projections that underpinned the 1960s softwood plantation program (chapters 3 and 4). The CIE's undisputed understanding of the importance of realistic market analysis stimulates investigation of other (non-wood market) factors driving the planting target. One possible explanation is that, if tree planting were regarded as a carbon-sink in international negotiations over climate change, a significantly increased plantation estate could reduce the compliance cost burden on industries contributing most to Australia's greenhouse gas emissions.

In 1994, the United Nations ratified its Framework Convention on Climate Change (UNFCCC) that aimed to stabilise atmospheric greenhouse gas concentrations to prevent human induced climate change. The Australian Mining Industry Council (AMIC) commissioned research into the economic implications of implementing such a policy. The research (McKibbin et al. 1994)[70] provided estimates of the cost burden, in terms of reduced Australian GDP, if a carbon tax were used to restrain CO_2 emissions. The CIE argued that some of the GDP loss would be avoidable through the CO_2 sequestration benefits of the 2020 Vision (Centre for International Economics 1997, p. 19). Although not reported in this way, the CIE's assumptions and calculations show that realising the 2020 Vision for plantations would enable Australia to increase its CO_2 emissions by 2 per cent on 1990 levels without generating a net increase in CO_2 into the atmosphere. The effect is significant because the 1997 Kyoto Protocol requires countries to tackle just the increase in CO_2 emissions since 1990. It is difficult to imagine that Australia's three million hectare plantation target was conceived independently of a wider strategy to address the cost impost, particularly to the mining industry, of climate change.[71] In launching the 2020 Vision, the Minister for Primary Industries and Energy presented figures showing that the Government expected a larger sequestration benefit:

> '*Achievement of the Vision of trebling the plantation estate will result in annual greenhouse gas sequestration equal to between 5 and 10 per cent of Australia's current annual emissions.*' (Anderson 1997, p. 4).

The 2020 Vision has been argued in the public mainly on traditional wood industry grounds. However, the discussion above suggests that the mining industry, as relatively large generators of Australia's greenhouse gas emissions, may have influenced the policy.

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[70] Andy Stoeckel, one of the report's authors, is the Executive Director of the CIE.

[71] As a postscript, the 1997 Kyoto Protocol allowed for Australia's CO_2 emissions to increase to 108 per cent of 1990 emissions. Article 3 of the Protocol allowed for the removal of greenhouse gases by sinks resulting from human-induced land use change and specified forestry activity since 1990 to offset a Party's emissions from sources to meet its commitments. The sequestration capacity of plantations has been questioned on scientific grounds (Turner & Lambert, in press).

The Federal Government saw its role primarily as providing clear and consistent policies supporting plantation development with the private sector undertaking the investment. Prospectus-based investment became the dominant vehicle for plantation development. Prospectus investment was available prior to the 2020 Vision (see for example SEAS Sapfor Investment Services Ltd. 1991; Timbercorp Eucalypts Ltd. 1993), but the number and size of plantation prospectus companies expanded significantly after 1997, riding on the wave of loosely regulated, mass-marketed tax effective schemes (Senate Economics Reference Committee 2001).

Most plantation prospectus companies marketed hardwood plantations for paper, seeing a bright market outlook for hardwood pulp and paper and attracted by the shorter rotations for hardwood chiplogs and hence earlier financial returns. Australia's purported trade deficit in wood and wood products, expectations of a global wood shortage and solid government support for plantation development were powerful marketing messages used in the plantation prospectuses to distinguish their product from other tax effective investment products. Australia's hardwood planting increased from an average 12 000 hectares per annum in the first half of the 1990s (National Plantation Inventory 1997, p. 10) to 146 000 hectares in 2000 (Wood et al. 2001, p. 14; figure 4.1).

The prospectus-based plantation boom turned to bust in 2001. By mid 2000, the share-price declines in the prospectus companies listed on the Australian Stock Exchange signaled a declining investor confidence in the industry.[72] As the financial year ending June 2001 drew to a close, the plantation prospectus companies, despite most having Product Rulings guaranteeing their tax deductibility status, were further damaged by the negative publicity over mass-marketed tax effective schemes in general. All plantation prospectus companies bar one failed to meet projected sales, and the largest promoters reported significant declines relative to projected sales for 2001 (Agribusiness Research as reported in Fenton-Jones 2001). Share prices continued to decline (Kormendy 2001) and by end-July/early August 2001 the financial plight of prospectus companies became clear. Australian Plantation Timber Ltd. appointed an administrator after the Commonwealth Bank (owed $40 million) refused it further funding (Bolt 2001) and Forest Enterprise Australia's position was described in the financial press as 'terminal' (Pierpont 2001). At the time of writing, the saga continues with the finance sector tuned out of the industry and the Federal Government exploring measures to prevent a precipitous fall in annual planting.

The 2020 Vision has received substantial public funding in the form of reduced taxation liabilities to private prospectus-based investors. The first-year tax benefit for individuals on the top marginal tax rate (48.5%) averaged $2 459 per hectare in 2001 for eight hardwood (eucalypt) chiplog projects investigated and $4 500 per hectare over

[72] Share-price data from the Australian Stock Exchange for Australian Plantation Timber Ltd., Forest Enterprises Australia, Great Southern Managers Australia Ltd., Timbercorp Eucalypts Ltd., and Willmott Forests Ltd. Rights issues do not alter the underlying assessment of a declining market value among these companies.

the full rotation of 10-13 years (Lonsdale Securities Limited Alternative Research Group 2001). Over the period 1998-2000, an estimated 200 000 hectares of prospectus based plantations were established in Australia (based on Cummine 2000). These figures suggest income taxation deductions in the order of $0.5 billion over 1998-2000. Plantation prospectus investments do not undermine the overall public revenue base to the extent that other mechanisms for reducing tax liability are used in their absence. As a marketing tool, however, the 2020 Vision policy can influence where Australia's tax minimising investment is focussed. The main groups to benefit from the 2020 Vision are wood buyers, particularly if the planting generates a wood over-supply and reduces wood prices further, and Australia's major energy producers - as the largest contributors to Australia's greenhouse gas emissions - if plantations are recognised as a carbon sink.

Export regulations on unprocessed plantation wood

The 1992 National Forest Policy statement announced the Federal Government's intention to remove controls on exporting unprocessed public and private plantation wood (chips and logs), subject to the application of codes of practice to protect environmental values (Commonwealth of Australia 1992, p. 19). In 1995, the Keating Labor Government announced its intention to remove export controls on plantation wood as soon as practicable after 1 January 1996 and the newly elected Howard Liberal-National Coalition Government expedited the legislative changes (Forest Taskforce 1995b; Ministerial Council on Forestry, Fisheries and Aquaculture 1996, p. 36).

Removing the export regulations on unprocessed plantation wood was a key 2020 Vision implementation strategy. When the Federal Government first imposed the export controls in 1968 they used generic terminology, there being no need to distinguish between growing regimes because at the time there were no proposals to export unprocessed plantation wood. Export markets were sought in the 1980s for surplus (to domestic processing capacity) wood from plantation thinnings and sawmill residues. These exports were subject to the Export Control (Unprocessed Wood) Regulations. Although rubber-stamping was the practice for applications to export unprocessed plantation wood, the controls were perceived as an inhibitor to further investment in plantations. The Centre for International Economics (1997, pp. 43, 51, 65) argued that the regulations put downward pressure on wood prices because of the uncertainty they created for wood buyers. Their removal would signal to the finance market the Federal Government's commitment to plantation expansion and would therefore add another level of confidence for potential investors.

If Australia's comparative advantage lies more in growing wood (agriculture) than processing wood into wood products (manufacturing), a policy focussed on deregulation of wood growing will deliver optimal resource allocation and maximise Australia's economic wealth. The evidence suggests, however, that Australia's comparative advantage may lie more in manufacturing some wood products than in wood growing. Margules Groome Pöyry (1995, pp. 76-9), in a plantation benchmarking study commissioned by the Federal Government, found that Australia's plantation

wood growing cost competitiveness is less attractive than all competing countries other than New Zealand. The Industry Commission (1993, pp. 96, 102) found that Australia was globally competitive in packaging and industrial papers; potentially globally competitive in hardwood kraft pulp and had a slight disadvantage in particleboard, medium density fibreboard, softwood plywood and softwood sawn timber on export markets. Given that exports of unprocessed wood are growing more strongly than the processing arm of the industry (chapter 5), these studies imply that barriers to plantation processing investment should be investigated.

Australia's plantation processing industry argued against the removal of export controls on unprocessed plantation wood. Auspine Ltd., a large private softwood grower, Australia's biggest exporter of softwood plantation chips, and an owner of sawmills in South Australia and Tasmania, wrote to Prime Minister Keating stating that it was not opposed to the removal of export licences per se but sought the Government's assurance that a mechanism would be retained to ensure that domestic preference remain an active part of government policy (Bankes 1995). Auspine Ltd. was opposed to the export of unprocessed logs if there were domestic opportunities to add value through processing without disadvantaging the plantation grower. It argued for the retention of the domestic preference clauses in the export licencing arrangements for plantation logs and woodchips and recommended some streamlining of the current system. Auspine advised the Prime Minister that its views were not isolated and that other major plantation companies maintained a similar position (Bankes 1995). Australian Newsprint Mills, with pulp and newsprint mills in Tasmania and New South Wales using softwood plantation and native forest wood and recycled paper, expressed to the Prime Minister its position strongly favouring a domestic processing preference (C. Humphries pers. comm. 1995). CSR Timber, then Australia's largest sawmiller and wood panels producer, supported a domestic preference policy, arguing that exports of unprocessed wood should occur when the domestic processing industry did not have a wood requirement. The company recognised that checks and balances were needed on wood prices with exporters being required to declare the export pricing arrangements (H. Pens pers. comm. 1995). The native forest environment movement aligned with these companies on the issue, concerned that lifting the export controls would see a firesale of plantation wood and deny Australia the opportunity to realise 15 000 to 20 000 new jobs in processing Australia's increasing plantation resource (National Forest Campaign 1995).

In December 1996, The Minister for Primary Industries and Energy introduced to Parliament amendments to remove export controls on unprocessed plantation wood in states where codes of practice had been assessed as protecting environmental values. Senator Brown's (Australian Greens Party) move to disallow the amendment triggered a long and intense Senate debate (Parliament of Australia 1997, pp. 1738-53). The Liberal-National Party Coalition Government and Labor opposition voted against the disallowance, thereby clearing the regulatory path for exporting unprocessed plantation wood subject to verification of environmental practices and controls by the CSIRO.

6.6 Evaluation of the Federal Government's 1990s forest and wood industry policy

Introduction

The Federal Government's exit from the native forest environment policy arena and the new national plantation target drove Australia's native forest and wood industry policy during the second half of the 1990s. The mechanisms, namely the RFA process and the 2020 Vision, were initiated under the Keating Labor Government and continued, with ALP opposition support, under the Howard Liberal-National Party Coalition Government.

The following section evaluates 1990s policy against the indicators established in chapter 5. The key questions are:

- What effect did the RFA and 2020 Vision have on shifting the Australian wood and wood products industry from native forests to plantations?

- What effect did the RFA and 2020 Vision have on the level of domestic integration in the Australian plantation industry?

The policy implementation period started in 1997. The first RFA was signed, for East Gippsland, on 3 February 1997. This was followed by Tasmania (8 November 1997), Central Highlands Victoria (27 March 1998), South West Western Australia (4 May 1999), North East Victoria (23 August 1999), Eden New South Wales (26 August 1999), North East New South Wales (31 March 2000), Gippsland Victoria (31 March 2000), West Victoria (31 March 2000) (Commonwealth Forests Taskforce 2000, p. 2). The Southern New South Wales RFA was signed in April 2001. As discussed at the end of this chapter, south east Queensland does not have a RFA. The 2020 Vision was also launched in 1997. Amendments to the regulations controlling the export of unprocessed plantation wood were voted through the Senate in March 1997 and the regulations were progressively abolished as each state's procedures for environmental protection were checked-off by the CSIRO.

Industry performance during the policy implementation period (1996/97 to 1999/00) is compared with the trends prior to policy implementation (1989/90 to 1995/96). Deviations from the trend are examined for a causal relationship with policy implementation.

Indicator 1: Shift from a native forest to a plantation based wood and wood products industry

Australia's native forest wood production increased by an average 3.4 per cent per annum in the policy implementation period 1996/97 to 1999/00. Virtually all the growth was realised during the end of this period as the full resource effects of the policy began to flow through. There was virtually no growth in native forest wood production during the pre-implementation period. The increase in native forest wood

supply occurred despite continuing strong growth in plantation supplies (table 6.2, figure 6.1). Indicator 1 therefore identifies deterioration during the policy implementation period in Australia's performance in shifting from a native forest to a plantation based wood and wood products industry.

Table 6.2 Average annual change in Australian production of wood and wood products 1989/90-1995/96 and 1996/97-1999/00 (% per annum). Growth rates calculated using regression analysis incorporating all annual data. Source: Australian Bureau of Agricultural and Resource Economics (2001b) and earlier editions; Australian Bureau of Statistics international trade statistics; Pulp & Paper Manufacturers Federation of Australia (2001).

Product[a]	Pre-policy period - 1989/90 to 1995/96	Policy implementation period - 1996/97 to 1999/00
Native forest based production		
Total wood	0.1	3.4
Woodchip exports	0.6	4.7
Whole log exports[b]	na	na
Sawn timber, plywood and wood based panels	-0.8	-1.8
Wood for domestic pulp production	-6.1	-4.7
Other[c]	-9.6	2.9
Plantation based production		
Total wood	6.2	7.3
Woodchip exports	44.6	9.2
Whole log exports[d]	118.0[e]	25.5
Sawn timber, plywood and wood based panels	8.5	7.8
Wood for domestic pulp production	-2.4	5.9
Other	6.7	5.3

a. Source data adjusted to be consistent with product descriptions using assumptions and information in Appendix D, with the exception of native forest hardwood wood panels production where ABARE roundwood removals for wood based panels production was used assuming a 55 per cent product recovery.
b. In 1999/00, 80 000 m^3 of hardwood logs were exported. Export volumes are small but growing and are not disaggregated into plantation and native forest sources.
c. Railway sleepers, fencing and mining timbers, poles and posts, etc.
d. Assuming all softwood log exports are plantation derived. Excludes hardwood logs - see note b.
e. Growth rate is high because of the low export volume at the start of the period.

Increased woodchip exports account for virtually all the additional native forest wood production (table 6.2). The volume of native forest woodchips exported during the pre-policy period increased by less than 1 per cent per annum on average. The removal of export licence regulations commenced with East Gippsland and then Tasmania - Australia's largest chip export state - in 1997. By the end of March 2000, the export regulations had been abolished in all RFA regions, with the exception of Southern New South Wales. Australia's exports of native forest woodchips increased by an average 4.7 per cent per annum during the policy implementation period (table 6.2, figure 6.1).

The strong volume growth in Australia's native forest chip exports, particularly during 1999/00 (19 per cent from 1998/99 to 1999/00), was realised despite the significant increase in resource productivity in the global paper industry and stagnating paper consumption during the second half of the 1990s (Clark 2001a, pp. 54-5). Real, inflation adjusted, prices for Australian eucalypt woodchips in the global market were relatively stable over the period 1994/95 to 1998/99 and then declined by 9.2 per cent

in 1999/00 (table 6.3), and volume exports grew strongly. This suggests price-cutting by the Australian native forest based industry to gain increased export volumes.

The financial statements of Harris Daishowa (Australia) Pty. Ltd. - the only company operating in Australia that solely exports native forest chips, and therefore whose financial statements relate specifically to this activity - indicate that exporting native forest woodchips from Australia continued to generate extra-ordinary returns on equity despite deteriorating woodchip prices for the Australian industry (table 6.3). It is difficult to establish whether state forest agencies have facilitated this outcome by lowering native forest stumpages (price of logs excluding logging and cartage) because, with the exception of Western Australia, their prices are either confidential, not available, or published as averages (Commonwealth Competitive Neutrality Complaints Office 2001, p. 32). There is solid evidence of very low stumpages on native forest chiplogs in Tasmania and Victoria (Miller 1999; Paine 2001). These are Australia's main exporting states. Export woodchip companies have also worked to reduce costs in other areas of their operations.

On the evidence available it is likely that, during the deregulation implementation period, reductions in native forest log stumpages have facilitated the significant growth in Australia's exports of native forest woodchips. This development has undermined Australia's capacity to shift commodity wood production from native forests to plantations.

Table 6.3 Operating profit, return on equity and chip export volume, Harris Daishowa (Australia) Pty. Ltd. and real price for Australian exports of hardwood chips. Source: Harris Daishowa (Australia) Pty. Ltd. (2001) and earlier statements: Australian Bureau of Agricultural and Resource Economics (2001b) and earlier editions; Reserve Bank of Australia for GDP deflator.

Year ending 31 December	Return on equity[a] (%)	Unit costs of production[b] ($A/green tonne)	Chip exports (million green tonnes)	Real price for Australian exports of hardwood chips[c] (A$ fob/bone dry tonne)
1995	46	71.24	0.94	147
1996	35	73.74	0.78	151
1997	27	74.28	0.70	150
1998	35	70.09	0.67	151
1999	17	72.30	0.70	152
2000	26	70.46	0.71	138

a. Operating profit after income tax as a per cent of shareholder's equity.
b. Payments to suppliers and employees deflated by GDP deflator (1998/99 = 100). Excludes income tax, GST and interest charges.
c. Prices for financial year ending June deflated by Australian GDP deflator (1998/99 = 100).

In contrast to increased native forest chip exports, domestically processed production using native forest wood declined during the policy implementation period. Plantation products increased their Australian production share in all products (figure 6.2 and table 6.2). This favourable performance is a continuation of past trends and, as discussed below, is occurring despite policy during the 1990s.

Figure 6.1 Australian production of plantation and native forest wood and exports of native forest woodchips 1990-2000. Wood production was disaggregated into plantation and native forest sources using the methods presented in Appendix D. Plantation eucalypt exports have been netted out using the methods presented in Appendix D and assuming 150 000 m^3 were exported in 1999 and 100 000 m^3 in 1998. Sources are as detailed in Appendix D.

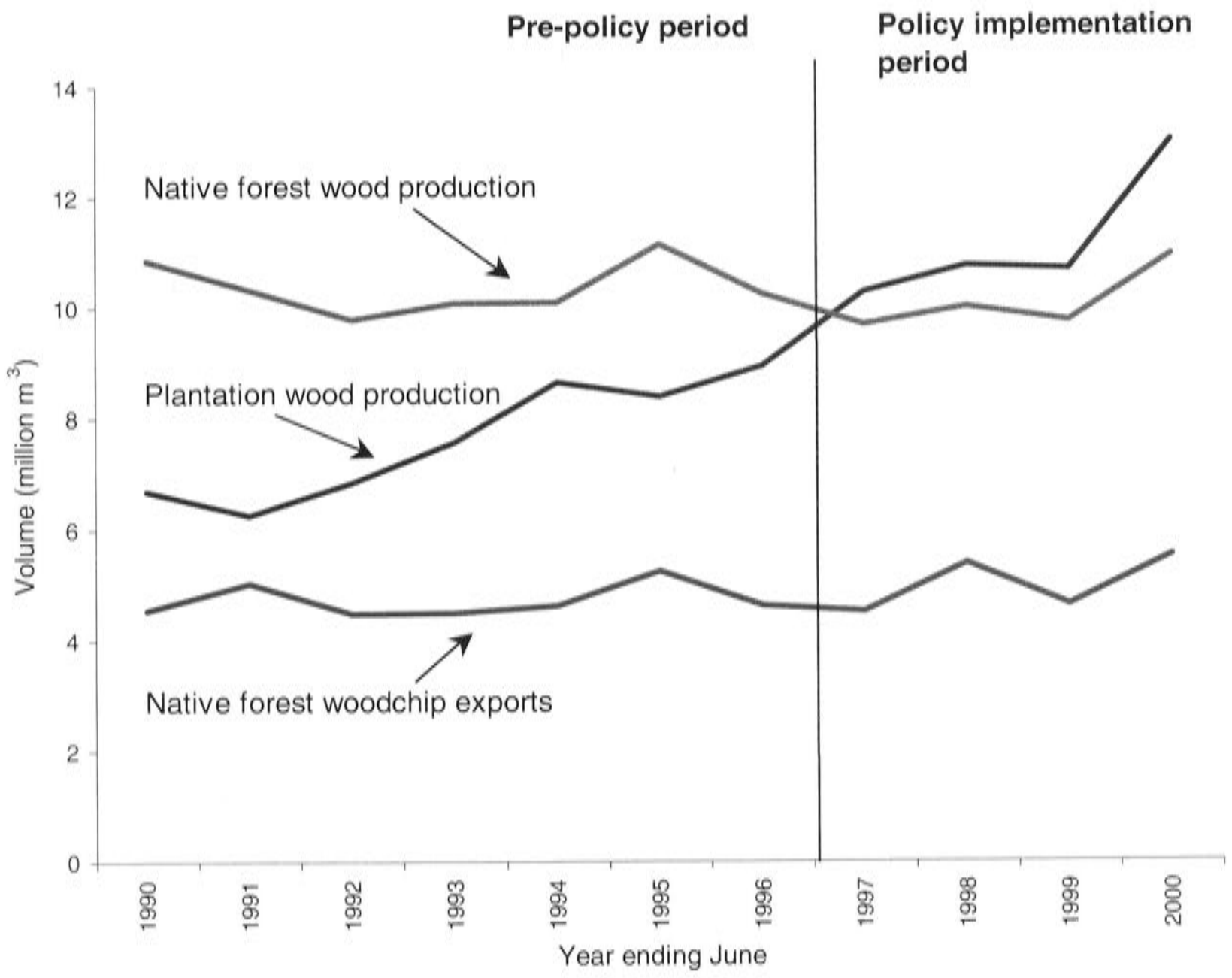
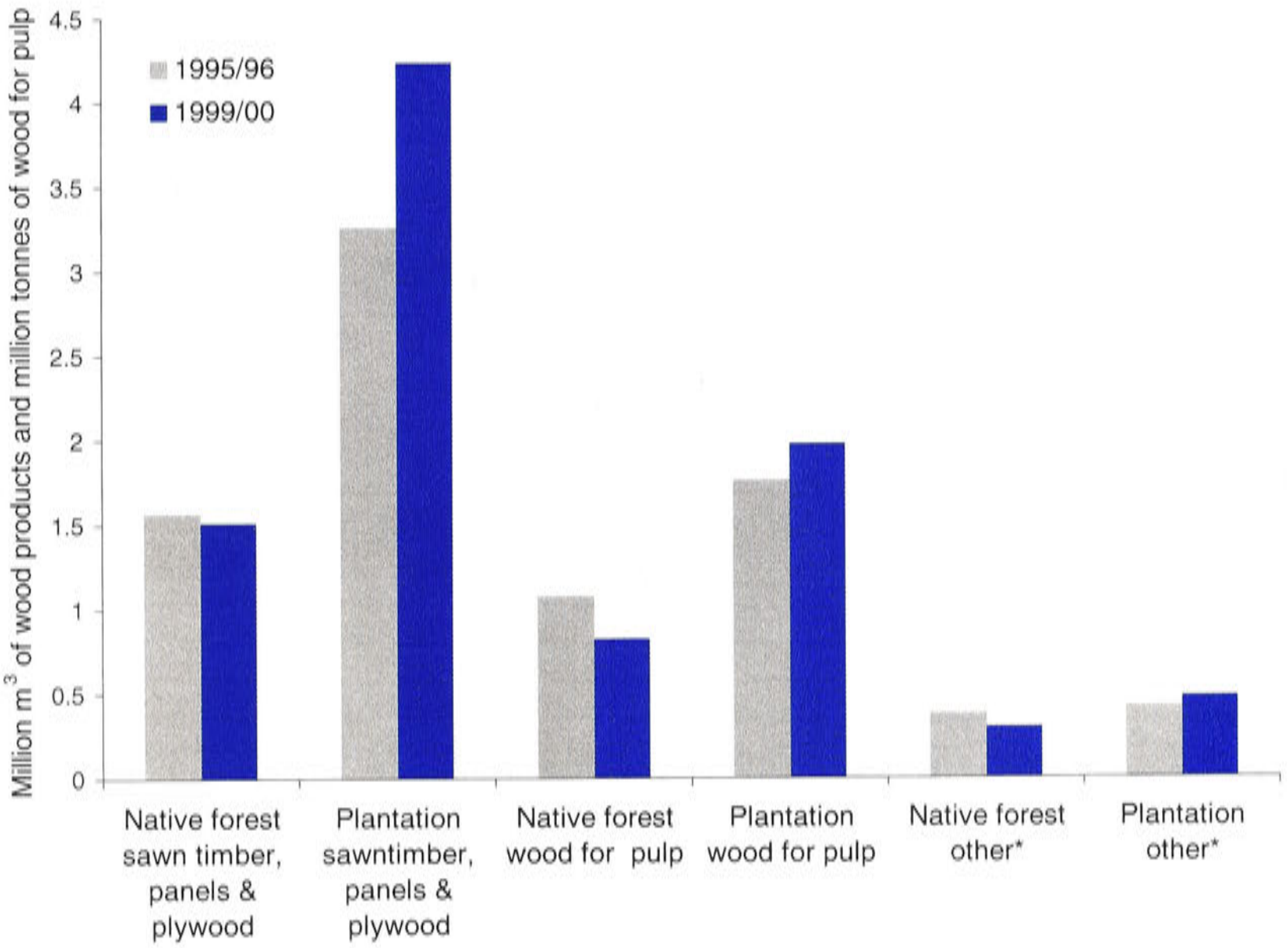


Figure 6.2 Australian production of plantation and native forest wood products 1995/96 and 1999/00. Production has been disaggregated into plantation and native forest sources using the methods presented in Appendix D. The data do not include adjustments for the over-reporting of native forest sawn timber production in Victoria. *Railway sleepers, mining and fencing timbers, poles and posts. Source: Australian Bureau of Agricultural and Resource Economics, Forest Products Statistics and Australian Commodity Statistics; Pulp and Paper Manufacturers Federation of Australia (2001) and earlier editions.



Indicator 2: Plantation industry domestic integration

As outlined in chapter 5, Australia's plantation industry has become less integrated as more plantation wood, principally from maturing softwood plantations, has come on stream. Virtually all Australia's plantation wood was processed domestically at the start of the 1990s. By the end of the pre-policy period (1995/96), 30 per cent was exported unprocessed and this share has continued to increase during the policy implementation period (table 6.4). Increased plantation woodchip exports account for most of the growth in unprocessed wood exports in the pre-implementation period. Chip exports continued to grow during the policy implementation period, particularly with the resource from eucalypt plantations coming on stream. Of significance is the growth in exports of unprocessed plantation logs in 1999 and 2000 (table 6.4).

Table 6.4 Australian production of plantation wood and exports of unprocessed plantation wood 1991-2000. Source: Australian Bureau of Agricultural and Resource Economics (2001b) and earlier editions; Australian Bureau of Statistics international trade statistics.

Year ending June	Wood production[a] (million m^3 per annum)	Chip exports (million m^3 per annum)[b]	Log exports[c] (million m^3 per annum)	Unprocessed wood exports as per cent of total wood production (%)
1991	6.3	0.4	0.1	8
1992	6.9	0.9	0.1	14
1993	7.6	1.1	0.2	17
1994	8.7	1.4	0.4	21
1995	8.4	2.5	0.3	33
1996	9.0	2.4	0.3	30
1997	10.3	2.5	0.6	30
1998	10.8	2.9	0.4	29
1999	10.7	2.9	0.7	34
2000	13.0	3.3	1.0	33

a. See appendix D for methodology used to separate wood production into plantation and native forest sources. Excludes relatively small volumes of eucalypt plantation wood supply prior to 1999/00.

b. Softwood chip exports reported in bone dry tonnes converted to m^3 by multiplying by 2.47. Data for 2000 include an estimated 483 000 m^3 of eucalypt plantation chips (appendix D) and assumes 150 000 m^3 were exported in 1999 and 100 000 m^3 in 1998. A 6.5% allowance for chip losses and fines (Australian Forest Growers 1996) is included.

c. Assumes all softwood log exports are plantation sourced. Excludes logs not specified as softwood. Eucalypt plantation log exports, currently relatively minor, are not reported separately from native forest logs and are excluded from the table.

The decades-long failure - largely of state forest agencies who in 1990 managed 70 per cent of Australia's softwood estate (Australian Bureau of Agricultural and Resource Economics 1992, p. 3) - to sell the available plantation resource (Jaakko Pöyry Consulting 2000, p. 16; Victorian Wood Products Working Party 1993, pp. 21-5) underpins the introduction of softwood plantation chip exporting. The resource oversupply was initially manifested in unthinned plantations, and action was finally triggered by concerns about deteriorating sawlog growth and quality combined with the income that could be generated from clearing the backlog of unthinned plantations via the woodchip export market. As discussed above, for softwood plantation woodchip exporters, the export controls that were in place in the first half of the 1990s merely involved rubber-stamping applications.

In contrast, the export of whole plantation sawlogs arouses significant concerns about lost opportunities for domestic sawn timber production, employment and native forest conservation. This was demonstrated in the 1997 Senate debate (Parliament of Australia 1997) over the proposed amendment to the Export Control (Unprocessed Wood) Regulations.

By the policy implementation period (commencing in the mid 1990s), Australia's softwood plantations contained a stockpile of sawlogs that, through corporatisation and privatisation of the public estate, exposed them to the pressures of cash flow. Abolition of the export controls on unprocessed plantation wood removed a Federal Government regulation that had the potential to constrain the surge in plantation log exports during the policy implementation period (table 6.4). This is not an argument against abolishing export controls, rather it is an argument for ensuring that any disincentives to investing in plantation processing are identified and removed and given sufficient time to work before deregulation. This approach was not pursued because, as argued earlier in this chapter, policy in the 1990s was not about facilitating plantation processing.

The increase in Australia's unprocessed plantation wood exports indicates an insufficient domestic plantation processing capacity, which in turn signals a manufacturing investment failure. Investment in plantation processing over the longer term has been affected to the extent that the collapse in Australian manufacturing industry policy generally has undermined manufacturing in Australia and to the extent that native forest wood production is subsidised. The question for this evaluation is whether 1990s forest and wood industry policy further inhibited investment in Australian plantation processing.

Evidence that the RFA has undermined plantation processing is found in the increased investment risk for the plantation industry. The RFA policy incorporated financial assistance (Forest Industry Structural Adjustment Packages) from the Federal and State Governments to individual companies, the industry generally, and employees negatively affected by native forest land use decisions. At this stage there is no analysis of changes in land use to demonstrate how RFA-generated conservation gains have affected native forest wood supply on a regional basis. With grants still occurring, it is too early for comprehensive evaluation of the compensation measures. State Government announcements show that a flexible approach has been taken in utilising the funds. Tasmania allocated much of their financial package to constructing and maintaining roads. In New South Wales, Government grants have financed a significant proportion of new investment in the native forest sawn timber industry. For example, 75 per cent ($6 million) of the cost of reopening a native forest sawmill in the Eden region was financed through the RFA structural adjustment package (Phillips 1999, p. 73) and, in northern New South Wales, 50 per cent ($22.5 million) of the expenditure by Boral Ltd. on native forest sawmill upgrades was funded through the RFA structural adjustment package (Boral Ltd. statement to Australian Stock Exchange, 17 October 2001). The Victorian Government has announced grants to individual companies in the native forest industry for purchasing new logging equipment, sawmill retooling and drying kilns (Minister for Environment and Conservation 2001). The compensation

provisions have also been used to encourage native forest sawmillers, for example in Western Australia and northern New South Wales, to exit the industry. Bearing in mind the qualifications made above about the absence of evaluation, much of the compensation funding appears to be a subsidy to native forest logging and commodity sawn timber production. Because plantation products can and are substituting for most of Australia's native forest sawn timber (appendix F), subsidies to the native forest industry undermine investment in plantation sawn timber and wood-based panels processing.

Federal Government subsidies, separate from the RFA process, have encouraged investment in plantation processing. The amount of assistance appears to be significantly less than that provided to the native forest industry. The main example was the $40 million grant made by the Federal Government through its Investing for Growth program to Visy Industries to encourage its $450 million investment in a softwood plantation pulpmill in Tumut, New South Wales. The decision was criticised within the Liberal Party as 'picking winners' (Ries 1998). If governments cannot resist providing corporate welfare, then it is in the public interest that the assistance is aligned with 'picking winners' (i.e. plantation based processing) rather than continuing the 'picking losers' approach. Removing subsidies to the native forest part of the industry will encourage investment in plantation processing without the need to pick anything.

Before closing this analysis, reference should be made to the significant change in ownership of Australia's plantation processing assets during the second half of the 1990s. Stafford et al. (2000, p. ii) report recent Australian plantation processing asset sales valued at nearly $2 billion, covering sawmills, wood panels plants, timber treatment plants and pulp and paper mills. They report that the purchasers are mainly international wood product specialists seeking to achieve global competitiveness and that international investors have been active in Australia's more recent processing capacity expansion. This changing ownership occurred in a Federal Government policy environment that largely ignored plantation processing industry interests, and it is arguable that this policy environment contributed to some asset sales. International investment has invigorated Australia's plantation processing industry and offers potential new markets for Australian growers. The key question, however, is whether some new investors view their Australian assets as primarily focussed on the domestic market rather than as a launch pad for global markets. The globalisation of the Australian plantation processing industry may also inhibit the transition of Australia's commodity-based industries out of native forests and into exporting plantation wood products. Investors are less likely to embark on marketing Australian wood products in the global arena as 'native forest free' if they have assets utilising native forest resources in other parts of the world. These issues are now being identified for debate.

6.7 Omission of plantations from RFA public consultation options

Public consultation was a central component of the RFA process and it is here that the 1990s policy incoherence becomes clearly visible. The *National Forest Policy Statement* included the provision of effective public participation in decision making as one of its goals (Commonwealth of Australia 1992, p. 6). Forest and wood industry policy can claim an extra interest in public consultation and participation because most of the native forest and plantation resource is publicly owned. The consultative effort surrounding the RFA process appears to have been driven by the Federal Government's understanding that public consultation was critical for public acceptance of the RFA outcome, and therefore a smoother exit from the native forest environment policy arena. Keys Young Pty. Ltd., consultants engaged in 1996 to assist in the Federal Government's RFA public relations strategy, reinforced this view. They advised that:

> '*The basic elements of the RFA approach (substantial research, community consultation, and an effort to reach a defensible balance among competing interests) will make sense to many members of the general public. In particular, the concept of a 'balanced' outcome, accommodating as many legitimate interests as possible, will strike a chord with many people – but probably not those who are most strongly committed to environment protection. There is likely to be some resistance to the notion of a State/Commonwealth agreement that is ultimately reached behind closed doors*'. (Keys Young Pty. Ltd. 1996).

Regional forest forums of government officials and key stakeholders were held to debate and obtain views, and various information and consultation sessions were held with the public. These processes provided a legitimising mechanism that raised stakeholder and public expectations that their views and submissions would influence the decisions (Dargavel et al. 2000). Dargavel et al. (2000) argue that Commonwealth-State steering committees of government officials oversaw the RFA process and negotiated the eventual agreements in private – just as Keys Young warned against. Dargavel et al. (2000) doubt that the RFA process will diffuse the conflict because it was not directed towards mediating or resolving the source of the conflict.

The main public consultation for the RFA centered on a report for each region that presented information and options and invited written submissions. Various options were presented for native forests, and their effects on the environment, industry production and employment were calculated. Plantation based opportunities were excluded from every option presented for public consultation (Clark 1999c; table 6.5). The RFA process focussed on native forests, yet it specifically defined forests to include both plantations and native forests and specifically stated that the RFA process was not limited to native forests (see for example Commonwealth and Western Australian Regional Forest Agreement Steering Committee 1998b, p. 16). The key goals of the RFA were to develop internationally competitive forest-based industries

that maximise value-adding opportunities as well as protect native forest ecological integrity. A role for plantations was clear.

At the time of the RFA negotiations, plantation wood accounted for approximately 45 per cent of the wood supply in the RFA areas and a higher proportion of the wood used in domestic processing. The RFAs have a 20 year duration, yet Australia's continuing strong growth in plantation wood supply is expected to see it double the native forest log supply within ten years (table 6.5, figure 6.3).

The RFA process denied the public the policy option of substituting native forest commodity wood with plantation supplies and thereby enhancing the persistence capacity of Australia's native forests, wood production systems and rural socio-economies. As Australia's softwood plantations matured and sawlog supply increased significantly, Australia chose to maintain native forest wood production through increased exports of woodchips. The key public policy issue for Australia's native forests and wood based industries over the next decade is the role to be played by Australia's significant hardwood plantation resource (figure 6.3).

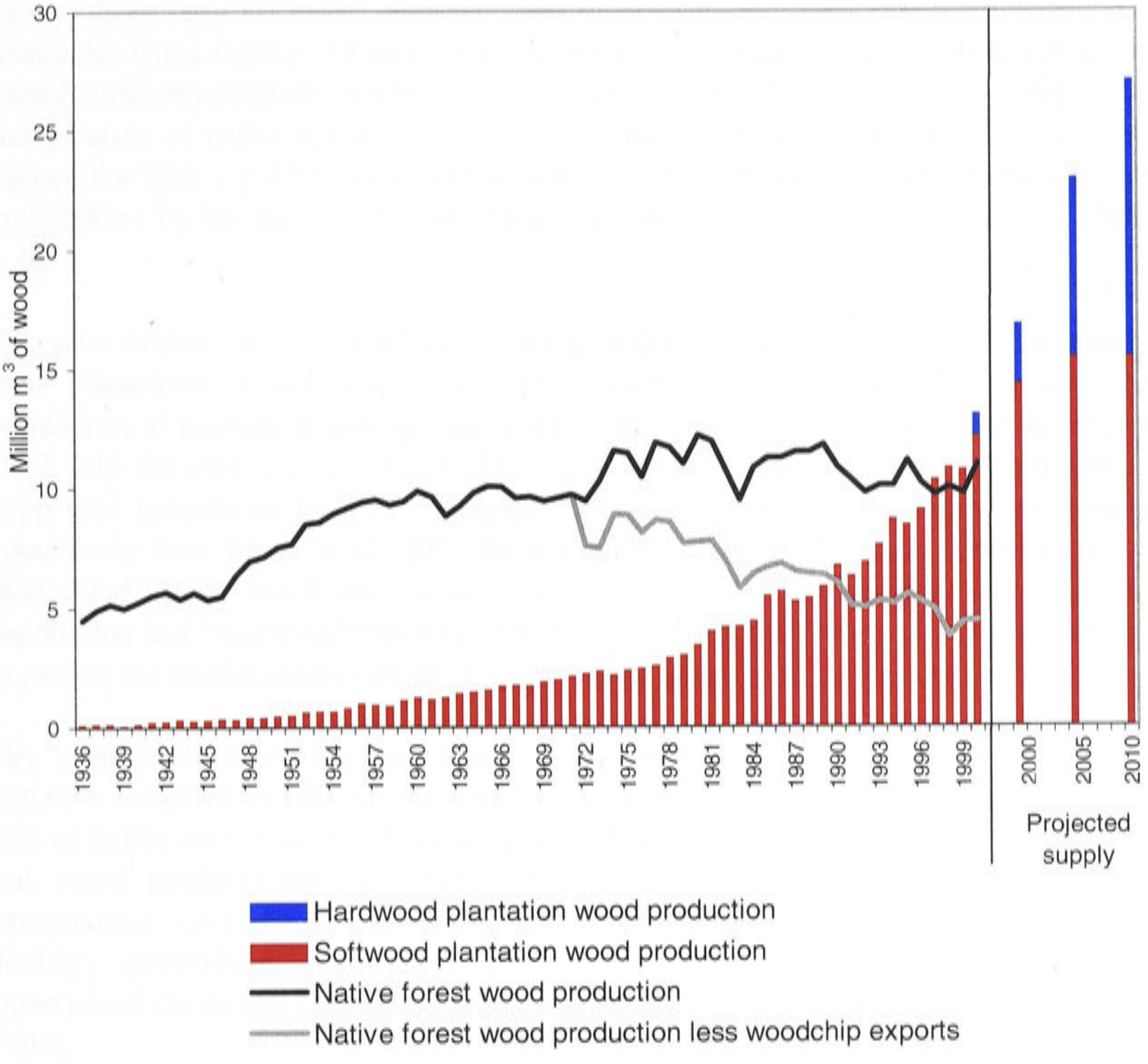
Table 6.5 Treatment of the plantation resource in the RFA options[a] presented for public consultation. Sources: Commonwealth and Victorian Regional Forest Agreement Steering Committee (1996a, 1996b, 1997, 1998, 1999a, 1999b, 2000a, 2000b); Tasmania-Commonwealth Joint Steering Committee (1997); Margules Groome Pöyry (1997); Banks & Clark (1997); Clark (1995a, 1998a); Duggie (2000); Gooday et al. (1998); Commonwealth and Western Australian Regional Forest Agreement Steering Committee (1998a, 1998b); New South Wales Government and Commonwealth Government (1998, 1999a, 1999b, 1999c); Department of Conservation and Natural Resources (1993); Bull et al. (1998).

Region and date of signing	Were plantations included in the options?	Estimated plantation share of wood supply in mid 1990s[b] (%)	Estimated plantation share of domestic processing in mid 1990s[b] (%)	Projected growth in plantation wood supply from actual use in mid 1990s[b] to 2010	Native forest log supply in mid 1990s[b] (million m^3 pa)
East Gippsland, Vic 3 February 1997	No plantations of significance in region	0	0	0	0.9
Tasmania 8 November 1997	No[c]	20	45	225% to 3.4 million m^3 pa	4.0
Central Highlands Vic 27 March 1998, Gippsland Vic 31 March 2000[d]	No	40	40	135% to 2.0 million m^3 pa	1.3
South West WA 4 May 1999	No	35	55	675% to 6.3 million m^3 pa	1.4
North East Vic 23 August 1999	No	90	*	45% to 1.2 million m^3 pa	0.1
Eden, NSW 26 August 1999	No	17	75	665% to 0.7 million m^3 pa	0.4
North East NSW 31 March 2000	No	25	*	160% to 0.8 million m^3 pa	0.9
West Vic 31 March 2000	No	75	*	150 to 2.4 million m^3 pa	0.3
Southern NSW 24 April 2001	No	85	*	210 to 2.9 million m^3 pa[e]	0.2
South East Qld unsigned	Yes. RFA practice of excluding the plantation resource discarded in the stakeholder/ State Government agreement.	80	70	45% to 2.2 million m^3 pa	0.3
Total RFA regions		45		200% to 21.9 million m^3 pa	9.8
Australia[f]		47	67	180% to 27 million m^3 pa	10.2

a. Options were variously described as scenarios, approaches and opportunities.
b. Slight variations in years due to sourcing from different reports.
c. Current softwood plantation sawn timber production excluded. Projected growth in softwood plantation saw and veneer log supply excluded. Current use of softwood plantation chiplog and sawmill residues included with native forest supply and not differentiated. Eucalypt plantation resource included, but neither quantified nor differentiated from native forest resource.
d. The RFA regions have been combined to be consistent with the plantation area used in the supply projections.
e. Includes resources in Bathurst and Oberon plantations.
f. Includes wood supply from outside RFA regions, notably South Australia's plantation resource.

* Data on exports of unprocessed wood from the region not readily available.

Figure 6.3 Australian native forest and plantation wood production and native forest woodchip exports 1936 to 2000, and projected softwood and hardwood plantation wood supply 2000 to 2010. Source: Forestry and Timber Bureau (1969); Clark (1995a); Duggie (2000); Australian Bureau of Agricultural and Resource Economics (1999a and 2001b and earlier editions). Note: fuelwood excluded.



The Queensland and Western Australian approach

Queensland

Queensland adopted a different approach to all other states on the RFA. Queensland's wood and wood products industry is similar to the plantation-dominant South Australian industry (which was excluded from the RFA process) in that it involves no native forest export woodchipping[73] and the plantation resource overwhelmingly dominates wood supply. Approximately 80 per cent of Queensland's wood was sourced from (softwood) plantations when the RFA process commenced (Bull et al. 1998). The conservation of native forests was especially urgent in Queensland, where only 9 per cent of the state's public native forests were protected in conservation reserves in the mid 1990s - by far the lowest of all Australian states (National Forest Inventory 1998, p. 6).

The sawn timber industry faced immediate growth opportunities (as did all other states) with plantations established under the softwood forestry loans agreement (for projections of plantation sawlog supply see Clark 1995a; National Plantation Inventory 1997; BIS Shrapnel Forestry Group Pty. Ltd. 2000). The build-up of exotic and native hoop pine plantations past their clearfell harvest age presented an immediate growth opportunity (see Wood et al. 2001 for age profile data).[74] The sawn timber industry (particularly Hyne and Sons, the state's largest sawmiller) had previous experience in negotiating and benefiting from a swap in native forest for softwood plantation resource as part of the machinations surrounding the Fraser Island World Heritage Listing.

The south east Queensland process was exceptional in achieving an agreement to initiate a complete transition to plantation processing and to protect immediately a large area of public native forest. This stakeholder agreement between the Queensland wood and wood products industry (represented by the Queensland Timber Board), the environment movement (represented by the Australian Rainforest Conservation Society, Queensland Conservation Council and the Wilderness Society) and the Queensland Government was signed on 16 September 1999 (Queensland Government 1999).

The main elements of the agreement were:

- the immediate reservation of a defined 425 000 hectares of native forests,
- the cessation of the use of public native forests for wood production by 2024 at the latest,
- a specified reduction in public native forest sawlog supply whilst maintaining existing Crown log allocations to specified mills to 2024,

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[73] Industry has proposed export woodchip schemes in the past and more recently a licence was granted to Queensland Hardwood Resources to export 140 000 tonnes of native forest wood in 1996, but the project did not proceed.

[74] To sustain the wood supply, the stockpile needs to be drawn down and the rest of the plantation estate managed such that the annual wood supply does not decline.

- continued logging of 184 000 hectares of native forests on a transitional basis before they are progressively added to reserves,
- 80 000 hectares of native forest to be temporarily quarantined from wood supply, for possible addition to reserves depending on the pace at which the transition to plantation resources is realised,
- implementation of a strategy to develop native hardwood plantations,
- exemption of Crown native forest sawlog holders from national competition policy requirements, and
- the Government's first right of refusal in terms of any mill seeking to sell their wood allocation or business (Queensland Government 1999; Brown 2001).

Critical to successful negotiation of the agreement was an agreement between Boral Ltd. and the Queensland Government with the company agreeing to transfer ownership of its native forest mills to the Queensland Government by July 2002 (Boral Ltd. 1999) for an undisclosed sum. The buy-out enabled a reduction in the overall sawlog cut from public native forests while maintaining log allocations to the remaining sawmills. With over 90 per cent of the region's native forest sawn timber sold unseasoned - primarily for house building, fencing and rough sawn boards, and produced in many small mills with relatively high unit costs (Bull et al. 1998) - market forces are likely to complement the Government's plantation transition strategy. Included in the strategy was an increased sawlog allocation from exotic species plantations to Hyne and Sons and, from indigenous hoop plantations, to Finlayson Timber. These allocations will help to draw down Queensland's plantation sawlog stockpile. The $18 million State Government funded plantation program (Brown 2001) should realise around 6 000 hectares of native hardwood plantations to complement the 186 000 hectare softwood plantation estate and provide for continued hardwood sawn timber production over the long term.

The Federal Liberal-National Coalition Government argued that the Queensland agreement was not a valid solution under the National Forest Policy Statement and suspended formal RFA negotiations with the Queensland Government on 21 February 2000 (Brown 2001). The Federal Government Minister for Conservation and Forests, Wilson Tuckey, argued that the south east Queensland RFA would not be endorsed because it failed to meet:

> '*a set of conditions set out in the NFPS to set up a comprehensive and adequate reserve system that also allows for…a continuation of a hardwood forest industry. The Queensland Labor Government is being asked to follow the same rules as other states and the Commonwealth who have signed on for a consistent national approach to forest policy.*' (Tuckey, as quoted in Brown 2001).

Brown, on the basis of the Minister's earlier press releases, interprets Tuckey's understanding of a continuing hardwood industry to mean a native forest hardwood industry in perpetuity. The Minister's view was that native forests should be used for

wood production irrespective of the existence of alternative resources.[75] The Minister's argument led Brown to examine whether the *National Forest Policy Statement* actually entrenched native forests for wood production. He concluded:

> '*While the NFPS may be based on an assumption that native forests can be logged in the long-term, nowhere does it say they must be logged.*' (Brown 2001).

Because the Queensland stakeholder agreement did not satisfy the Federal Government, it received no compensation funding through the RFA process. Instead the $80 million structural adjustment package was funded entirely from the Queensland public purse (Brown 2001). Against this loss is the enhanced persistence capacity of south east Queensland's native forest ecosystems, wood production system and socio-economic systems.

Western Australia

In contrast to the process of stakeholder negotiation in south east Queensland, Western Australia's environment movement continued its campaign for native forest protection mainly through public engagement. Western Australia's RFA process identified that only 8.2 per cent of its estimated pre-1750 forests were in conservation reserves (Commonwealth and Western Australian Regional Forest Agreement Steering Committee 1998b, appendix 6). The RFA, signed in May 1999, endorsed old-growth forest logging and galvanised wide public support for better conservation outcomes. With a state election imminent and the public losing confidence in its Environment Minister (who was also responsible for the forest agency), the Premier, Richard Court, was forced to directly engage in the issue.[76] The outcome was a breaking of the RFA agreement signed with the Prime Minister only a few months earlier. In July 1999, the Premier announced that old-growth karri forest logging would be phased out by 2003 and the annual karri sawlog cut reduced to 50 000 m^3 per annum by 2003 (Western Australian Liberal Party 2001). Under the RFA, the karri sawlog cut would fall to 178 000 m^3 per annum by 2003. The RFA-set jarrah sawlog cut would remain unchanged. The environment movement argued that the changes were not sufficient - nearly one-quarter of the remaining old-growth forests were still available for logging (B. Schultz pers. comm. 2001) - and supported the ALP's policy (Australian Labor Party - Western Australia 2001) of immediately ending logging in nearly 99 per cent of Western Australia's old-growth forests.

Western Australia's old-growth forests were estimated to provide only 13 per cent of the state's native forest sawlogs and 17 per cent of its chiplogs in the early 1990s (Resource Assessment Commission 1992a, p. 151). A policy limited to old-growth forest conservation requires supplementation for the system-enhancing strategies

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[75] The Federal Labor opposition expressed in the Senate the same view as the Minister when it voted in August 2001 against a Senate motion that wherever there is an existing plantation alternative, old-growth forests and high conservation forests should not be logged (Parliament of Australia 2001).

[76] As part of that process, I by invitation, briefed the Premier on the state's plantation resource and industry policy on 16 July 1999.

presented in chapter 5 to be implemented. In particular, policy must directly address native forest export woodchipping. Chip exports accounted for slightly over half the state's native forest log cut, and Sotico Pty. Ltd. (a subsidiary of Wesfarmers Ltd.) is the monopoly operator. As part of the Premier's July 1999 strategy, a process was initiated to help the company meet its Japanese chip contract with eucalypt plantation wood rather than native forest wood. On 13 March 2000, Wesfarmers Ltd. announced its transition to a plantation-based woodchip industry in Western Australia (Wesfarmers Ltd. 2000). The company announced that its native forest chip exports would decline from 630 000 tonnes per annum in 1999 to 270 000 tonnes per annum by 2002. Concurrently, eucalypt plantation chip exports would increase from 50 000 tonnes per annum in 1999 to 750 000 tonnes per annum in 2002 and about one million tonnes per annum by 2004 (Wesfarmers Ltd. 2000). This initiative, combined with the protection of all old-growth forests in Western Australia (the ALP won the state election), means that the state is now undergoing a substantial transition to a plantation-based industry.

The Queensland and Western Australian experiences demonstrate the political feasibility of a plantation transition for Australia. The premiers of both State Governments were motivated to look further than the RFA process as a basis for their native forest and wood industry policy. They needed, amongst other things, information on the plantation resource and its processing potential and a coherent policy framework that could meet conflicting objectives. With this information, they could negotiate with the players, particularly industry, pragmatic and immediate plantation transition outcomes. The RFA process undermined this approach, denying government and the public information about the potential for a plantation transition in every RFA region, except East Gippsland where there are virtually no plantations. Examination of Australia's knowledge about its plantation wood supply potential (chapter 7) provides some insight as to why plantation processing was virtually ignored in Australia's 1990s policy.

Chapter 7

Impediments to information flow

7.1 Introduction

Product substitution is fundamental to the strategic choice land use framework presented in chapter 5. Product substitution embodying increased resource productivity has been proposed for the energy, transport, communication, agriculture, construction, packaging, consumer good and home building sectors (von Weizsäcker et al. 1997; Hawken et al. 1999). Chapters 5 and 6 established that with large volumes of available plantation wood (chapters 3 and 4) market-based competition provides an important mechanism for product substitution. These chapters also found that government policies can undermine product substitution even though substitution may be desirable from a wider perspective.

Schattshneider's (1960) analysis of the mobilisation of bias in political organisation offers a potential theoretical explanation for government policy resistance to product substitution. In his analysis of democracy in America, Schattshneider argued that, by its very nature, politics ensures that some issues are organised into politics and others are organised out:

> '*All forms of political organization have a bias in favor of the exploitation of some kinds of conflict and the suppression of others because organization is the mobiliation of bias.*' (Schattschneider 1960, p. 71).

Those with power are able to focus decision making on the issues and information that advantage them and away from issues that would disadvantage them.

Bachrach & Baratz (1970) in their study of poverty, race and politics in Baltimore, USA, linked the mobilisation of bias to 'nondecision-making'. By keeping issues and information out of the public arena, conflict could be suppressed and the status quo maintained. Bachrach and Baratz extended the definition of power to explicitly include situations where:

> '*A devotes his energies to creating or reinforcing social and political values and institutional practices that limit the scope of the political process to public consideration of only those issues which are comparatively innocuous to A. To the extent that A succeeds in doing this, B is prevented, for all practical purposes, from bringing to the fore any issues that might in their resolution be seriously detrimental to A's set of preferences.*' (Bachrach & Baratz 1970, p. 7).

They perceived a diversity of mechanisms for achieving 'nondecision-making', including co-opting with the enticement of potential rewards, branding individuals and groups in negative ways and intimidation. The motivation for 'nondecision-making', argue Bachrach and Baratz, is to prevent change in the existing allocation of benefits:

> '*To be more nearly explicit, nondecision-making is a means by which demands for change in the existing allocation of benefits and privileges in the community can be suffocated before they are even voiced; or kept covert; or killed before they gain access to the relevant decision making arena; or, failing all these things, maimed or destroyed in the decision-implementation stage of the policy process.*' (Bachrach & Baratz 1970, p. 44).

Australia's 1990s native forest and wood industry policy was as much a nondecision about plantation processing as it was a decision to facilitate increased wood supply from native forests and plantations. The mobilisation of bias and nondecision making are the pegs used in this chapter's examination of the reaction of interested players - including the public service and government - to new information that could threaten the status quo agenda. The information, namely Australia's plantation wood supply potential, could be regarded as old information because the plantation wood coming on stream in the 1990s and soon thereafter was largely the legacy of the 1960s softwood plantation program. It was new information in the sense that, by the time these plantations matured, they appeared to have been largely forgotten or dismissed by policy makers in the three decades of conflict over native forest allocation and resource use.

I examine the RAC's performance in providing reliable information on Australia's plantation wood supply potential. This is to establish the nature of the information the Federal Government had at the time of its 1995 policy to exit the native forest environment arena. The chapter then investigates the reaction to a significant initiative of the environment movement to identify Australia's plantation wood processing potential and the subsequent behaviour of interested players to the public release of that information. The project, funded by the Federal Government, incorporated the production of the 1995 report *Australia's Plantations: Industry, Employment, Environment* that was written by me in my capacity at the time as a consultant.

7.2 Government information on Australia's plantation wood supply at January 1995

The wood supply potential of Australia's existing plantation estate is critical information for policy. A relatively large, unused resource meant that government could consider a bolder conservation agenda combined with a policy to encourage investment in processing. The opposite would support a policy of continued use of the native forest resource and additional plantation establishment.

At that time of the Federal Government's decision in 1995 to exit the native forest environment policy arena, the most up-to-date information on Australia's plantation wood supply potential was that generated by the AFC in 1989 and the RAC in 1992. The AFC presented projections of Australia's softwood plantation wood supply potential to 2030, disaggregated by region and log grade (Australian Forestry Council 1989). Inadequate documentation prevents peer review. Information explaining the projections is limited to reporting the plantation area by species and state, and plantation productivity (MAI) for Australia as a whole. The AFC reports an average MAI for the Australian softwood plantations of 18 m^3 per hectare per annum - the upper end of the range of projections (table 4.5). The projections present a relatively low sawlog supply particularly for the period 2000-19 (see Appendix E for a comparison with other projections). The absence of documentation, particularly on plantation management assumptions, meant the reason for the relatively low sawlog supply projection could not be identified.

The RAC argued that the wood and wood products industry must remain dependent for some time on the native forest resource, suggesting that Australia had not then planted sufficient trees (Resource Assessment Commission 1992a, pp. 34-5). The RAC remained silent about the importance of the plantation resource in its 14 pages of principal conclusions and recommendations. In its overview chapter, the RAC presented qualitative information vaguely indicating the wood supply role of plantations. Quantitative information on wood and wood products industry production and trade was aggregated by sector irrespective of wood source (Resource Assessment Commission 1992a, p. 6, 19). The RAC did not report on Australia's future plantation wood supply in its conclusions, recommendations and overview chapter. This information was presented in appendix L. The appendix reported the RAC's projections of plantation wood supply graphically, not numerically. This, combined with the omission of key information and assumptions underpinning the projections, frustrated peer review. The RAC created confusion over the softwood plantation resource by presenting (numerically expressed) projections of softwood sawn timber production (Resource Assessment Commission 1992a, table L.5). They are effectively consumption projections - quite different to projections of resource supply potential. As discussed below, the sawn timber production projections were developed using vaguely specified, contestable assumptions about the industry's competitiveness against native forest and imported sawn timber.

Numerical projections of the RAC's graphically presented projections of Australia's softwood plantation sawlog supply potential were derived using ANU software[77] and are presented in table 7.1 together with the RAC's projections of softwood plantation sawn timber production. Appendix E presents the RAC's projections of softwood plantation wood supply together with other projections prepared in the late 1980s and 1990s.

[77] The Data Grabber program was developed by Steve Roxburgh of the Ecosystem Dynamics Group of the Research School of Biological Sciences at the Australian National University.

Table 7.1 Resource Assessment Commission projected softwood[a] sawlog supply and softwood[a] sawn timber production and potential softwood sawn timber production. Source: Resource Assessment Commission (1992a); Australian Bureau of Agricultural and Resource Economics (2001b).

Year	RAC projected sawlog supply[b] ($000 m^3$ log per annum)	RAC projected sawn timber production ($000 m^3$ sawn timber per annum)	Potential sawn timber production[d] ($000 m^3$ sawn timber per annum)	Per cent of projected sawlog supply assumed to be used for sawn timber[e] (%)
2000 actual	7 341[c]	2 388		
1990 projected	3 760	1 549	1 504	103
2000 projected	7 810	2 048	3 124	66
2010 projected	8 750	2 036	3 500	58
2020 projected	8 730	2 074	3 492	59
2030 projected	6 850	2 136	2 740	78

a. Softwood is assumed to be all plantation based. Softwood sawlogs include veneer logs.
b. Projections presented graphically converted to numerical data using ANU Data Grabber software.
c. Data for 1999/00. This figure is likely to under-report availability because of the stockpile situation and debate about grading plantation log exports.
d. Assuming a 40 per cent sawn timber recovery.
e. RAC projected sawn timber production as a percentage of potential production.

The analysis presented in table 7.1 clarifies a key assumption RAC made about the use of softwood plantation sawlogs. Prior to 2000, the RAC assumed - presumably on the basis of actual production data - that virtually all Australia's softwood plantation sawlog resource would be used for sawn timber production. However, for the year 2000 and onwards it was assumed that between 35 and 40 per cent of Australia's softwood sawlog supply would not be used for sawn timber production (table 7.1). This could not be identified in the RAC's report because one set of information was presented graphically and the other numerically.

The RAC did explain its assumed under-use of the plantation sawlog supply. It identified a surplus softwood plantation sawlog resource that had been diverted to chip production. The surplus was generated by constraints the RAC had imposed on the share of the Australian market assumed to be supplied by Australian softwood plantation sawn timber. It constrained softwood sawn timber (imported and domestically produced) to 65 per cent of the Australian market and maintained the market share of Australia's softwood plantation sawn timber industry within that, arguing that the industry was uncompetitive against imported softwood (Resource Assessment Commission 1992a, L50-51). In 2000, softwoods accounted for 71 per cent of the Australian sawn timber market and the market share of Australian softwood plantation sawn timber increased from 36 per cent in 1992 to 51 per cent in 2000 (Australian Bureau of Agricultural and Resource Economics 2001b and previous editions). The RAC had assumed that native forest hardwood sawn timber would supply 30 per cent of the Australian sawn timber market in 2000. In 1999/00 it supplied 25 per cent (calculated using appendix D and Australian Bureau of Agricultural and Resource Economics (2001b)). The RAC, based on poor market analysis, has presented unrealistic projections of Australia's softwood plantation sawn timber production (consumption). The RAC's projection of 'no growth' in Australian softwood plantation

sawn timber production over the next three decades has already been defied with production in 2000 being 17 per cent higher than projected (table 7.1).

The second component of the RAC's constraint on the softwood plantation sawn timber market share was its view that Australia faced a softwood chip shortage. It argued that, because current softwood plantation management aims to maximise sawlog yields, there was insufficient chip resource to meet Australia's projected future needs (Resource Assessment Commission 1992a, L47). No evidence or argument was provided to support the softwood chip shortage view. Subsequent reports identified a serious problem of insufficient markets for thinning material for most Australian softwood plantation regions (Victorian Wood Products Working Party 1993, p. 22; Jaakko Pöyry Consulting 2000, p. 16). This problem was well-known within the industry by the mid 1980s.

The RAC reported that in its modeling work it modified the softwood plantation harvesting regime to more than double chiplog yields, having the effect that sawlog availability declined by about 20 per cent (Resource Assessment Commission 1992a, L47). It is not clear whether the RAC's graphical projections of softwood plantation sawlog supply (reported numerically in table 7.1) include this 20 per cent reduction.

In summary, the RAC provided the Federal Government with an inadequate account of the then significance of Australia's plantations for wood products manufacturing and employment and presented a confused and unrealistic account of Australia's plantation wood supply potential, particularly that of softwood sawlogs.

7.3 New information that challenged the policy agenda

This section examines, through a case study focussed on the report, *Australia's Plantations: Industry, Employment, Environment* report (hereafter called the Report), how stakeholders and government react to information and processes that are perceived to threaten the status quo agenda. The Report was an initiative of the Australian State and Territory Conservation Councils who, in June 1993, sought funding from the Federal Minister for Environment, Ros Kelly, for a process to improve the understanding of the environment movement, industry, government policy makers and the public of the output and employment growth potential of the plantation industry and to identify the implications for industry and environment policy at the national level (State Conservation Councils 1994a).

The project had two components. The first was to undertake research and gather information to develop a nation-wide picture of Australia's plantation base as well as identifying, for each state, industry development and employment opportunities that could be supported by both industry and the environment movement. This work was presented in the Report. The second component of the project was to build on this information to develop a deeper understanding within the environment movement of the critical issues surrounding the shift to plantation processing (State Conservation

Councils 1994b; Clark 1995a, appendix 1). This work was undertaken by eight project officers who, under my supervision, carried out data collection and information tasks and researched identified issues; visited plantations and processing facilities and engaged with industry players; and communicated information and discussed issues with the wider environment movement. A high degree of co-operation was required from the plantation industry to develop an accurate picture of the wood-supply potential of the existing plantation estate, the role of the plantation processing industry at the time and its growth potential over the following decade. All large and medium-sized plantation processors and major plantation growers were consulted and contributed information to the project (Clark 1995a, appendix 3).

The key findings of the Report were that:

- plantation wood was the dominant resource for the Australian wood products industry with more than two-thirds of the wood and fibre processed domestically already coming from plantations and recycling and less than one-third from native forests,
- plantation processors were poised to invest large sums in processing capacity to take advantage of rapidly expanding supplies of plantation wood,
- with the large volumes of plantation wood available for processing, the public could choose the future for Australia's native forests, and
- to reap the benefits that Australia's plantation processing industry could deliver in the 1990s, all stakeholders had to escape from past attitudes (Clark 1995a, pp. ix-x).

The project was not an isolated piece of work. Its origins lay in an earlier research paper (Clark & Blakers 1989) stimulated by an interest in reworking the figures in Cameron & Penna (1988) to clarify the wood resource implications of Australia's existing plantations. A later study commissioned by Environment Victoria confirmed the growth potential of plantation processing and associated employment at a Victorian state level (Clark 1992b). The Victorian Government, aware of the potential for substantial agreement between industry and the environment movement, established the Victorian Wood Products Working Party in 1993 to identify these opportunities and develop a strategic plan. The Working Party included members from the plantation and native forest industry, unions and the environment movement.[78] The Working Party confirmed substantial growth opportunities in plantation processing and substantial agreement between the plantation industry members and the environment movement (Victorian Wood Products Working Party 1993). This outcome encouraged other State Conservation Councils to revisit plantations. The process they settled on was embedded in the funding proposal submitted to the Federal Minister for the Environment in 1993 by Environment Victoria acting on behalf of the State Conservation Councils.

The Minister for the Environment, John Faulkner, approved funding for the project in August 1994 (Cook 1994). The 14-month delay to what was a 12-month project, meant

[78] Phillip Sutton, Director of Green Innovations Inc., and myself were also on the Working Party. Notably public servants were used as support staff and professional facilitation ensured that the Working Party controlled the agenda.

that its contribution to the policy process in the critical period of early 1995 was limited. The reactions to the project and Report can be divided into four phases - the pre-study phase, the study phase, the Report release phase and the post-Report release phase.

Pre-study phase

The results of the Victorian studies (Clark 1992b; Victorian Wood Products Working Party 1993) provided a reasonable indication of the situation and outlook for other states and Australia as a whole because the softwood planting program was common to all states (chapters 3 and 4). Most players could broadly envisage the project's potential before work commenced.

A number of factors contributed to the relatively long 14-month period waiting for Federal Government funding approval. The first delay resulted from the Environment Minister inviting the Minister for Resources, Michael Lee, and his Department to participate. The offer was effectively refused in October 1993 (Lee 1993). The Resources Minister argued that it was premature to commit funds to the project and that consideration of industry development and employment opportunities should wait until other government studies were finalised and considered. These included the Industry Commission's 1993 report, *Adding Further Value to Australia's Forest Resources,* the Australian Taxation Office's comprehensive public ruling on private plantation taxation and the Bureau of Rural Science's (BRS) National Plantation Inventory (Lee 1993). The Industry Commission's report was released in September 1993 and, whilst it advanced our understanding of industry structural change, substantial work remained to be done on establishing the potential for the plantation resource to generate even more industry efficiency gains. The tax ruling related to future plantings - the Report was focussed on opportunities surrounding the existing plantation resource. The BRS' work was in a very early stage, and the BRS presented the National Plantation Inventory four years later. The State Conservation Councils submitted a revised proposal in February 1994 that Minister Kelly verbally approved but did not sign before her resignation on 1 March 1994 (State Conservation Councils 1994a; L. Parlane[79] pers. comm. 2001).

The incoming Environment Minister, John Faulkner, did not act on the Department's recommendation to fund the project until questions about Environment Victoria's finances were settled on receipt of their audited financial statements (Faulkner 1994b). The questions were raised by Barry Cunningham, ALP Member for McMillan. The McMillan electorate was the home of Amcor's Maryvale pulp and paper mill complex,[80] which relied on native forests for about half of its wood supply, and the Central Highlands native forest sawmillers, the state's largest sawmilling region (Jaakko Pöyry Consulting 2001, p. 16). In the late 1980s, Amcor and the CFMEU formed what they called the Maryvale 'A' Team to tackle public opposition to the construction of an ocean outfall. The alliance was maintained after the outfall was completed and used as a powerful weapon in the company's fight against other

[79] Linda Parlane was Director of Environment Victoria and initiated the project.
[80] Amcor later divested its subsidiary, the Australian Papers Group, through a public vehicle called PaperlinX Ltd.

conservation threats (McCallum 1997). Cunningham's concern was focussed on the native forest resource, although plantations then supplied slightly more than half the region's wood resource and plantation processing growth opportunities were significant (Department of Conservation and Natural Resources 1993; Stewart & Clark 1995, pp. 167, 174).[81] Environment Victoria provided the necessary documents, thereby addressing Cunningham's concerns.

Study phase

Minister Faulkner announced the Government's approval and funding for the project in his speech at the ALP National Conference on 29 September 1994. As part of his green jobs theme, Faulkner said:

> '*Plantation forestry can also be described as a 'green' industry. I'm looking at how plantations can play a role in relieving pressure on native forests, while at the same time offering significant expansion of the industry's resource base. To this end, I have recently agreed to fund a National Plantation Study involving State and Territory based Conservation Councils. The Study will provide an information base on Australia's plantation resource and encourage a greater understanding of the critical issues surrounding the shift to plantation processing.*' (Faulkner 1994a, p. 4).

The Minister's announcement triggered Bob Richardson, Industrial Officer for the ACTU, to issue the press release, *ACTU and industry slams green funding*, on 10 October (Australian Council of Trade Unions 1994). The release reported that a coalition from Timber Towns, the ACTU and the CFMEU '*were furious over the Minister's decision*' and called on Industry Minister Peter Cook and Resources Minister David Beddall to intervene. Jon Faine from Melbourne's radio station 3LO interviewed Bob Richardson and clarified the union's concerns. Richardson explained that:

> [the Report] '*will say that the forest products industry should get out of native forests and into plantations. What I do is object, and the unions and the community groups object to them* [the Federal Government] *funding groups in specific circumstances where the reports are unscientific, they're going to be used as propaganda tools. In fact some of them are already being used by Lindsay Tanner* [ALP Member for Melbourne] *to substantiate a particular political position. That's what we're objecting to.*' (Richardson [B] 1994).

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[81] Amcor's Maryvale operations relied on native forests for 47 per cent of its wood supply in 1999/00 – 53 per cent being sourced from plantations, predominantly softwood (Stafford et al. 2000, p. 371). In 1999/00 the softwood plantation sawmills in the region processed 411 000 m^3 of sawlogs (Stafford et al. 2000, pp. 336, 371). Public native forest sawlog supply from the Central, Central Gippsland and Dandenong regions totalled 366 100 m^3 in 1999/00 (Department of Natural Resources and Environment 2000).

The ACTU and CFMEU were attempting to stifle research into manufacturing and employment growth in Australia's already dominant plantation industry as part of the native forest and wood industry policy process.

Minister Faulkner responded to the union's criticisms in the Senate the next day (11 October 1994) arguing:

> '*they* [the criticisms] *are groundless. I think they are mischievous statements. They are certainly statements that, I believe are out of step with many of his union colleagues.*' (Faulkner 1994b).

Faulkner used the rest of his question time differentiating the project from previous studies that focussed on plantation wood growing, rather than processing, and concluded:

> '*I believe this study will provide a basis for greater dialogue on plantation issues between industry, union and conservation interests. I think this is very important to the environment debate in this country.*' (Faulkner 1994b).

The Minister's enthusiasm disappeared when the Government decided to exit from the native forest environment policy arena. This was demonstrated during his one-day tour of plantation operations in the Mount Gambier region in May 1995.[82] The Minister was uninterested and communicated minimally with industry. At lunch he delivered a strong attack on Australian Greens Party Senator Brown and the Wilderness Society - destroying, in the plantation industry's mind, any notion of harmony between the industry, environment movement and the Government. At his press conference, the Minister expressed support for the industry and displayed none of the earlier disinterest. Given the Government's policy redirection following the January 1995 Parliament House blockade, the Minister could have elected to cancel the tour. My interpretation is that the Minister was on a mission to deliver the message that a harmonious relationship between the plantation processing industry, the Federal Government and the environment movement was not a political reality. The Labor Government was facing a federal election and not antagonising the unions was essential for keeping native forest issues out of the media.

The project required information from the plantation industry to fill information gaps and develop regional industry profiles. With the exception of small processors, every plantation processing company and all the major growers contributed information to the project. A list of the companies and government business operations and individuals providing information is presented in the Report (Clark 1995a, appendix 3). My interpretation of this high degree of cooperation is that the plantation processors were frustrated by the lack of government recognition of their part of the industry and saw

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[82] The tour incorporated Kimberly-Clark Australia's pulp and paper mill, CSR Timber Product's wood panels operations and Auspine's sawmill and plantation growing operations. Company heads, senior managers and I were in attendance.

that a report presenting a national picture could help redress the imbalance. Of significance was the support from Henry Pens, Chief Executive of CSR Timber Products, whose operations dominated Australia's sawn timber and wood panels industry at the time, and Adrian de Bruin, Managing Director of Auspine Ltd., which owns large plantation sawmills in Tasmania and South Australia and was Australia's largest softwood plantation woodchip exporter. This support made it easier for other companies to engage in the project. Surprisingly, for those companies using both plantation and native forest wood, the decision about participating did not appear to be a challenge. This can be explained by the project's focus on factual information about the plantation part of the industry, the industry's obvious understanding of the importance of plantations both now and in the future, the participation of major industry players, and the project team's interest in the industry and its information sources. With the exception of pulp and paper producers, most companies that process both native forest and plantation wood do so in separate establishments. Because the project focussed on establishments operating in the regions, it was able to communicate directly with mill managers who had responsibility for a plantation business and could therefore speak with clarity about the situation and the outlook for the plantation sector.

Amcor's behaviour contrasted to that of other plantation-processing companies. The company was represented by Angus Pollock, General Manager of Forest Resources at Amcor and a member of the above mentioned Victorian Wood Products Working Party. He considered that the Working Party had presented some good proposals but objected to the message from Environment Victoria that there was enough wood in plantations to substitute for native forest logging. His concern about the national project was that the environment movement would 'misuse' the information presented in the Report and that the study should be done by an industry department as part of an industry policy process. Pollock advised that he was reluctant to be involved but that Minister Faulkner had visited Amcor and his Ministerial Advisor was keen to broker a meeting (A. Pollock pers. comm. 8 March 1995).

It appears likely that somewhere between March 1995 and May 1995 (when Faulkner delivered his pointed message to the South Australian plantation processors) the Labor Federal Government ruled out a native forest and wood industry policy approach that embraced a transition to plantation processing.

Amcor was left as the last company to be consulted - it could choose whether or not to participate. Its decision was irrelevant from an information perspective because the company had provided the necessary information for a previous report (Clark 1992b). The interest was more for industry consultation completeness. Pollock and members of the project team met on 10 April 1995 with George Masri, Advisor to the Federal Minister for the Environment, facilitating the meeting. The main aim of the meeting from the Report's perspective was to clarify Amcor's eucalypt plantation wood supply and processing outlook. Pollock presented Amcor's projections of wood supply from the company's eucalypt plantations in the Maryvale region of Victoria. The figures were significantly lower than calculations using area, productivity and management regime information previously provided by Pollock and presented in Clark (1992b, pp. 82-3). Information, or confirmation of existing information, was sought from and

provided by Pollock at the meeting to enable a later recalculation of the projections. This comprised plantation productivity by species, plantation age profile, rotation length by species and clarification on the extent to which the plantations would be used for sawlog supply. Information from the meeting (Clark 1995c) was forwarded to Pollock who verified the accuracy of the eucalypt plantation assumptions and data. There was a significant discrepancy between the projections of eucalypt plantation chiplog supply presented by Pollock at the meeting and those reworked using his assumptions (table 7.2).

Table 7.2 Projections of eucalypt chiplog supply from Amcor's plantations. Source: Clark (1995c); Stewart & Clark (1995).

Eucalypt plantation wood available by:	Eucalypt plantation chiplog supply presented by Pollock on 10 April 1995 ($000 m^3$ per annum)	Eucalypt plantation chiplog supply calculated by Clark using data provided by Pollock on 10 April 1995 and later verified by Pollock ($000 m^3$ per annum)	Difference (%)
Available in 1995 from plantings >30 years in age	350		
1995-99	100	119	19.2
2000-04	150	223	48.8
2005-09	150	234	55.9
2010-14	150	392	161.1
2015-19	175	not calculated*	

* Not calculated because it requires an assumption about future first rotation planting.

Barry Cunningham in Federal Parliament again attacked the project on 1 June 1995. He reported that Amcor had approached him, as the local member, about the project. Cunningham (incorrectly) argued that, because Amcor was not prepared to respond to the project, information had been denied to it, and therefore the project could not meet its objectives. Cunningham argued:

> '*It* [the not yet released Report] *is flawed: it should not be allowed to be used as a catalyst for a fraudulent campaign: it should not be allowed to be used in the way these people intend to use it, in order to convince city people on an issue where they do not have a lot of knowledge. It is an emotional issue and the information being provided to them is emotional: the planning to use this is emotional; and it is causing tremendous problems in an industry in Australia…I call on the government to get some alternative reports which have substance and are done by proper people.*' (Cunningham 1995).

Cunningham's calls went unheeded, but his parliamentary speech added to earlier actions to publicly tarnish the Report.

Cunningham was one of an important group of Federal ALP Members of Parliament whose rural seats were vulnerable in the forthcoming early 1996 election. The ALP was sensitive to criticism that it had abandoned the rural worker. A policy that enhanced

native forest conservation and promoted plantation processing was perceived as an attack on 'forest' industry jobs and would further add to the ALP's image of abandoning the rural worker. The Prime Minister's office was pressured on native forest and wood industry policy because of these concerns (M. O'Neill pers. comm. 1995). O'Neill reported nine rural seats that the party had identified as close contests at the forthcoming election - seven were held by the ALP. At the March 1996 election, six of the seven seats held by the ALP were lost and the Liberal Party retained their two previously held seats.[83] Ironically, electorates with a significant native forest industry that were held by the ALP (namely, Page, McMillan and Bass) also had significant plantation resources. This correlation is explained by the clearing of native forests for plantation establishment.

The Report was finished in May 1995 and the Department of the Environment, Sport and Territories decided that it should be peer reviewed. Although this process was not included in the Conditions of Grant agreed to by the Department and Environment Victoria, Environment Victoria advised that they would be happy for the department to initiate a peer review to assist in preparing a briefing for their Minister (Parlane 1995).[84] An explanation of the motivation for the peer review was provided by Dr Robert Bain, Executive Director of NAFI. In a memo written to an ACTU officer in August (the purpose of which is discussed below), Bain advised that:

> '*Senator Faulkner's department is currently distancing themselves from the report because they are aware of its potentially political embarrassment for their minister and are trying to insist that it is purely an Environment Victoria report…Senator Faulkner is acutely aware that if the report is significantly flawed he will be closely questioned by the Opposition and is likely to be significantly embarrassed.*' (as quoted in Nicholson 1995).

On 5 June 1995, the Department sent out invitations and a consultancy brief to peer review the Report (Griffiths 1995). The peer review did not proceed because the forestry consultants invited to tender declined.

Environment Victoria sent the Report to Graham Ogilvie, General Manager of ANM Ltd.,[85] Henry Pens and Adrian de Bruin for review and comment. Between them, they managed significant businesses in all sectors of the Australian wood and wood products industry. Environment Victoria's intention was to satisfy itself of the accuracy of the Report's findings and to test the waters for industry participation in jointly releasing the Report. All three spoke positively about the Report and two, in events discussed below, put their opinions on the Report into the public domain. Ogilvie wrote:

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[83] The seats lost by the ALP in the 1996 election were Page (Harry Woods), Richmond (Neville Newell), McMillan (Barry Cunningham), Bass (Silvia Smith), Patterson (Robert Horne), Capricornia (Marjorie Henzell). Lyons (Dick Adams) was the only seat identified by O'Neill that the ALP retained.

[84] Environment Victoria's concern was limited to the Department first confirming that the Report fulfilled the terms of the Conditions of the Grant (Parlane 1995) enabling the final grant payment.

[85] ANM Ltd. produced pulp and newsprint in Tasmania and New South Wales using softwood plantations, native forests and recycled paper.

> '*I am impressed with the comprehensiveness of the report and support the author's call for government, industry and conservation groups to work together to expand the processing of existing plantations and to increase Australia's plantation estate…As the report notes, plantations already make a significant contribution, however the major public focus in the past has been on native forest wood and recycling. This report addresses the often forgotten area of plantations and urges industry, government and the conservation movement to work together to maximise the potential of this resource…I would hope that this report will have a similar impact* [to the RFA process then just underway] *in terms of focussing attention on the importance of plantations to achieving a wood and wood fibre balance which meets both industry and conservation objectives.*' (Ogilvie, as quoted in Australian Newsprint Mills Ltd. 1995).

de Bruin, when questioned by the media about the Report, said:

> '*Well for the first time we've got a study that has got some credibility, some real credibility, whereas the previous assessments I think were lacking and didn't involve enough private industry players.*' (de Bruin, as quoted in ABC TV 1995).

Pens said of the Report:

> '*It surprised me not in a negative sense but a positive sense. Nothing directly concerns me. Most messages are positive in relation to the plantation industry. So from your perspective there is no problem with me in association with the report. It's a good balance and recognises my direct input.*' (H. Pens pers. comm. 9 August 1995).

Release phase

By July 1995, Environment Victoria commenced serious planning for the release of the Report. The key player was Ogilvie because he was highly respected in both the native forest and plantation parts of the industry and understood that any approaches that could genuinely reduce conflict were good for the industry. Ogilvie consulted the industry before making his decision about participating in a public launch of the Report - three-quarters were supportive and one-quarter was emphatically opposed (L. Parlane pers. comm. 1995). With this support, Ogilvie formally agreed on 3 August 1995 to participate in the Report's release on the condition that, although he believed the Report was constructive and made an important contribution to the overall debate, he would make it clear that he did not endorse it completely. In particular, he would state in his address that he believed that, with the RFA process allocating native forest areas for preservation, the remaining areas could be used for production forestry and/or clearing for plantations (Ogilvie 1995a). This did not imply any endorsement at the launch of the view by other parties, including the environment movement - it was a statement of

view. Parlane and Ogilvie proceeded with a joint industry/environment movement public launch on the basis of this understanding (L. Parlane pers. comm. 1995).

Shortly thereafter, Ogilvie reluctantly withdrew his acceptance because he did not want to leave his successor with an ANM-precipitated legacy of industry divisiveness (Ogilvie 1995b).[86] At the time, Ogilvie was unaware of the above-mentioned memo from Dr Bain to the ACTU officer. In that memo Bain also wrote:

> '*Industry has expressed concern to Mr Ogilvie that his participation and even partial endorsement of the report will be used as a major propaganda tool by the extreme elements of the environmental movement against the industry...I would be grateful if Mr Ogilvie can be contacted by the union movement indicating that his endorsement of the report may have significant adverse consequences for industry development and employment.*' (as quoted in Nicholson 1995).

When Ogilvie became aware of the memo he wrote to the NAFI board, sending copies to others, advising them that, before he made the decision to withdraw, Robert Bain had written to the union movement asking them to pressure him to reject the invitation. Ogilvie's message to the NAFI Board expressed his anger over Bain's action:

> '*I think it is outrageous that the head of an industry organisation would do such a thing. It has deeply concerned me. The Greens are aware of the Bain request and will no doubt pick their time to use it. An ABC Radio journalist has already raised it with me. Again, for industry solidarity reasons, I believe I successfully batted it away. Perhaps the next media bowler may not allow that to happen.*' (Ogilvie 1995b).

Ogilvie reported that the union movement did not act on the request. What was remarkable about Bain's actions was that, as the head of an industry association, he was prepared to engage worker unions against the expressed interests of industry.

With a public release of the Report scuttled, Environment Victoria, on behalf of the State Conservation Councils, successfully approached ABC TV's Lateline Program[87] to cover the Report. The story ran on 24 August 1995. After introducing the Report and the issues, the program moved to a debate between Linda Parlane and Robert Bain with Kerry O'Brien presenting. From a policy perspective, the most important issue was the accuracy of the Report's findings. Kerry O'Brien worked to establish whether the Report was credible in the eyes of NAFI, the organisation representing the native forest and plantation industry nationally. O'Brien asked:

> '*Robert Bain - this is an extraordinarily optimistic report on the capacity of plantation forest to supply all Australia's timber needs in the future. Do*

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[86] Ogilvie was soon to take up an appointment with a pulp and paper company in south east Asia.
[87] Lateline ran at 10.00 p.m. and targeted politicians and the interested public on current political issues.

> *you find any fault with the factual base?*' (O'Brien, as quoted in ABC TV 1995).

Bain replied:

> '*No, I don't Kerry, in the sense that what it is focussed on is the existing plantations - the plantations that we have in the ground now and it highlights the potential of those plantations. And I think that is very important. And I think that has got lost in the debate. It has been understated and it highlights it.*' (Bain, as quoted in ABC TV 1995).

Bain did not 'quibble' about the Report's finding that plantation wood supply would double in the following ten years and acknowledged that plantation wood already dominated the Australian markets for wood products (ABC TV 1995).

From a policy perspective, Bain's public agreement over the wood supply potential of Australia's existing plantations should have been a significant development. That it was not can be explained by the nature of entrenched conflict and the actions of players in the Report's post-release phase.

Post-release phase

Plantations Report Not Credible was the heading for one of the two NAFI media releases issued the day after the Lateline program (National Association of Forest Industries 1995a). The media release remained silent about the Report's plantation wood supply projections. Instead it argued that the Report only dealt with existing plantations; conflicted with the National Forest Policy Statement; ignored the worsening trade deficit; and ignored the increase in global demand for wood products. It argued that withdrawing Australia's native forests from wood supply would therefore put more pressure on overseas forests and result in substitution by less environmentally friendly products. These contestable arguments worked to establish the Report as controversial and therefore undermine the capacity for its key information to be taken up in the policy process.

NAFI's second media release for the day, *New Study Shows Major Growth in Forest Industries* (National Association of Forest Industries 1995b), appeared aimed at creating confusion. The study (Centre for International Economics 1995) mixed together the plantation and native forest resource. NAFI presented the CIE's projections of the output, employment and net trade that could be achieved by 2030 given appropriate policy changes. These changes were aimed at promoting greater use of native forest wood and substantial new plantation establishment - the policy the Federal Government implemented in the second half of the 1990s. NAFI argued for a greater use of native forest residues (then 'wasted' as a consequence of the woodchip export controls); more investment in pulp and paper production (not specifying the resource); creation of substantial new plantations; and increased processing of native forest hardwoods. Securing increased investment in plantation processing was not mentioned.

The CFMEU responded to the Report with a press release titled *Forest Reports* (sic) - *Waste of Taxpayers' Money.* It correlated with the NAFI view arguing that the Report was:

> '*...clearly pushing a position which is ideologically driven not driven by the facts. The Commonwealth Government has distanced itself from the report, demonstrating it lacks real substance.*' (Construction, Forestry, Mining, and Energy Union 1995).

The reason the Federal Government distanced itself from the Report was largely because of the CFMEU's earlier actions, not for the reasons the CFMEU claimed. It is not clear that the CFMEU had seen the Report when it wrote its response.

In contrast to the CFMEU and NAFI reaction, ANM's media release welcomed the Report and said the company, being a major user of plantation wood, would examine the Report's findings with an open mind (Australian Newsprint Mills Ltd. 1995). Ogilvie's views on the Report were quoted earlier.

In September 1995, NAFI released a 19-page, two-part response to the Report (National Association of Forest Industries 1995d). Part A was the native forest[88] and plantation member's combined response and Part B was the NAFI native forest industry response. It is worth quoting in full the first half of the Executive Summary to Part A.

> '*The release of the "Australia's Plantations" report has been accompanied by claims from the conservation councils that the report is the first comprehensive study of the plantation industry and serves to focus attention on plantations rather than natural forests. These claims are extremely misleading.*
>
> *While industry welcomes the acknowledgement of success in the plantation industry and agrees that the growth of the plantation wood supply and associated industry has been of benefit to Australia, there are some serious discrepancies in both the analysis and conclusions of the report. Furthermore, the continued growth of the industry, an objective that all Australians should be able to agree on, is ignored in the report.*
>
> *Future predictions of wood supply are difficult and are greatly influenced by the assumptions made. The predictions of plantation wood supply in the "Australia's Plantations" report, while based on some accurate data contain a number of misinterpretations and inappropriate assumptions.*
>
> *The claim that the report has been prepared in consultation with industry is misleading. Many companies provided raw data on plantation areas,*

[88] The wording 'natural' forest was used instead of 'native' forest. Plantations were not referred to as 'unnatural' forests.

> *growth rates and processing capacity, but this information has been misused, distorted and exaggerated in the analysis. Industry was not consulted at any stage beyond the provision of raw data.*
>
> *Disagreement with the actual figures and method of analysis aside, industry agrees that a future increase in the volume of wood from plantation forests presents an exciting opportunity for growth in the plantation processing sector.*' (National Association of Forest Industries 1995d, p. i).

The summary proceeded with a listing of the requirements for the industry to reach its full potential, namely additional planting, a globally competitive industry and plantation policy not impeded by the native forest conflict. Part B argued that the Report set out to prove that '*harvesting of natural forests must cease*' and identified what it claimed to be serious deficiencies in the Report, namely:

- simplistic assumptions about substitution of plantation for native forest wood,
- the predetermined objective of proving that existing plantations are sufficient to replace native forests and ignoring the global market,
- repetition of claimed previous mistakes based on Clark's work in Victoria,[89]
- incompatibility with current and future forest policy, and
- a focus only on processing existing plantations - ignoring future plantings and criticising 'value-adding' in the native forest industry (National Association of Forest Industries 1995d, p. ii).

Up to August 1995, NAFI had largely been able to avoid confronting intra-industry competition publicly. However, with the media coverage generated by the Report, NAFI was forced to confront the issue and seek the views of its diverse membership in developing its (unique two-part) response. On the one hand, NAFI welcomed and acknowledged the Report's findings on the plantation industry's growth, but on the other it aggressively attacked the plantation wood supply projections, thereby undermining the public choice option for native forests. NAFI's response contains no substantiation of the claims made in the Executive Summary about the Report's serious discrepancies; misinterpretation of data and inappropriate assumptions; and misuse, distortion and exaggeration of data provided by the industry.

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[89] NAFI was referring to a projection made in Clark (1992) that native forest sawn timber production would continue to decline as plantation production displaced it in the market. ABARE data shows Victorian native forest sawn timber production trending up during the 1990s although the Australian industry was trending down. The Victorian Department of Natural Resources and Environment generates the data for ABARE to include in their national quarterly publication, *Australian Forest Products Statistics*. As a cost cutting measure the department ceased its sawmill survey and presented estimates of Victoria's native forest sawn timber production using its sawlog sales data and a sawn timber conversion that appears to be based on the assumptions used to calculate stumpage prices. These factors assume that around 50 per cent of the sawlog is converted to sawn timber. This is significantly higher than generally accepted in the industry and contradicts the average 37 per cent the Timber Promotion Council reported for the industry in 2001 (Jaakko Pöyry 2001, p. 18). The discrepancy suggests that the official figures for Victoria's native forest sawn timber production over-stated actual production in calendar year 2000 by approximately 30 per cent. A letter has been sent informing the Director of ABARE of the discrepancy and, if verified, seeking revision to establish the integrity of national time series data (Clark 2001b). ABARE is aware of the discrepancy and is working to resolve it.

The Plantations Australia Group also considered the Report. It circulated a draft response stating that the predictions of plantation wood supply in the Report, while based on data available, were overly optimistic (Plantations Australia 1995). The claims were also not documented and appear to have been formed by Miles Prosser (Clark 1995d), Secretary for Plantations Australia and Assistant Director of Economic and Resource Policy, NAFI. At a meeting with Plantations Australia in November 1995, the Group undertook to reconsider the appropriateness of the description of the Report's projections of plantation wood supply as 'overly optimistic'. If the wording was considered inappropriate, a revised statement would be issued. If the wording was considered appropriate, Plantations Australia undertook to document who considered the projections overly optimistic and why (Clark 1995d). When no response was received from Plantations Australia, a follow up letter was sent to Angus Pollock as Chairperson of Plantations Australia in early February 1996 (Clark 1996b). Plantations Australia responded advising that opinion on the Report varied amongst its members but that it stood by its statement that the Report's plantation wood supply projections were overly optimistic (Prosser 1996). No documentation was provided and the letter advised that a report by lecturers from the Australian National University's Forestry Department, *Forest Plantations of Australia*, presented a more realistic view of future plantation wood supply. This report is discussed below.

Identifying the source of the claims made by NAFI and Plantations Australia about the Report's plantation wood supply projections is difficult, although two documents may have contributed. The first was prepared by the Western Australian Department of Conservation and Land Management (CALM) in September 1995 and comments specifically on the Report (Department of Conservation and Land Management 1995). This document remained unknown to me until it was tabled in the Western Australian Parliament on the 23 of December 1998 following a question in Parliament (Edwards 1998) seeking the tabling of all CALM responses to Clark's work. Every paragraph of this five-page document, with the exception of the introductory paragraph, contained some misrepresentation of argument, error, contestable point, illogicality or other objection (Clark 1999a).

Amcor was the second possible source for the claims made by NAFI and Plantations Australia. At a meeting in Canberra on 5 December 1995, between Pollock and myself, Pollock advised that he wrote a memorandum on the Report dated 25 September 1995 to Amcor's public relations officer Kerrie Milburn Clark. The contents of the memorandum were discussed, but my request to retain a copy was refused. The memorandum implicitly assumed that Amcor would remain Australia's sole manufacturer of printing and writing paper (the main domestic market for eucalypt plantation wood) and therefore was Australia's printing and writing paper industry. The memorandum argued that there was insufficient eucalypt plantation wood for Amcor to meet Australia's printing and paper consumption without calling on native forests. This 'Amcor-centric' view of the industry meant that eucalypt plantations in regions without Amcor processing capacity, namely Western Australia, were excluded from the memorandum's consideration. Amcor may not be able to meet Australia's printing and writing paper consumption using eucalypt plantations located in the Maryvale region of

Victoria, but that does not imply that the industry (including competing, new entrants located in other states) can not. Pollock acknowledged this point.

The key question is were the projections of chiplog supply from Amcor's eucalypt plantations presented in the Report accurate? Pollock and Karl Kny, General Manager - Corporate Development of APM (an Amcor subsidiary) with whom I met shortly later, both agreed with the projections. Amcor, however, would not correct for any misperception created by the September memorandum that might have flowed through to the NAFI and Plantations Australia response to the Report.

By the end of September 1995, no specific error in the Report's plantation wood supply projections had been identified. Shortly later, Senator Nick Sherry (ALP, Tasmania) released a report (James et al. 1995) by four staff from the ANU's Department of Forestry on the potential for Australia's plantations to meet Australia's wood needs. The report was commissioned by the Standing Committee on Forestry of the Ministerial Council on Forestry, Fisheries and Aquaculture.[90] The report's main conclusion was that:

> '*in terms of quantity, the current plantation resource cannot meet the anticipated demand for wood products in Australia. If the supply of wood from native forest was to be reduced to a 'minimum' level, supplying the shortfall from Australian sources would require substantial additional investment in plantations.*' (James et al. 1995, p. 4).

The authors claim to have provided an independent assessment of the potential for Australia's existing plantations to meet Australia's wood needs (James et al. 1995, p. 5), however the projections were a collation of those presented by state forest agencies (James et al. 1995, p. 9). The authors omitted critical data and methodology that could enable peer review (Clark 1996a). James et al. (1995) presented lower softwood plantation wood supply projections than the Report, but the two sets of projections came into reasonably close alignment for the sawlog resource up to 2005 (see appendix E, figure E2). James et al.'s (1995) conclusion that Australia's existing plantations cannot meet Australia's anticipated wood demand rests largely on their high wood consumption projections. They used old projections of sawn timber consumption that, based on actual data already published by ABARE at the time of their work, indicated a significant over-estimation of the long-term trend growth in Australia's sawn timber consumption and under-estimated the role of paper recycling in constraining the growth in Australia's wood consumption (Clark 1996a, pp. 6-8). Having been released by a Senator, the report enjoyed high political exposure and was promoted as being more accurate in its projections of Australia's plantation wood supply than those presented in the Report (for examples, see Prosser 1996; Shea, as quoted in Department of Conservation and Land Management 1996).

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[90] The forestry component being the former Standing Committee to the Australian Forestry Council formed in the mid 1960s to facilitate the softwood planting program (chapter 3).

Peer review was essential for resolving the differences between James et al. (1995) and the Report and therefore their fundamentally different policy implications. However, peer review was virtually impossible. The Report's plantation wood supply projections were documented to enable peer review, but peer review invitees declined and those sections of the industry and its industry associations who criticised the projections would not detail their concerns. The plantation wood supply projections presented in James et al. (1995) were accompanied by no documentation, effectively ruling out peer review. This meant that a critical piece of information for policy was left to a public battering devoid of scientific appraisal.

7.4 The National Plantation Inventory (NPI)

In 1997, the BRS published an inventory of Australia's plantations established up to 1994 (National Plantation Inventory 1997). It provided quantitative information on Australia's softwood and hardwood plantation estate - age-profile, area, species-composition and location. After some debate, the BRS inventory team, on the advice of its reference committee, included projections of Australia's plantation wood supply (Anon. pers. comm. 1997).[91] Drs Brian Turner and Ryde James, two of the authors of James et al. (1995), were engaged as consultants to assist in the preparation of the projections. The projections were a combination of grower estimates and, in their absence, projections using indicative yield tables prepared by the consultants (Turner & James 1997a). The projections, particularly for sawlogs coming on stream over 1995-04, are significantly lower than those presented in James et al. (1995) (appendix E, figure E2). Peer review was again frustrated because the projections are undocumented with the BRS maintaining confidentiality on all individual grower information (National Plantation Inventory 1997, p. 2). Nearly 70 per cent of the plantations included in the NPI were publicly owned. Documentation of the projected wood supply from public plantations in the NPI could have made a substantial contribution to resolving the debate over Australia's plantation wood supply.

The projections for Australia's largest softwood plantation wood supply region - the Green Triangle comprising western Victoria and south east South Australia - presented a 20-year declining sawlog supply outlook, contradicting recent processing industry investment. The projections were reviewed by identifying the productivity and management regime assumptions required to replicate the results given the age profile data contained in the NPI (Clark 1997b). The review was forwarded to the Federal Minister for Primary Industries and Energy (Clark 1997c), the Executive Officer of the Greater Green Triangle Farm Forestry and Plantation Committee (Clark 1997d) and the head of the Department of Forestry, ANU (Clark 1997e). Neither the Minister nor his

[91] The informant wishes to remain anonymous. The National Plantation Inventory Reference Committee comprised Rod Channon of the Federal Department of Primary Industry and Energy, Alan Cummine of Australian Forest Growers, Ken Eldridge from the Association of Consulting Foresters of Australia, Ross Hills of the National Association of Forest Industries, Roger Hnatiuk of the National Forest Industry Secretariat, David Jamieson from the National Forest Inventory Steering Committee, Graham McKenzie Smith and Ian Millard of the Standing Committee on Forestry, Miles Prosser from Plantations Australia, Leng Sar (observer) from ABARE (National Plantation Inventory 1997, p. 4).

department responded. Peter Kanowski, Professor and Head of the Department of Forestry, at the ANU, spoke to the NPI team and brokered meetings between Brian Turner and myself. There was no resolution over the differences in the projections. Andrew Moore, a member of the Greater Green Triangle Farm Forestry and Plantation Committee, undertook some broad-brush indicative projections of the softwood plantation resource in the region and compared them with the projections presented in the NPI (Moore 1997). Moore's projections of average annual softwood plantation sawlog supply for 2000-09 exceeded those presented in the NPI by 33 per cent, and for the period 2010-19 by 75 per cent. The analysis led Moore to comment that the Turner and James projections presented in the NPI appear to be very conservative and that knowing the basis for their assumptions would be desirable (Moore 1997).

An analysis of the debate over the Western Australian plantation resource provides further insight into the actions that frustrate government and public understanding of Australia's plantation resource potential. The debate, described in essence below and in detail in appendix G, circled around the projections presented in the NPI.

Western Australia's softwood plantation sawlog supply potential was a key piece of policy information because it determined the capacity for Western Australia to cease logging old-growth forests. The cessation of logging in old-growth native forests was strongly supported by the Western Australian public (AMR: Quantum Harris 1998). Neither the Government, the opposition nor the public had clarity over the plantation supply potential.[92] The need for clarity required the Western Australian Government, through CALM, to prepare projections of the state's public and private softwood plantation sawlog supply and release them publicly with documentation to enable critical review. The RFA process did not generate this information despite its extensive public funding and stated consideration of the '*industry as a whole and not just the native forest sector*' (Commonwealth and Western Australian Regional Forest Agreement Steering Committee 1998b, p. 16). This meant that the NPI became the key source of information on Western Australia's plantation wood supply potential.

The NPI's projections for Western Australia were actually prepared by CALM, but this appears to have been denied by the Western Australian Government (see appendix G). At the very least, one can argue that neither CALM nor the Government worked to correct any misunderstanding about the authorship of the projections. The wall of confidentiality surrounding the NPI made it difficult to clarify the source of the projections (appendix G).

The NPI projections of sawlog supply from Western Australia's softwood plantations differed substantially from those of Clark (1998a), particularly for the immediate future. Clark (1998a) projected an annual softwood plantation sawlog supply for 2000-04, 70 per cent higher those published in the NPI (table 7.3). The difference in the projections was equivalent to 60 per cent of the state's native forest sawn timber production in 1999/00 (converted to roundwood equivalent units).

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[92] My comments regarding the Government are based on my briefing the Premier Richard Court, at his invitation, on the plantation resource potential and policy implications on 16 June 1999.

The Western Australian Government used the NPI projections (incorrectly perceived to be the work of the ANU's Forestry Department and the BRS) to criticise the projections in Clark (1998a). Undermining Clark's projections worked to invalidate a plantation transition policy.

The media's coverage of the plantation resource debate (see for example Capp 1998; Pownall 1999); the pressure from politicians to have the uncertainty over the plantation resource clarified (Sharp 1999; Edwards 1999); and possibly Clark's meeting with the Premier on 16 July 1999 and Keynote address, *Can Plantation Forests Solve the Old Growth Forest Debate*?, to the Western Australian Business Forum on 7 October 1999[93] put considerable pressure on CALM to clarify the softwood plantation sawlog supply potential.

On 13 October 1999, Dr Shea, Executive Director of CALM, wrote to Clark enclosing the document, *An analysis of Judy Clark's softwood sawlog yield predictions for Western Australia* (Shea 1999a; Department of Conservation and Land Management 1999). The Minister did not approve the release of the document because she perceived it to be too personal, wanting the emotion taken out and a factual report on the projections (Edwardes pers. comm. 12 November 1999).[94] Despite the critique's style, it was an important document containing new (and publicly available) information. Specifically, CALM presented new projections of sawlog supply from Western Australia's public softwood plantations.

These projections can be used to estimate the state-wide softwood plantation sawlog supply potential by adding them to projections of private plantation supply. CALM's projections of sawlog supply, prepared for the NPI, were disaggregated by plantation ownership, namely private and public, but this disaggregated information remains confidential (B. Turner pers. comm. 2001).[95] Appendix G presents projections of sawlog supply from Western Australia's privately owned softwood plantations generated by assuming a sawlog MAI of 10.0 m^3 per hectare per annum applied to age profile data collected by CALM's National Forest Inventory Project Team (Appendix G, table G2). Dr Turner confirmed the MAI assumption as being consistent with CALM's view (B. Turner pers. comm. 2001). The projections of annual sawlog supply over the period 1995-14 are presented in appendix G, table G3. These projections can

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[93] The Western Australian Business Forum - Breakfast Briefing is hosted by the Institute for Research into International Competitiveness, Curtin University of Technology. Representatives from major resources companies, finance sector, media, government departments (including the Office of Public Accountability), academia and political parties attended the Briefing.

[94] CALM's document was responded to by Clark (1999f) and the Director and immediate past Director of the Centre for Resource and Environmental Studies at the Australian National University (CRES). Shea took exception, claiming that Clark was accusing CALM staff of being dishonest (Shea 1999b, p. 4). Further correspondence from Shea (1999c, 1999d) informed the ANU of his intention to vigorously defend himself and CALM officers. This appeared to be a threat of legal challenge. The matter ended when Shea ceased to be the Executive Director of CALM and a Western Australian public servant.

[95] Consultants were engaged in 1999 to review CALM's plantation business activities and clarify the private resource situation (Western Australian Legislative Assembly 1999, p. 2389). The report (Forestry Pacific Pty. Ltd. 1999) did not add substantially to knowledge of the private softwood plantation supply potential.

be compared with those presented in the NPI by aggregating to the time periods used in the NPI projections.

Combining CALM's 1999 projections for the public estate with the projections for the private estate (using CALM age profile data and average productivity assumption) resulted in the state's projected softwood sawlog supply in 2000-04 being 81 per cent higher than the projections CALM provided to the NPI. CALM's 1999 projections combined with those for the private plantations were not significantly different to Clark (1998a) (table 7.3, appendix G, figure G1).

Table 7.3 Projections of sawlog supply from Western Australian softwood plantations presented in the NPI (prepared by CALM); CALM (1999) and private plantation projections; and Clark (1998a) (000 m^3 per annum).

	CALM projections for NPI 1997	CALM 1999 and projections for private plantations using CALM data and productivity assumptions	Clark 1998
1995-99	313		412
2000-04	436	791	747
2005-09	1 005	867	971
2010-14	677	733	670

The difference in the projections CALM sent to the NPI and its later projections for the public estate combined with the private estate projections has substantial implications for Western Australia's native forest policy and its wood products industry policy. The BRS' confidentiality policy and the actions of CALM frustrated critical review that could have saved four years of debate over critically important policy information.

In October 2001, the BRS released the NPI for 2001 (Wood et al. 2001). The Inventory does not include projections of plantation wood supply although projections have been generated. The BRS advises that a cross-validation exercise reveals that the projections are comparable with those presented in the 1997 NPI (Wood et al. 2001, p. 9). The University of Melbourne undertook the work, and the BRS reported that it was available as a companion report (Wood et al. 2001, p. 9), but it was not released at the time of writing. Considerable operational change is required if Federal Government agencies wish to establish a reputation for providing reliable information on Australia's plantation wood supply potential.

7.5 Summary

The wood supply potential of Australia's existing plantation estate is key information for native forest and wood industry policy. A relatively large, unutilised resource means that government can consider a bolder native forest conservation agenda combined with a policy to encourage investment in plantation processing. The opposite supports a policy of continued use of native forests and additional plantation establishment.

The establishment of the RAC in the late 1980s provided an important opportunity to fill large gaps in our knowledge about the plantation industry's then current production,

employment and international trade and its growth potential based on future plantation supply. This did not happen. The RAC remained silent about the plantation wood supply potential in its principal conclusions, recommendations and overview chapter. This information was presented in appendix L. Peer review of the projections is frustrated because they were presented graphically, not numerically, and were inadequately documented. Confusion about the plantation wood supply potential was created by the RAC's focus on projected plantation sawn timber production. An analysis of their report shows that about 40 per cent of the RAC's projected Australian softwood plantation sawlog resource was diverted from sawn timber production to chip production using conservative assumptions about the Australian plantation sawn timber industry's domestic market share.

The failure of the Federal Government public service to report adequately, in my view, on Australia's plantation wood supply potential stimulated the State and Territory Conservation Councils to fill the information gap and resulted in the *Australia's Plantations* Report.

An analysis of the responses to the Report identified strong linkages between the unions, major corporations and industry associations in their actions aimed at keeping plantation resource information off the agenda. These actions defy commonly held perceptions of the relationship between capital and labour; union desire for safe, secure and employment-generating manufacturing industries; private companies as profit maximisers; public servants acting with disinterest providing information and advice to government for policy making in the public interest; academics providing peer reviewable information; and the environment movement as opponents of economically rational industry development.

The actions of major players in the Australian plantation processing industry demonstrated that they were not happy with government and public perceptions of their industry and that the wood supply potential of the existing plantation estate was important information. However, without an industry association representing their interests as plantation processors, they, as individual people and individual companies, were more vulnerable to retaliatory action if they articulated to the public the competitive relationship between themselves and the native forest-based industry.

The public debate that followed the Report's release has alerted policy makers and the public to the importance of the wood supply potential of Australia's existing plantation estate. While the BRS has allocated resources to generate this information, it has failed to provide plantation wood supply projections that government and the public can be confident in using. The practice of using commercial-in-confidence provisions to hide data is a major concern. Government information for public policy remains inadequate, and unnecessary conflict over Australia's native forests and wood industries continues.

Chapter 8

What can Australia learn from its native forest and wood industry policy experience?

8.1 Introduction

Australia can enhance its capacity to develop problem solving polices by learning - and committing it to public memory - from its native forest and wood industry experience. Australia's forest problem is essentially about product substitution. What is learned from Australia's forest experience may therefore provide insights for other environment and industry-enhancing substitution challenges.

This thesis argues that over the 1990s Australia's native forest and wood industry policy failed to exploit the ecological, industrial and socio-economic benefits that its maturing plantation estate offered. There is, therefore, a great deal to learn. This learning can benefit from Australia's more recent achievements, in south east Queensland and Western Australia.

This chapter, based on the information and analysis presented in this thesis, discusses the fundamental reasons for Australia's native forest and wood industry policy failures and successes in the 1990s. It then presents some suggestions about what can be done, acknowledging that governments are fundamental to the outcome.

8.2 Why the policy failure and policy success?

Government in Australia today is a play between what I view as the largely competing interests of capitalism and democracy. Politicians are actors juggling with the complexity of these tensions as they drive their chariots (to use the analogy of Snooks (1996)) somewhere or other. The path travelled largely reflects the agendas set, refined and reset as new and existing players struggle for power or retention of their dominance. Historically, Australia's native forest and wood industry policy has largely aligned with native forest wood production and plantation establishment agendas. Less powerful players have formed alliances with the more powerful and over many decades this process has woven a compacted complexity of relationships.

The strategic significance of the 1990s for Australia's native forests and wood industry was that the plantation resource began to unravel stakeholder alliances. It takes time for stakeholders to separate and rejoin into alliances that better suit their core interests. In this time, the pendulum swung closer to the plantation processing industry that was able to promote its specific interests to government and the public without fear of the

consequences of breaking relationships with the native forest part of the industry and its service providers. As this happened, alliances with the environment movement - the first stakeholders to recognise the strategic opportunity for agenda realignment - became possible. The Victorian Wood Products Working Group's 1995 report demonstrated the potential for alliance. The south east Queensland 1999 stakeholder agreement with the Queensland Government is Australia's first formal alliance between the environment movement and the plantation processing industry. The unions may one day accept that an industry policy favouring the native forest sector will no longer generate the best employment outcome because it undermines investment in more competitive plantation processing.

The failure of Australia's 1990s native forest and wood industry policy was in not using Australia's maturing plantations and the inevitable reassessment of stakeholder agenda alliances to develop and implement policy in the public interest; that is, to facilitate in a constructive way a transition to plantation processing and cessation of native forest based commodity wood production. Instead, policy was presented with the implicit assumption that the 'forest' industry was competing against environment interests. The inevitable conflict created the misunderstanding that the only way forward was to seek a balanced outcome of the incorrectly perceived competing interests. Not presenting the industry in its two parts - plantation based and native forest based - prevented a fundamentally different approach to native forest and wood industry policy that has quite different implications for industry competitiveness, employment and the environment.

This policy 'blind spot' resulted from a failure to define the problem first and then to collect and present critical information before proceeding with the development of policy options. Chapter 6 identified a failure in all government reports over the 1990s to examine critically the appropriateness of the multiple use approach to native forests to supply an industry focussed on commodity production. They all assumed the continuation of a multiple use (or ESD) approach to native forests for wood production and, therefore, failed to present an analysis that went to the core of Australia's native forest conflict.

The second failure was to not clarify the current importance of the plantation resource and to provide reliable projections of Australia's plantation wood supply. Confusion over the meaning of 'forest' remains, and no government report separates Australia's wood and wood products production, employment and trade into its plantation and native forest components. This means that neither the government nor the public has the proper base on which to build the policy options surrounding Australia's increasing plantation wood supply.

All projections show increasing wood supply from Australia's softwood plantations (appendix E, figure E2) and there is agreement that eucalypt plantations will add to this resource. However, the timing and size of the softwood plantation wood supply increase (particularly sawlogs) remains contested and shrouded in confusing conflict. Despite the importance of clarifying the plantation supply potential for policy, all government projections of Australia's plantation wood supply remain virtually

impossible to peer review because they are inadequately documented (chapter 7 and appendix G).

These are simple failures, but they have serious policy implications and their reasons are complex.

In my view, public servants, by their nature, will tend to align to the dominant agendas and be cautious about upsetting agenda alliances. Their role is to provide information and advice to a government that holds office because its platform suits dominant agendas. Despite the hallmark of a professional public service providing advice without fear or favour, it takes deliberate effort to provide government with advice in the public interest that challenges the interests of powerful stakeholders. This bias to the status quo is reinforced by Federal Government policy to formally engage stakeholders in Australia's native forest and wood industry policy process (chapter 6). No government report with direct stakeholder involvement presented a policy approach that shifted the dominant agenda from native forest logging and plantation growing to plantation processing. This was despite the obvious maturing of Australia's plantation estate and increasing importance of plantations in Australian's production of wood products. Compacted agenda alliances and the absence of a powerful industry association representing the interests of Australia's plantation processors underpinned this outcome.

The casting of the environment movement as anti-industry/anti-capitalist non-compromisers reinforced the perception that the forest problem was insoluble. Therefore, the policy approach must be one of seeking a balanced compromise over the use of native forests. Because the issue is really about substituting an old product with a new product, compromise entrenches already high levels of production from the old system (i.e. native forests), and frustrates the substitution process. The environment movement was painted as being extreme in their calls for native forests to be protected. The shifting of commodity wood production from native forests to plantations is no more extreme than shifting report production from type-writers to word-processors and personal transport from horse and buggy to motor vehicles. Presenting the conflict as industry versus environment, in my view an incorrect portrayal, is a problem common to product substitution opportunities where environmental benefits threaten existing corporate interests - energy production and climate change being another notable example.

The RAC's failure to present a problem-solving approach to government (chapters 6 and 7) calls for investigation. The RAC was adequately funded, it appointed staff from the key disciplines, it investigated new approaches to conflict resolution, it consulted stakeholders whilst retaining its public service autonomy, yet its inquiry over slightly more than three years failed to deal with all the options available. The three Commissioners to the RAC were short-term external appointments, an arrangement that should be included in any examination of the RAC model as a public service institution for natural resource analysis and policy advice. The RAC tried to find and present solutions too early. The RAC received its terms of reference for the forest and wood industry inquiry in late November 1989; by July 1991, it presented a two volume draft

report of around 1 300 pages, including options for forests and the wood based industries, and in March 1992 it released a slightly smaller three volume final report. Political hopes ran high that the RAC would find a solution, and the RAC itself thought the task possible with considered analysis. The analysis presented in chapters 6 and 7 indicate that the RAC remained lost in what Schattshneider (1960) called 'the fog of war' - the inevitable confusion, even over what the debate is about, as players struggle to capture the agenda. The RAC did not need more time - a point acknowledged by Justice Stewart its Chairperson (Resource Assessment Commission 1992a, p. viii) - it needed critical thinking skills and discipline to complete the tasks of problem identification and information collection before proceeding with the development of options. Critical thinking skills were absent; the RAC failed to identify the interrelationships of commodity production, intensification technologies and multiple use of native forests as the triad to be solved. Because the problem was not correctly defined, critical information was either not collected (e.g. the ecological effect of intensification technologies on native forests) or poorly accounted for (e.g. presenting the plantation supply potential in appendix L). By rushing to formulate the options (some of which were set by stakeholders that the Federal Government wished be evaluated), how could any option address the fundamental problem or even its rationale be understood? Lack of problem definition and incomplete collection of key information also meant that the RAC ruled out options that it thought were politically unfeasible, notably the cessation of wood production from native forests (chapter 6). Yet slightly less than a decade later the Queensland Government adopted just such a policy.

The RAC assumed that the balanced compromise between industry and environment should be in the regrowth native forests. This preference may explain why critical investigation of the ecological effects of intensification technologies in native forests was not undertaken and why the RAC did not challenge the multiple use (ESD) approach to native forests for wood production. The preference for (regrowth) native forest use for wood production, common to other reports, meant that the Federal Government was presented with options that either reflected the author's value judgements or second guessed what the Government wanted. The Federal Government was not presented with a clear account of the native forest and wood industry problem or the full range of options and their implications. Whether the Federal Government wanted this clarity is not for public servants to determine.

The RAC did not unravel the stakeholder interests by seeking a balanced outcome over native forests, instead it joined the group. The clear commercial beneficiary of such a policy is the native forest export woodchip industry. The RFA options, by ignoring the plantation resource, also displayed the same preference for a native forest-based compromise. Perhaps the failure to expose these preferences and key information (e.g. the plantation wood supply potential) to critical review was motivated by a fear of rocking the boat - of angering powerful interests and undermining what was perceived as the only way forward for the supposedly intractable forest conflict.

Why did the Queensland and, to a slightly lesser extent, the Western Australian Governments move in another direction and adopt a plantation transition strategy?

These states are distinguished in that, on the native forest issue, their governments rose above their public services. The Queensland environment movement, under the leadership of Dr Aila Keto, formed a strategic alliance with an industry association dominated by plantation processing, the Queensland Timber Board. After intense debate and negotiation, the two stakeholders presented an approach that met their core interests to the State Government, who became a party to the final agreement. The Queensland Government actively protected the process of negotiation and the implementation of the agreement from Federal and State Government public service disruption (A. Keto pers. comm. 2001). Victoria's 1995 Wood Products Working Party also showed that substantial agreement can be reached between the industry, represented by plantation processors, and an informed environment movement if the public service is constrained from dominating or interfering with the process.

A similar theme emerges from Western Australia although the experience was markedly different. The Western Australian environment movement successfully built on a long history of public campaigning for forest protection. By the late 1990s, with the help of the RFA finding that less than 10 per cent of its old-growth forests remained, the movement deepened its support base to include a majority of the population across a broad spectrum of society. With an election looming, the Premier, who only months earlier had signed the RFA with the Federal Government, was forced to engage directly in the issue. His approach was to invite people with relevant information and analysis to brief him, his Chief of Staff and one senior public servant. The approximately two-week long process produced a strategy of increased old-growth forest protection (later added to by the opposition on their winning office) and a transition to the plantation resource. Public service involvement in the strategy was notably constrained and resulted in the resignation of the Executive Director of the responsible public service department.

8.3 Enhancing capacity for policy making in the public interest

It is reasonable to assume that over the medium term Australia's native forest and wood industry policy environment will be characterised by an increasing plantation wood supply; agenda-aligning efforts between the plantation industry and environment movement; and continuing conflict over native forest land use.

The challenge is to break the government-public service nexus that has trapped policy in the past. One approach is to privatise Australia's wood resource as suggested by the Industry Commission (now Productivity Commission) in its 1993 report. Privatisation of the plantation resource is already a well-established trend. The framework developed in this thesis suggests that its continuation should be preceded by an industry policy that encourages domestic grower-processor integration. Leasing public plantations to processors under appropriate terms and conditions could form part of the industry policy. The strategic choice land use approach presented in chapter 5 indicates that privatising native forest land is counter-productive and unnecessary from industry and ecological perspectives. With native forests allocated substantially to conservation, and

plantations owned or managed by the private sector, the public service role on wood industry matters should be to facilitate investment in plantation processing and the ecological sustainability of plantation wood growing.

Observation of recent State Government success in native forest and wood industry policy reveals that the environment movement can be a strategically important player in motivating government to engage directly in the issue. We can also expect the plantation industry to build on the pressure for government to rise above the public service, where it has become entrenched in conservative patterns, and directly engage in tackling Australia's native forest and wood industry problem. If we understand the policy process as Snooks describes with his chariot analogy, the question is how do we increase the probability that the charioteer picks up native forest and wood industry policies in the public interest?

The first challenge is to generate such policies. The public service has this capability but, as argued in this thesis, it has failed to perform in the native forest and wood industry policy arena. A public service with an open mind and critical thinking skills could develop a plantation transition policy.

Universities, think tanks and other research organisations may claim a capacity for policy making in the public interest. However, the analysis presented in this thesis shows that these organisations are not immune from the same weaknesses besetting the public service in its approach to native forest and wood industry policy. To establish their policy making legitimacy, in a competitive environment, these organisations need to demonstrate their capacity to avoid bias towards status quo agendas; to apply critical thinking skills to their in-depth knowledge of the problem from different perspectives; to participate in disciplined processes that articulate assumptions and preferences; and to provide information and advice without fear or favour. That society has many organisations, including the public service, competing for policy legitimacy through public debate can only enhance our capacity to generate policy in the public interest.

How then can we increase the probability that the policy that best meets the public interest is adopted? Status quo interests appear to have the upper hand in government policy processes addressing substitution issues. The challenge is to take the issue to the public for debate and, by continuous public engagement, build up the public's capacity to understand the issues and arguments and demand better policy. Institutions engaged in public policy making are obvious candidates for this task, but their repertoire of skills and knowledge will need supplementing, particularly in terms of understanding how the public perceives issues and how to communicate information. By engaging with the public and stakeholders that have the capacity to change the chariot's direction, public policy institutions can contribute to good governance and challenge actions that undermine it.

Appendix A

Wood consumption projections underpinning Australia's 1960s softwood plantation program

A1 Introduction

Chapter two established that the Federal Government's three million acre softwood plantation target originated from Jacobs' 1963 address to the Australian Timber Congress (Jacobs 1963c). Jacobs used the consumption projections presented in Hanson (1962a) and assumed that native forests would supply approximately half of Australia's projected consumption in 2000. Using a mean annual increment (MAI) of 200 cubic feet per acre per year (14 m^3 per hectare per year) and 40 year rotations, Jacobs calculated that Australia needed three million acres (1.2 million hectares) of softwood plantations to supply the other half of Australia's projected wood requirements in 2000. The planting target was achieved if hardwood plantings that substituted for some softwood planting are included. In 2000 Australia had 1.5 million hectares of plantations, comprising 1.0 million hectares of softwood and 0.5 million hectares of hardwood (Wood et al. 2001, p. 14). The average productivity of Australia's softwood plantations is widely considered to exceed that assumed in Jacobs (1963c) (chapter 4, table 4.5). Australia's hardwood plantations are expected to generate significantly higher yields than the 14 m^3 MAI assumed in Jacobs (1963c) (Duggie 2000; Turner & James 1997). With the plantation area and productivity exceeding Jacobs' target and expectations, Australia's plantation wood supply must also exceed Jacobs' aim that it meet half Hanson's wood consumption projection.

Data are now available to estimate Australia's actual consumption of wood and wood products over the year ending 31 December 2000. In 2000, Australia required an estimated 18.6 million m^3 of wood to make the wood products (excluding fuel wood) it consumed in 2000 (table A1). This compares with Hanson's projection of Australia's wood needs (excluding fuel wood) in 2000 of 32.6 million m^3.

The aim of this appendix is to identify the sources of the over-projection. It is important to understand this because it provides critical background to the debate over the wood supply capacity of Australia's existing softwood plantations (chapter 7). Hanson's consumption projections set the planting target. With actual consumption being slightly more than half that projected in Hanson (1963a) and the planting target and productivity exceeding expectations, Australia's plantations should therefore be able to meet not half Australia's consumption as planned, but virtually the entire consumption in wood volume terms.

A2 Methods

Hanson prepared separate consumption projections for each major wood product - sawn timber (including sleepers), plywood and veneer, particleboard, newsprint, printing and writing paper, paperboard, other paper, hardboard, softboard, poles, piles and posts and fuel wood. Fuel wood is excluded from this analysis to be consistent with the definitions and focus of this thesis on industrial wood for wood products. Hanson assumed an Australian population of 22.4 million people in 2000 and per capita consumption of each project as specified. The projected consumption of each wood product was converted to its log equivalent and aggregated.

This appendix quantifies the error sources by reworking Hanson's projections with each assumption, or implied assumption (per capita consumption, population, paper recycling, conversion to log equivalent) replaced with the actual or estimated figure for 2000, all else held constant. This enables us to answer the question, for example, if Hanson's assumption about Australia's per capita consumption of sawn timber in 2000 was correct, all other assumptions held constant, how would the consumption projection change?

Hanson reports in imperial units. In this appendix all data have been converted to metric units, namely:

- 100 super feet = 0.235973 m^3
- 1 cubic foot = 0.0283168 m^3
- 1 ton = 1.01605 tonnes
- Products reported in square feet were converted to cubic feet using the product thickness reported in Forestry and Timber Bureau (1969).

The year 2000 is taken as the year ending 31 December 2000.

ABARE, in their publication Australian Bureau of Agricultural and Resource Economics (2001b), presented estimates of Australia's actual wood consumption - the latest year being 1999/00. The same publication reported calendar year 2000 data for all wood products except paper and railway sleepers. Table A1 uses these data, together with the specified wood conversion factors, to obtain a wood consumption estimate for calendar year 2000 (Hanson's projection period) using the maximum amount of available data for 2000. The use of financial 1999/00 data for paper consumption will reduce the estimated wood consumption in 2000. Offsetting this factor is the sawn timber figure for calendar 2000 that is affected by the one-off pre goods and services tax implementation building boom. It is estimated that Australia consumed 18.6 million m^3 of wood in 2000 (table A1).

Table A1 Estimated Australian consumption of wood in 2000.[a] Source: Australian Bureau of Agricultural and Resource Economics (2001b); Beca Simons Australia Pty. Ltd. et al. (1997); Clark (1995a); Forestry and Timber Bureau (1969); Hanson (1962a).

	Wood product consumption (000 m^3 for all products except paper that is reported in 000 tonnes)	Wood conversion factor[b]	Wood consumption (000 m^3 roundwood equivalent)
Sawn timber	4 704	0.40	11 760
Railway sleepers	23[c]	0.40	58
Plywood	296	0.50	592
Particleboard	966	0.55	1 756
Medium density fibreboard	464	0.55	844
Hardboard	100[d]	0.55	182
Softboard	34	0.55	62
Paper	3 841[c]	[e]	5 822[c]
Newsprint	755		
Printing & writing	1 277		
Household & sanitary	262		
Packaging	1 547		
Poles, piles, posts,	662[c]	1.00	662[c]
Deduction for saw and plywood mill residues (30% of log) used to make panels and paper[f]			(3 150)
Total wood required to meet Australian wood products consumption in 2000			18 588
Hanson 1962 wood consumption projection[g]			32 600

a. Year ending 31 December. Where data are not yet available for the full calendar year 2000, year ending 30 June data are used as noted.
b. This figure is divided into the finished wood product volume to estimate the volume of wood (in roundwood form) required to make the finished product. Conversion factors are sourced from Beca Simons Australia Pty. Ltd. et al. (1997). The sawn timber figure (also used for railway sleepers) was reduced from 0.45 to 0.40, in line with the author's knowledge of Australia's softwood sawn timber industry (Clark 1995a). Conversion factors for softboard and hardboard were set to that assumed for other wood based panels.
c. Year ending 30 June 2000.
d. Author estimate - hardboard data are not reported because of commercial confidentiality.
e. Wood volume figure is sourced directly from Australian Bureau of Agricultural and Resource Economics (2001b).
f. Assuming 15 per cent of residues were not used. Full residue use would mean that Australia's wood consumption would be 0.6 million m^3 less than reported in the table.
g. Excluding fuel wood and assuming all the allowance for sawmill residues was used for pulp production and not fuel wood.

A3 Projected saw and veneer log requirements

A3.1 Per capita consumption of sawn timber (including railway sleepers)

Hanson argued that widely fluctuating movements with irregular periodicity in Australia's per capita consumption of sawn timber meant that its forecasting required a subjective judgement. Hanson assumed that by 2000 Australia's per capita consumption of sawn timber and railway sleepers would be 0.47 m^3 per person - equivalent to the lower figure used in forecasting work by the USA Forest Service (Hanson 1962a). Hanson argued that this figure was not 'unduly optimistic' given productivity improvements in wood growing and processing and technology developments that would enhance the competitiveness of sawn timber against substitute non-wood products. An examination of the statistics available to Hanson at the time (published by the Forestry and Timber Bureau in its annual reports) shows that during the 1950s Australia's per capita consumption of sawn timber was trending down. Although Hanson did not refer to this decade long trend, his view was that an increased domestic softwood resource would enable industry to better satisfy the market and also enhance its competitiveness through realising scale economies (Hanson 1959).

Australia's population of 19.28 million people in 2000 (Australian Bureau of Statistics 2001a) consumed 4.73 million m^3 of sawn timber and railway sleepers (table A1). Australia's per capita consumption of sawn timber and sleepers in 2000 was 0.2452 m^3 per person - about half the figure Hanson assumed.

The assumptions made by Hanson, in hindsight, significantly over-stated Australia's wood requirements to meet its sawn timber consumption in 2000. Based on projected population size and per capita consumption, the projected sawn timber and railway sleeper consumption was 10.57 million m^3 (0.4719 m^3 x 22.4 million). Using Hanson's 0.5 log to sawn timber conversion factor means that 21.14 million m^3 of sawlogs would be required to meet projected consumption in 2000.

Furthermore, had Hanson used a per capita sawn timber and sleeper consumption of 0.2452 m^3 per person (i.e. actual for 2000) all else held constant, projected sawn timber and sleeper consumption would have been 5.49 million m^3 in 2000 requiring 10.99 million m^3 of logs.

This means that Hanson's per capita consumption assumption for sawn timber and railway sleepers over-estimate Australia's wood requirements for 2000 by 10.16 million m^3 per annum or by 92 per cent.

A3.2 Sawn timber recovery factor

Hanson used a log to sawn timber (including railway sleepers) conversion of 0.50. The actual for softwood plantation sawn timber is around 0.40 (Clark 1995a). Using a higher conversion factor works to lower estimated log requirements. Hanson projected

that by 2000 Australia would consume 10.57 million m^3 of sawn timber and railway sleepers requiring:

- 21.14 million m^3 per annum of logs using a recovery factor of 0.50.
- 26.43 million m^3 per annum of logs using a recovery factor of 0.40.

Therefore Hanson's sawn timber recovery assumption under-estimated Australia's wood requirements for 2000 by 5.29 million m^3 per annum or by 20 per cent.

A3.3 Sawn timber and railway sleeper consumption in log equivalent (combining A4.1 and A4.2)

The net effect of over-estimating per capita consumption and sawn timber recovery, whilst leaving the population assumption unchanged, can be calculated by deducting from Hanson's projected sawn timber and railway consumption in log equivalent (21.14 million m^3 per annum), the reworked figure using today's per capita consumption and sawn timber recovery. That is:

21.14 million m^3 - ((22.4 million x 0.2452 m^3)/0.4) = 7.41 million m^3 per annum. This figure represents the over-estimation of Australia's wood requirements in 2000 holding Hanson's population assumption constant. For 2000 the over-estimation is 54 per cent.

A3.4 Per capita plywood and veneer consumption

Hanson noted the modest upward trend in Australia's plywood and veneer consumption, but considered that growth would be constrained by log availability and competition from other wood products. He assumed that Australia's per capita consumption of plywood and veneer would increase from its then level of 0.0133 m^3 per person to 0.0177 m^3 per person by 2000. Actual per capita plywood consumption in 2000 was 0.0154 m^3 per person (calculated from table A1 and Australia's population).

Based on projected population size and per capita consumption, the projected plywood and veneer consumption was 0.397 million m^3 (0.0177 m^3 x 22.4 million). Using Hanson's 0.4667 log to plywood conversion factor means that 0.85 million m^3 of veneer logs would be required to meet projected consumption in 2000.

If Hanson had used the actual per capita plywood consumption of 0.0154 m^3 per person for 2000, all else held constant, projected plywood consumption would have been 0.345 million m^3 in 2000 requiring 0.739 million m^3 of logs.

This means that Hanson's per capita consumption assumption for plywood worked to slightly over-estimate Australia's wood requirements for 2000 by 0.11 million m^3 per annum, or by 15 per cent.

A3.5 Projected saw, sleeper and veneer log requirements by 2000 (combining A3.3 and A3.4)

The net effect of over-estimating per capita consumption and using a high sawn timber recovery factor was to over-estimate Australia's saw, sleeper and veneer log requirements in 2000 by 7.52 million m^3 per annum (figure A1). This projection was 52 per cent above that required for 2000 if Australia's population was as Hanson assumed.

A4 Projected wood requirements for wood-based panels

A4.1 Particleboard and medium density fibreboard (MDF)

The wood requirements for particleboard were not included in Hanson's projections. At the time, particleboard was a new product and Hanson considered its wood requirements could be met from sawmill residues without drawing on the resource used for pulp production. MDF is a product that appeared on the market since the projections were undertaken. Australia consumed 1.4300 million m^3 of particleboard and MDF in 2000 requiring 2.6000 million m^3 of wood (table A1). Hanson's omission of these products works to dampen his projection of Australia's wood requirements in 2000 by 2.6000 million m^3 per annum.

A4.2 Hardboard

Hanson considered that growth in hardboard consumption would be constrained by competition from plywood. He assumed that per capita consumption would increase to 0.0265 m^3 per person by 2000.[96] Hardboard production in Australia is no longer recorded for confidentiality reasons, being produced by only one company in 2000. Imports are minor. It is estimated (based on Stafford et al. 2000) that Australia consumed about 0.1 million m^3 of hardboard per annum with per capita consumption of 0.005 m^3 per person in 2000.

Based on projected population size and per capita consumption, the projected hardboard consumption was 0.59 million m^3 (0.0265 m^3 x 22.4 million). Using Hanson's 0.5385 wood to finished product conversion factor means that 1.1023 million m^3 of wood would be required to meet projected consumption in 2000.

If Hanson used a per capita hardboard consumption assumption of 0.0050 m^3 per person (i.e. actual for 2000) all else held constant, projected hardboard consumption would have been 0.1120 million m^3 in 2000 requiring 0.2080 million m^3 of logs.

This means that Hanson's per capita consumption assumption for hardboard over-estimated Australia's wood requirements for 2000 by 0.89 million m^3 per annum, or by 430 per cent.

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[96] In converting to metric units it was assumed that hardboard was 3/16 inch thick (Forestry and Timber Bureau 1969, p. 108).

A4.3 Softboard

Hanson considered that the volume of wood used to produce softboard would revert to its mid 1940s levels due to a substitution for some of the raw material market captured by bagasse. In 2000 Australia recorded no softboard production and imports[97] of only 0.0337 million m^3 requiring an estimated 0.0613 million m^3 of wood (table A1) for production.

Hanson assumed that 0.113 million m^3 of wood would be required to meet Australia's softboard requirements by 2000. This assumption resulted in an over-stating of wood requirements by about 0.0520 million m^3 per annum as at the end of 2000.

A4.4 Projected wood requirements for wood-based panels (Combining A4.1 to 4.3)

The effect of Hanson's per capita consumption assumptions and omission of wood requirements for particleboard and MDF on Australia's projected wood requirements in 2000 is as follows:

- Particleboard/MDF - under-estimated by 2.60 million m^3 per annum
- Hardboard - over- estimated by 0.894 million m^3 per annum
- Softboard - over- estimated by 0.052 million m^3 per annum
- Total wood based panels - under- estimated by 1.654 m^3 per annum (figure A1).

A5 Projected wood requirements for paper

Hanson argued that incomplete pre-war data made it difficult to establish long-term paper consumption trends. He noted the FAO warning about establishing a long-term growth trend on the relatively short post-war period with its readjustment to more liberalised trading. Hanson observed that Australia's per capita consumption of the main paper grades followed closely that of the USA, but with a 15 to 20 year lag. Assuming that this relationship would remain, Hanson considered that the USA forecasts could be used to guide Australian consumption projections.

A5.1 Newsprint

Hanson expected that growth in advertising and Australia's population in the newspaper-buying age group would increase per capita consumption. FAO projections undertaken in 1960 of per capita newsprint consumption in the USA in 1975 ranged from 0.0399 tonnes to 0.0445 tonnes (Hanson 1962a). Allowing for the Australian 15-year lag and a saturation effect, Hanson assumed Australia's per capita consumption of newsprint in 2000 to be 0.0454 tonnes per person. In 1999/00 Australia's population

[97] Imports of other fibreboard are included in this figure.

of 19.1570 million people (Australian Bureau of Statistics 2001a) consumed 0.755 million tonnes of newsprint (table A1) - 0.0394 tonnes per person.

Based on projected population size and per capita consumption, the projected newsprint consumption was 1.02 million tonnes (0.0454 tonnes x 22.4 million). Using Hanson's finished product to raw material conversion of 1 tonne of newsprint requiring 3.01 m^3 of wood and assumed paper recycling levels, means that 3.06 million m^3 of wood would be required to meet projected consumption in 2000.

If Hanson used a per capita newsprint consumption assumption of 0.0394 tonnes per person (i.e. actual for 1999/00) all else held constant, projected newsprint consumption would have been 0.883 million tonnes in 2000 requiring 2.66 million m^3 of wood.

This means that Hanson's per capita newsprint consumption assumption over-estimated Australia's projected wood requirements in 2000 by 0.405 million m^3 of wood per annum, or by 15 per cent.

A5.2 Printing and writing paper

Hanson considered that Australia's per capita consumption of printing and writing papers would increase as the industry grew domestically, through import replacement, and with increasing consumption of magazines and quality paper for advertising. Hanson adopted the then per capita consumption of printing and writing papers in the USA of 0.0295 tonnes per person per year as the figure for Australian per capita consumption in 2000. In 1999/00 Australia's 19.1570 million people consumed 1.277 million tonnes of printing and writing paper. Per capita consumption in 1999/00 was 0.0667 tonnes per person – more than double Hanson's assumption.

Based on projected population size and per capita consumption, the projected printing and writing paper consumption was 0.661 million tonnes (0.0295 tonnes x 22.4 million). Using Hanson's finished product to raw material conversion of 1 tonne of printing and writing paper requiring 3.6445 m^3 of wood and assumed paper recycling levels, means that 2.41 million m^3 of wood was required to meet projected consumption in 2000.

If Hanson had used a per capita printing and writing paper consumption figure of 0.0667 tonnes per person (i.e. actual for 1999/00) all else held constant, projected printing and writing paper consumption would have been 1.49 million tonnes in 2000 requiring 5.45 million m^3 of wood.

This means that Hanson's per capita printing and writing paper consumption assumption under-estimated Australia's projected wood requirements in 2000 by 3.037 million m^3 of wood per annum, or by 56 per cent.

A5.3 Other paper - paperboard and other paper

My analysis combines Hanson's projections of the then two paper categories 'paperboard' and 'other paper' to rule out discrepancies caused by subsequent product classification changes of these papers to 'packaging and industrial' and 'household and sanitary' papers. Here, 'other paper' refers to the combined grades - i.e. all other papers excluding newsprint and printing and writing papers. Packaging and industrial papers accounted for 86 percent of Australia's consumption of other papers in 1999/00 (Australian Bureau of Agricultural and Resource Economics 2001b).

Hanson considered that Australia's per capita consumption of other paper would continue its steady increase through to the end of the 20th century. The per capita consumption assumption used by Hanson of 0.1383 tonnes per person by 2000 was based on a combination of the then USA rate and FAO projections for the USA. Australia's 19.157 million people consumed 1.809 million tonnes of other papers in 1999/00 (table A1) - 0.0944 tonnes per person.

Based on projected population size and per capita consumption, the projected consumption of other papers was 3.10 million tonnes (0.1383 tonnes x 22.4 million). Using Hanson's finished product to raw material conversion of 1 tonne of other paper requiring 2.2570 m^3 of wood and assumed paper recycling levels, means that 6.99 million m^3 of wood would be required to meet projected consumption in 2000.

If Hanson had used a per capita other paper consumption of 0.0944 tonnes per person (i.e. actual for 1999/00) all else held constant, projected consumption of other papers would have been 2.11 million tonnes in 2000 requiring 4.77 million m^3 of wood per annum.

This means that Hanson's per capita other paper consumption assumption over-estimated Australia's projected wood requirements in 2000 by 2.22 million m^3 of wood per annum, or by 47 per cent.

A5.4 Aggregated effect of per capita paper consumption assumptions on projected wood requirements (combining A6.1 to A6.3)

The combined effect of Hanson's per capita consumption assumptions for the various paper grades on projected wood requirements are as follows:

- Newsprint - over- estimated by 0.405 million m^3 per annum
- Printing and writing - under- estimated by 3.037 million m^3 per annum
- Other paper - over- estimated by 2.219 million m^3 per annum
- Total paper - under- estimated by 0.413 million m^3 per annum (figure A1).

A5.5 Changes in pulp and paper industry resource productivity

Hanson made no allowance for wood saving technologies in the pulp and paper industry. Over the near four-decade period wood saving technologies such as recycling, use of fillers and increased pulping efficiency have significantly reduced the amount of wood required to produce a unit of paper (Sedjo & Lyon 1990; Clark 2001a). Here, I examine the extent to which wood saving technologies have reduced wood requirements to meet Australia's paper consumption. Limitations of the published data prevent the calculation of resource productivity for each major paper grade, so the analysis is conducted at the aggregate industry level.

Hanson's projections imply that on average each tonne of paper consumed in Australia in 2000 would require 2.6093 m^3 of wood. In 1999/00 Australia consumed 3.84 million tonnes of paper requiring an estimated 5.82 million m^3 of wood to produce (Australian Bureau of Agricultural and Resource Economics 2001b). On average each tonne of paper consumed in Australia in 1999/00 required 1.5158 m^3 of wood. By not forseeing wood-saving technology, Hanson over-estimated the wood required to meet Australia's projected paper consumption in 2000 by 5.22 million m^3,
i.e. (4.7757 million x 2.6093) - (4.7757 million x 1.5158) (figure A1).

A5.6 Use of sawmill residues in pulp production

Hanson made an allowance for 4.0493 million m^3 of sawmill residues to be used for pulp production and fuel wood. The figure was not disaggregated and also contains an unspecified rounding-off factor. Excluding particleboard consumption on the assumption that sawmill residues would meet its wood requirements is a further complication. It is difficult to evaluate the assumption, because of continuing limitations with data. Hanson's estimate appears to be reasonable given that an estimated 3.7 million m^3 of saw and plywood mill residues was generated in meeting Australia's consumption of sawn timber and plywood in 2000 (see table A1 and allowing 30 per cent for mill residues). Hanson probably assumed that significant volumes of residues were not within economic distance of a market, thereby off-setting the effect of his high sawn timber consumption projection on residue supply.

A6 Poles, piles and posts

Hanson after weighing up new product development, competing products and market trends assumed that the total consumption of poles, piles and posts would remain relatively unchanged at 0.85 million m^3 per annum by 2000. In 1999/00 Australia consumed 0.662 million m^3 of logs comprising fencing and mining timbers, poles and piles (Australian Bureau of Agricultural and Resource Economics 2001b). Hanson over- estimated Australia's wood requirements in 2000 by 0.188 million m^3 per annum.

A7 Population

Projections of Australia's population extended to 1975 at the time when Hanson was preparing his wood projections. Hanson projected Australia's population to 2000 by assuming a per annum growth of 1.87 per cent - the lower of the two officially estimated population growth rates in 1975 (Hanson 1962a). Hanson considered that Australia's population in 2000 would be in the range of 20.1 million to 23.1 million. His preferred figure used in the projections was 22.4 million. Australia's population at 31 December 2000 was estimated to be 19.28 million people (Australian Bureau of Statistics 2001a). Reworking the projections with a population of 19.28 million people shows that Hanson's population assumption, all else held constant, over- estimated Australia's projected consumption of wood in 2000 by 5.06 million m^3 (table A2, figure A1).

Table A2 The effect of the population assumption on Hanson's wood consumption projections

Product	Hanson's projected wood requirements in 2000 with a population of 22.4 million	Wood requirements in 2000 assuming a population of 19.28 million.
	(million m^3)	(million m^3)
Sawn timber and railway sleepers	21.24	18.20
Plywood	0.85	0.73
Hardboard	1.10	0.95
Softboard	0.11	0.10
Newsprint	3.06	2.63
Printing and writing papers	2.41	2.07
Other papers	6.99	6.02
Poles, piles and posts	0.85	0.85
Deduction for sawmill residues	4.05	4.05
Total wood	32.56	27.50

A8 Summary

Hanson projected that Australia would require 32.6 million m^3 per annum of wood by 2000 (excluding fuel wood). In 2000, Australia's consumption of wood products required an estimated 18.6 million m^3 of wood (table A1). Table A3 presents the sources of error.

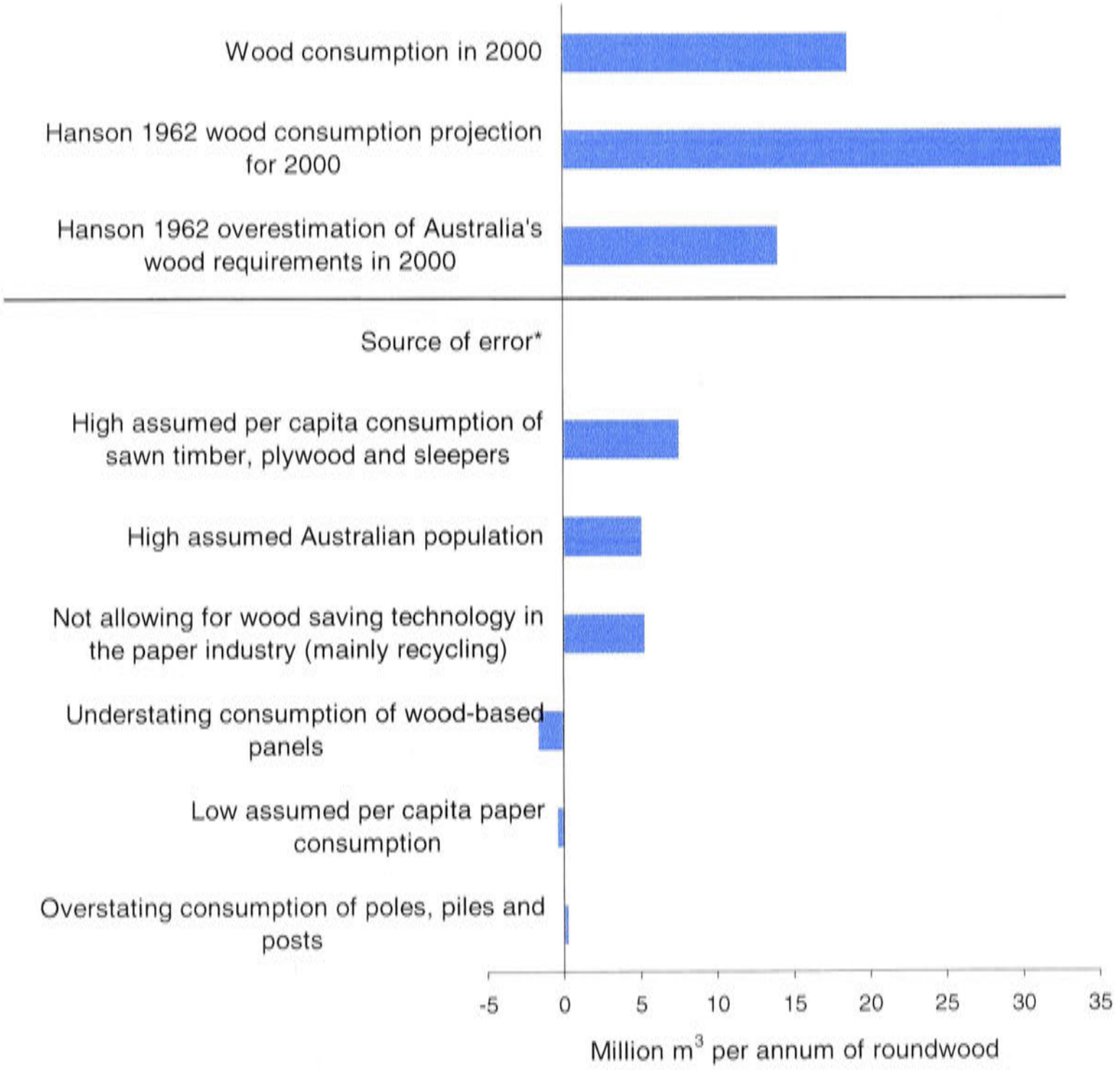
Table A3 Sources of error in Hanson 1962 projected Australian wood consumption in 2000

Error source	Effect on projected wood consumption in 2000. + means over-estimate: - means under-estimate (million m^3 per annum of wood)	
Per capita consumption assumption	+7.11	
Sawn timber, plywood and sleepers[a]	+7.52	
Paper - total	-0.41	
▪ Newsprint		+0.40
▪ Printing and writing papers		-3.04
▪ Other paper		+2.22
Wood saving technology in the paper industry (mainly recycling)	+5.22	
Wood-based panels consumption	-1.65	
▪ Particleboard/MDF		-2.60
▪ Hardboard		+0.89
▪ Softboard		+0.05
Consumption of poles, piles and posts	+0.19	
Australia's population assumption	+5.06	
Total all sources[b]	+14.0	

a. After allowing for Hanson's high sawn timber recovery assumption.

b. Error sources cannot be aggregated because the error with the population assumption will be double counted. This figure is sourced from table A1.

Figure A1 Error source in Hanson (1962a) projected Australian wood requirements in 2000.



* Error source calculated by substituting 2000 data for each of Hanson's assumptions whilst holding all else constant. The total overestimation cannot be derived by aggregating the error sources because the error with the population assumption would be double counted.

Appendix B

Commodity production in the Australian wood and wood products industry

B1 Introduction

Commodities are homogeneous products that usually meet established standards. This means that commodity producers compete largely on price to distinguish their company's product from others in the industry. The significance of commodity production in the Australian wood and wood products industry is critical information. It enhances our understanding of the nature of the industry and its strategies for success, thereby assisting in the development of coherent policy. Clark (1995a, p. 19) considered that commodity production accounted for between 80 to 90 per cent of the Australian wood and wood products industry. The estimate has not been contested and is similar to estimates of the share of commodity production in the industry, globally (A.J. Leslie pers. comm. 1992). There appears to be no other quantification of commodity production in the Australian industry.

This appendix presents estimates of the commodity share of Australian production of wood and wood products. The approach is based on the product classifications and production data from Australian Bureau of Agricultural and Resource Economics (2001a). The data are adjusted using the assumptions and information as detailed in table B1 to estimate the volume of commodity based production. The estimation relies heavily on the author's industry knowledge to establish commodity production shares for each major product. The analysis sets the last stage of domestic processing as the point for determining whether the product is a commodity or otherwise. For example, all woodchip exports are commodities from an Australian industry perspective, although some may be used in the overseas manufacture of specialty papers.

B2 Finding

It is estimated that commodity production accounted for around 95 per cent of the volume of Australian-made wood and wood products in 1999/00 (table B2).

Table B1 Estimated Australian production of commodity wood and wood products 1999/00 (000 m^3)

Product	Actual commodity and non commodity production	Estimated commodity production	Log equivalent volume focussed to commodity production in last stage of domestic production	Log equivalent volume of commodity and non commodity production	Assumptions and information used to estimate commodity production
Sawn timber	3 928	3 535	8 838[a]	9 820[a]	Assuming 10% of native forest and plantation production goes into specialty markets. Guided by Regional Forest Agreement data (e.g. Gooday et al. 1998).
Plywood	192	154	385[a]	480[a]	Assuming 80% is commodity production.
Wood-based panels	1 599	1 519	2 337[b]	2 460[b]	Assuming 5% goes into specialty mouldings.
Paper	3 532[c]	3 080	2 346[d]	2 697[e]	Assuming commodity production accounts for: ▪ 100% of newsprint ▪ 80% printing and writing ▪ 60% household & sanitary ▪ 90% packaging
Woodchip exports	8 602[f]	8 602	9 200[g]	9 200[g]	All chips are sold on commodity markets
Log exports	1 150	1 150	1 150	1 150	All commodities
Sleepers	40	40	54	54	All commodities
Other (poles, posts etc.)	662	662	563	662	Assuming 85% commodities.

a. Assuming a 40% sawn timber and veneer recovery factor. ABARE data on saw and veneer log removals could not be used because ABARE does not report the volume exported in log form.

b. Assuming a 65% recovery factor. ABARE provides data on log input for wood based panel production, but not sawmill residues.

c. Assuming 1 m^3 of paper on average weighs 0.75 tonnes (Clark 2001a).

d. Assuming the ratio of commodity to total paper production applies to wood input.

e. Wood input data reported in Pulp and Paper Manufacturers Federation of Australia (2001) converted from green tonnes to m^3 by multiplying hardwood by 0.9 and softwood by 1.0.

f. Hardwood chips reported in bone dry tonnes converted to m^3 by multiplying by 1.68 and softwood chips reported in bone dry tonnes converted to m^3 by multiplying by 2.47 (Neilson & Flynn 1998, p. xiv).

g. Allowing for 6.5% loss in chip handling and fines.

Table B2 aggregates the data across products and removes the double counting of sawmill residues utilised in domestic production of wood panels and paper and as chip exports to generate an industry wide estimate of commodity production.

Table B2 Summary table of Australian production of commodity wood and wood products 1999/00

Product	Log equivalent volume focussed to commodity production in last stage of domestic production	Log equivalent volume of total commodity and non commodity production	Commodity production share of total production
	($000\ m^3$)	($000\ m^3$)	(%)
Sawn timber & plywood	9 223	10 300	90
Sleepers	54	54	100
Other	563	662	85
Paper, wood based panels, chip exports	13 883	14 357	97
Log exports	1 150	1 150	100
Total above	24 873	26 523	
Less estimated saw and veneer log residues used in domestic production of wood panels and paper and chip exports.[a]	(2 767)	(3 090)	
Total	22 106	23 433	94

a. Assuming that utilised sawmill residues are 30% of the saw and veneer log production.

Appendix C

Value added and employment per unit of wood used in the Australian wood and wood products industry

C1 Introduction

This appendix presents the methods, data sources and assumptions used to generate figure 5.2 in the main body of this thesis. The ratios of value added and employment per unit of wood input were calculated for 1998/99 using Australian Bureau of Statistics (ABS) value added and employment data for each of the main industry groups in Australia. Wood and wood products volume data were sourced from the Australian Bureau of Agricultural and Resource Economics (ABARE) and the Pulp and Paper Manufacturers Federation of Australia (PPMFA). The information and assumptions used to calculate the ratios are presented in table C1.

The ratios could not be calculated separately for the plantation and native forest based sectors because the ABS does not disaggregate industry data by wood-growing regime. Using ABS value added and employment data for South Australia - virtually all plantation based - is not a viable alternative because of the high aggregation across products to satisfy confidentiality requirements. Incorporating native forest based production in the exercise will not distort the ratios significantly except for the sawn timber employment to wood input ratio. This ratio is expected to decline as sawn timber produced in more capital intensive plantation mills continues to displace native forest sawn timber.

Employment is that generated inside the mill gate or port; i.e. it excludes employment that is general to all sectors of the industry, namely wood growing, logging and haulage.

C2 Finding

The ratios of value added and employment per unit of wood used in the Australian wood and wood products industry are presented in table C1 with methods detailed in the notes.

Table C1 Value added and employment to wood input ratios for the Australian wood and wood products industry 1998/99. Source: Australian Forest Growers (19960; Australian Bureau of Agricultural and Resource Economics (2001a); Australian Bureau of Statistics (2000); Dart Radiata Services (1997); New Zealand Ministry of Agriculture and Forestry (2001a); Pulp and Paper Manufacturers Federation of Australia (1999); Ian Sedger pers. comm. 2001.

ANZSIC product number	Product	Value added ($ million)	Roundwood equivalent (000 m^3)	Value added per unit of wood ($ per m^3 roundwood equivalent)	Employment (persons)	Employment per unit of wood (persons per 000 m^3 roundwood equivalent)
	Softwood plantation A grade sawlog exports			13.74[a]		0.08[b]
	Softwood plantation chiplog exports			0.96[c]		0.08[b]
2312	Wood chip exports[d]	168.2	7 896[e]	21.30	737	0.09
2311 2313 2321	Sawn timber, plywood and veneer	914.8	9 859	92.79	13 309	1.35
2322	Wood-based panels	278.9	2 695[f]	103.49	3 522	1.31
2323 2329	Further processing sawn timber and panels[g]	1 008.8	2 200[h]	275.00[i]	25 857	7.00[i]
2331	Paper	711.0	3 783[j]	187.95	4 382	1.16
2332 2333 2334 2339	Processing paper into containers, bags, sacks, etc	1 212.8	na[k]	na[k]	12 912	na[k]

a. ABS does not report on value added for log exports. Value added was estimated for A grade softwood sawlogs by deducting from the New Zealand fob A grade sawlog price per m^3 (New Zealand Ministry of Forestry and Agriculture, 2001a) in 1996 converted to $A ($A100.89), costs of $A35.25 for stevedoring, wharfage, loading, storage, wharf holding, cartage over 100 km and harvesting (using Australian Forest Growers (1996) for unit cost data) and stumpage of $A51.90 (NSW Government rates reported by DART Radiata Services, 1997) to give an estimated value added per m^3 of $A13.74. Nominal log prices have remained stable between 1996 and 1999.

b. Employment in log handling, weighing and storage, quality assurance and administration per unit of wood (Ian Sedger pers. comm. 2001).

c. Value added calculated using same data sources and methodology as for A grade sawlogs (note a) but with fob log price of $A48.21/$m^3$ and costs including stumpage of $A47.25/$m^3$.

d. Includes native forest and plantation chip exports to be consistent with ABS value added and employment data.

e. ABARE reported exports of 1 033 200 bone dry tonnes (bdt) of softwood chips converted to m^3 by multiplying by 2.47 and allowing for 7% loss from chipping and chip handling = 2 744 000 m^3 roundwood equivalent. ABARE reported exports of 2 851800 bdt of hardwood chips converted to m^3 by multiplying by 1.68 and allowing for 7% loss from chipping and chip handling = 5 152 000 m^3. These conversion figures are averages - whole log chipping has lower conversions than residue chips from sawmills.

f. To the ABARE estimate of particleboard and medium density fibreboard production in Australia of 1 397 000 m^3 was added an estimated 100 000 m^3 of hardboard production. This combined estimate was then converted to roundwood equivalent by multiplying by 1.8.

g. Processing into wooden structural components (e.g. trusses and door-window units) and other wood products (e.g. pallets and containers). Also includes articles manufactured from cork and bamboo and further processing of imported products.

h. In the absence of data on Australian wood processed past sawn timber, plywood and wood-based panels, a roundwood equivalent figure was estimated assuming that 60 per cent of wood input for panels production was sourced from sawmill residues and 20% of Australian production of sawn timber, plywood and wood based panels was further processed. Severe information gaps mean that

these assumptions should be treated cautiously. The reason for persisting with the calculation was to reinforce the point that the further processing of commodity wood products may lead to significant value-adding and employment, a point often lost because of data limitations.

i. Deducting an assumed 40 per cent of value added and employment to allow for imported products. Severe information gaps mean that this assumption should be treated cautiously. Figure 5.2 excludes these ratios because the data are not considered to be sufficiently robust. The reason for persisting with the calculation was to reinforce the point that the further processing of commodity wood products may lead to significant value-adding and employment, a point often lost because of data limitations.
j. Pulp and Paper Manufacturers Federation of Australia reported wood usage of 1 780 000 tonnes of softwood (assuming 1:1 for tonne: m^3 conversion) and 1 007 000 tonnes of hardwood converted to m^3 by multiplying by 0.85 and adding 310 000 tonnes of imported pulp (90% chemical) converted to roundwood equivalent by multiplying by 3.7.
k. Value added and employment to wood input ratios are high, but difficult to calculate because of data limitations.

Appendix D

Australian production of wood and wood products in 1999/00 and 1989/90 disaggregated by wood source

D1 Introduction

Neither the Australian Bureau of Statistics (ABS) nor the Australian Bureau of Agricultural and Resource Economics (ABARE) use a wood source (native forest and plantation) disaggregation as the basis for statistical reporting. ABARE reports some production data by wood source, but not consistently across all wood and wood products. This appendix fills in the gaps to provide estimates of Australia's production of wood and wood products (excluding fuel wood) and exports of unprocessed wood in 1999/00 disaggregated into plantation and native forest sources. Data sources and assumptions are provided in the discussion and tables. The method was also used to disaggregate production data by wood source for 1989/90 (table D6) to facilitate the evaluation of industry performance over the 1990s (chapter 5).

D2 Australian wood supply in 1999/00

ABARE reports annual roundwood removals with hardwood disaggregated into native forest and plantation sources and softwood (mostly plantation) not disaggregated (Australian Bureau of Agriculture and Resource Economics 2001b, p. 63). These data exclude logs sold for fuel wood.

D2.1 Plantation log cut

The plantation log cut can be estimated by deducting from softwood roundwood removals (12.475 million m^3 in 1999/00) the estimated volume of native forest softwood removals (mostly for sawn timber) and adding the volume of hardwood plantation removals (0.839 million m^3 in 1999/00). ABARE reported that in 1999/00, Australia's native forest softwood sawn timber production was 108 800 m^3 (Australian Bureau of Agriculture and Resource Economics 2001b, p. 13) processed from an estimated 272 000 m^3 of logs (assuming a 40% sawn timber recovery). It is estimated that log removals from Australia's plantations totalled 13.0 million m^3 in 1999/00.

D2.2 Native forest log cut

Australia's native forest hardwood log removals totalled 10.695 million m^3 in 1999/00 (Australian Bureau of Agriculture and Resource Economics 2001b, p. 63). The native forest log cut can be estimated by adding the native forest softwood log volume (272

000 m^3). With this adjustment, it is estimated that log removals from Australia's native forests totalled 11.0 million m^3 in 1999/00.

D3 Australian production of sawn timber and wood panels in 1999/00

It is estimated that 4.2 million m^3 of sawn timber and wood panels were made from plantation grown wood in 1999/00 accounting for 73 per cent of Australian production (table D1).

Table D1 Australian production of sawn timber and wood panels 1999/00 (000 m^3 finished product)

Product	Made from plantation wood	Made from native forest wood	Source
Sawn timber			ABARE 2001b, pp. 13, 63.
Softwood	2 484.3	105.7	Assuming a 40% sawn timber recovery for hardwood plantation sawlogs. Native forest hardwood sawn timber production has been corrected for an anomaly in the Victorian data.[a]
Hardwood	60.0	1 163.3	
Total	2 544.3	1 269.0	
Particleboard	978.1	0.0	ABARE 2001b, p. 17.
Medium density fibreboard (MDF)	621.4	0.0[b]	ABARE 2001b, p. 18.
Hardboard	0.0	100.0	Estimated Amatek production in Queensland and NSW.
Plywood	163.0	28.8	ABARE 2001b, p.17 and assuming 85% of production is plantation based (National Association of Forest Industries 1990, p. 82).
Total sawn timber and wood panels	4 306.8	1 397.8	

a. ABARE data overstate Australia's native forest hardwood sawn timber production in calendar year 2000 by an estimated 9 per cent (Clark 2001b). Possible explanations currently being investigated by ABARE are the inclusion in the Victorian data of some chiplogs in the sawlog category that were not used for sawn timber and a high sawn timber recovery assumption in the calculation of Victorian sawn timber production. ABARE's reported native forest hardwood sawn timber production for Victoria in 1999/00 was recalculated using sawlog supply data and the sawn timber recovery assumption presented in Jaakko Pöyry Consulting (2001, pp. 11, 18). The sawlog supply data were adjusted to include 10 per cent of the residual log sales based on Victorian Department of Conservation and Natural Resources unpublished data on residual log licence allocations and the products manufactured from them. Data reported in tonnes were converted to m^3 by multiplying by 0.8.

b. Starwood's medium density fibreboard (MDF) plant in Tasmania has been operating at well below capacity and whilst the plant was designed to use 50 per cent eucalypt and 50 per cent plantation softwood, since start up the majority of the intake has been plantation softwood (Stafford et al. 2000, p. 153).

D4 Australian production of pulp and paper in 1999/00

Australia uses recycled paper, imported and domestically manufactured pulp, fillers and cotton linters as the material inputs for its paper production. Recycled paper accounted

for 52 per cent of Australia's paper production in 1999/00 (Pulp and Paper Manufacturers Federation of Australia 2001). The importance of recycled paper and other non-wood inputs in Australia's paper production means that disaggregating the industry's output into plantation and native forest sources is not appropriate. The disaggregation is therefore reported as wood input for Australian paper production.

The Pulp and Paper Manufacturers Federation of Australia (2001) reported softwood and hardwood input for Australian pulp and paper production. All softwood is plantation based. The hardwood component has not been disaggregated by wood source. In 1999/00, PaperlinX used 0.2 million m^3 of plantation hardwood in its Victorian operations (Stafford et al. 2000). The company's Maryvale, Victorian pulp and paper complex is Australia's main user of hardwood chips (Clark 1995a). I understand that virtually all other hardwood chips processed in Australia in 1999/00 were sourced from native forests.

Wood input reported in tonnes by the Pulp and Paper Manufacturers Federation was converted to m^3 assuming 1 tonne of native forest (virtually all regrowth) wood used in Australian pulp production = 0.9 m^3 and 1 tonne of softwood plantation wood = 1 m^3.

Table D2 Wood used for Australian pulp and paper production in 1999/00 (000 m^3 wood)

	Plantation	Native forest
Softwood	1 776	0
Hardwood	200	720
Total	1 976	720

D5 Australian production of other wood products in 1999/00

Other wood products comprise railway sleepers, fencing and mining timbers, poles and piles. Fuel wood is excluded from this exercise.

Table D3 Wood used for other products - Australia 1999/00 (000 m^3 finished product)

	Plantation	Native forest	Source
Railway sleepers	0	40	ABARE 2001b, p. 16.
Fencing, mining , poles piles and other	484	178	ABARE 2001b, p. 63 and assuming that all softwood production is plantation based.
Total	484	218	

D6 Australian production of unprocessed wood exports (logs and chips) in 1999/00

Table D4 Australian exports of unprocessed logs and chips 1999/00 (000 m^3 roundwood equivalent)

	Plantation	Native forest	Source
Hardwood chips	483	5 953	Assuming all ABARE (2001b, p. 63) reported plantation hardwood production less the wood used for PaperlinX's domestic production (see above and assuming 1 tonne plantation hardwood = 1 m^3) is exported as chips. Hardwood chip exports (ABARE 2001b, p. 56) reported in bone dry tonnes multiplied by 1.68 to convert to m^3 (Neilson & Flynn 1998, p. xiv). An allowance of 6.5% for chip losses and fines (Australian Forest Growers 1996) was made. The native forest component was calculated by netting out plantation-based exports.
Softwood chips	2 764	0	ABARE 2001b, p. 57 with bone dry metric tonnes multiplied by 2.47 to convert to m^3 (Neilson & Flynn 1998, p. xiv) and allowing 6.5% for chip losses and fines (Australian Forest Growers 1996).
Softwood logs	1 032	-	ABARE 2001b, p. 47 and assuming half of unspecified logs were plantation sourced.
Hardwood logs	-	118	ABARE 2001b, p. 47 and assuming all hardwood logs are native forest sourced and half of unspecified logs are native forest sourced.
Total unprocessed wood	4 279	6 071	

D7 Summary

Table D5 Australian production of wood and wood products and unprocessed wood exports by wood source 1999/00

	Unit	Plantation	Native forest	% plantation
Wood production	000 m^3 roundwood	13 000	11 000	54
Sawn timber & wood panels	000 m^3 finished product	4 307	1 398	75
Wood for domestic pulp production	000 m^3 roundwood	1 976	720	73
Other wood products	000 m^3 finished product	484	218	69
Unprocessed wood - chips & logs	000 m^3 roundwood	4 279	6 071	41
% of wood exported unprocessed		33	55	

D8 Disaggregation of 1989/90 production

Production data for 1989/90 were disaggregated by wood source using the above methods. ABARE data were sourced from *Quarterly Forest Products Statistics March Quarter 1992 & 1995*. The calculations are simplified by the absence of hardwood plantation wood production. MDF production not reported by ABARE in 1989/90 was sourced from National Association of Forest Industries (1990, p. 78). Log export data were sourced from the Australian Bureau of Statistics international trade data. The results are presented in table D6.

Table D6 Australian production of wood and wood products and unprocessed wood exports by wood source 1989/90

	Unit	Plantation	Native forest	% plantation
Wood production	000 m^3 roundwood	6 704	10 861	38
Sawn timber & wood panels	000 m^3 finished product	2 304	1 874	55
Wood for domestic pulp production	000 m^3 roundwood	2 080	1 133	65
Other wood products	000 m^3 finished product	334	461	42
Unprocessed wood - chips and logs	000 m^3 roundwood	283	4 475	6
% of wood exported unprocessed		4	41	

Appendix E

Projections of Australia's softwood plantation wood supply

E 1 Introduction

This appendix presents the main published projections of Australia's softwood plantation wood supply prepared since the late 1980s. Each, in time order, is briefly described and presented in tables and figures for comparison.

E2 Projections of softwood plantation wood supply

Cameron & Penna (1998) presented projections of softwood plantation wood supply to 2030 in the Australian Conservation Foundation (ACF) report *The Wood and the Trees* report. They projected wood supply by applying five different management regimes (selected and weighted to provide a coverage of the range likely to be implemented across Australia) to age profile data for the Australian estate. Details are presented in appendix 4 of their report.

The Australian Forestry Council (1989) presented projections of Australia's softwood plantation wood supply potential to 2030 disaggregated by region and log grade. Information explaining the projections is limited to reporting the plantation area by species and state and plantation productivity (MAI) for Australia as a whole. The projections present a relatively low sawlog supply particularly for the period 2000 to 2019. The absence of documentation, particularly on plantation management assumptions, accompanying the projections means the reason for the relatively low sawlog supply projection cannot be identified.

The Resource Assessment Commission (1992a) projected sawlog and chiplog supply from Australia's softwood plantations to 2090. Area and productivity data for each plantation region were collected in their forest resources survey completed by all state and territory forest agencies (Resource Assessment Commission 1992b). Projections of sawlog and chiplog supply for the Australian estate are presented graphically not numerically. The data presented in the tables and graphs below were generated using ANU Data Grabber software.[98] The RAC did not document their projection method and key information and assumptions are not reported. In preparing projected softwood sawlog availability, the RAC reduced their softwood sawlog supply projections by about 20 per cent because they considered that Australia faced a softwood chip shortage (Resource Assessment Commission 1992a, L11). No evidence or argument

[98] Steve Roxburgh of the Ecosystem Dynamics Group at the Research School of Biological Sciences, Australian National University developed the program.

was provided to support the chip shortage view despite it contradicting the serious problem facing most Australian softwood plantation regions of insufficient markets for thinning material (Victorian Wood Products Working Party 1993, p. 22; Jaakko Pöyry 2000, p. 16). It is not clear whether the 20 per cent adjustment was made before or after the sawlog projections were presented.

The RAC projected Australia's softwood plantation sawn timber production by bringing demand into the analysis. The projections are consumption projections and were generated by superimposing assumptions of the Australian softwood plantation sawn timber industry's future market share. A model with price as the mechanism for aligning supply and demand was not used. Softwood sawn timber (imported and domestically produced) was constrained to 65 per cent of the Australian market and Australia's softwood plantation sawn timber production was constrained to not exceed 55 per cent of the total market (Resource Assessment Commission 1992a, L 23). In 2000, softwoods accounted for 71 per cent of the Australian sawn timber market and the market share of Australian softwood plantation sawn timber increased from 36 per cent in 1992 to 51 per cent in 2000 (Australian Bureau of Agricultural and Resource Economics 2001b and previous editions). In this appendix (table E2 and figure E2) the RAC's projections of sawn timber production have been converted to a sawlog equivalent unit (assuming a 40 per cent sawn timber recovery) to enable comparison with projections of sawlog supply. The RAC's sawlog supply projections are presented as RAC 1 and the sawn timber production projections presented in log equivalent form are shown as RAC 2.

Clark's (1995a) projections of Australia's softwood plantation sawlog and chiplog supply are an aggregation of projections prepared for each plantation region. The report included state-based working papers presenting each region's plantation area and age profile and the productivity and management regime assumptions used to generate the projections. The method was described in appendix 1 to the report and a list of the names of people and their organisations consulted was presented in appendix 3. The national projections focus on wood supply becoming available at 2000 and 2005 when Australia's softwood plantation estate will be fully on stream. Short-term surges that raised wood supply in 2000 to 2005 above what the plantations could sustainably supply (assuming no increase in plantation productivity) were removed to ensure that processing opportunities could be maintained with a sustainable wood resource. Reliable data across the estate on likely plantation productivity improvements are not available, and so the projections were constrained to the period 2000 to 2010.

The projections of James et al. (1995) of softwood plantation wood supply to 2015 are presented in tables 3 and 8 of their report. Projected total wood supply is an aggregation of projections presented by various (unstated) state organisations and sawlog supply is assumed to be 70 per cent of this total (James et al. 1995, p. 9 & 12). The report provided no further details on data sources, assumptions or methods.

The National Plantation Inventory (1997) presented regional projections of softwood plantation chiplog, sawlog and veneer log supply to 2039. The projections are an aggregation of grower-based information and, where not available, projections using

indicative yield tables prepared by consultants (Turner & James 1997a, 1997b). The projections are not documented, an action rationalised by the NPI on the grounds of maintaining data confidentiality to secure grower information. At the time 70 per cent of Australia's plantation resource was publicly-owned.

BIS Shrapnel Forestry Group Pty. Ltd. (2000) presented sawlog supply projections for Australia disaggregated by state to 2030. The projections are a combination of those presented in Australian Forestry Council (1989) and National Plantation Inventory (1997) with undocumented adjustments made following discussions with State Governments.

The projections of total softwood plantation wood supply are presented in table E1 and figures E1 and the sawlog projections are presented in table E2 and figure E2.

Table E1 Projections of Australia's softwood plantation wood[a] supply 1990-2029 (000 m^3 per annum). Source: Cameron & Penna (1988); Australian Forestry Council (1989); Resource Assessment Commission (1992a); Clark (1995a); James et al. (1995); National Plantation Inventory (1997).

	Cameron & Penna 1988	AFC 1989	RAC 1992[b]	Clark 1995	James et al. 1995[c]	NPI 1997
1990-94	8 800	8 712	6 930			
1995-99	10 960	8 712	6 930		11 800	10 462
2000-04	14 060	11 547	13 970	14 400	12 500	11 916
2005-09	18 270	11 547	13 970	15 550	12 200	12 550
2010-14	18 670	13 442	13 960	d	12 200	12 085
2015-19	19 630	13 442	13 960			12 163
2020-24	19 030	14 746	14 720			12 688
2025-29	19 280	14 746	14 720			13 199

a. Includes chiplogs, sawlogs and veneer logs.
b. Projections presented graphically converted to numbers using ANU Data Grabber software.
c. Projection period set back one year to align with other projection periods.
d. Plantation supply expected to continue increasing as productivity improvements are realised.

Table E2 Projections of Australia's softwood plantation sawlog[a] supply 1990-2029 (000 m^3 per annum). Source: Cameron & Penna (1988); Australian Forestry Council (1989); Resource Assessment Commission (1992a); Clark (1995a); James et al. (1995); National Plantation Inventory (1997); BIS Shrapnel Forestry Group Pty. Ltd (2000).

	Cameron & Penna 1988	AFC 1989	RAC 1 1992[b]	RAC 2 1992[c]	Clark 1995	James et al. 1995[d]	NPI 1997	BIS Shrapnel 2000
1990-94	3 930	3 759	3 760	3 873				
1995-99	5 240	3 759	3 760	3 873		8 300	5 705	
2000-04	8 530	6 472	7 810	5 120	9 500	8 800	7 124	7 746
2005-09	12 380	6 472	7 810	5 120	10 600	8 500	8 585	10 015
2010-14	13 540	8 284	8 750	5 090	e	8 500	8 181	10 110
2015-19	14 630	8 284	8 750	5 090			8 470	10 110
2020-24	14 340	9 394	8 740	5 185			8 914	10 610
2025-29	14 090	9 394	8 740	5 185			9 312	10 610

a. Includes veneer logs.
b. Projections presented graphically converted to numbers using ANU Data Grabber software.
c. Projections of sawn timber production converted to sawlog equivalent assuming 40 per cent sawn timber recovery. Note this projection is effectively a consumption projection generated by assumptions about the market share for plantation sawn timber.
d. Projection period set back one year to align with other projection periods.
e. Supply expected to continue increasing as productivity improvements are realised.

Figure E1 Projections of wood supply from Australia's softwood plantations 1990-2029.
Source: Appendix E, table E1.

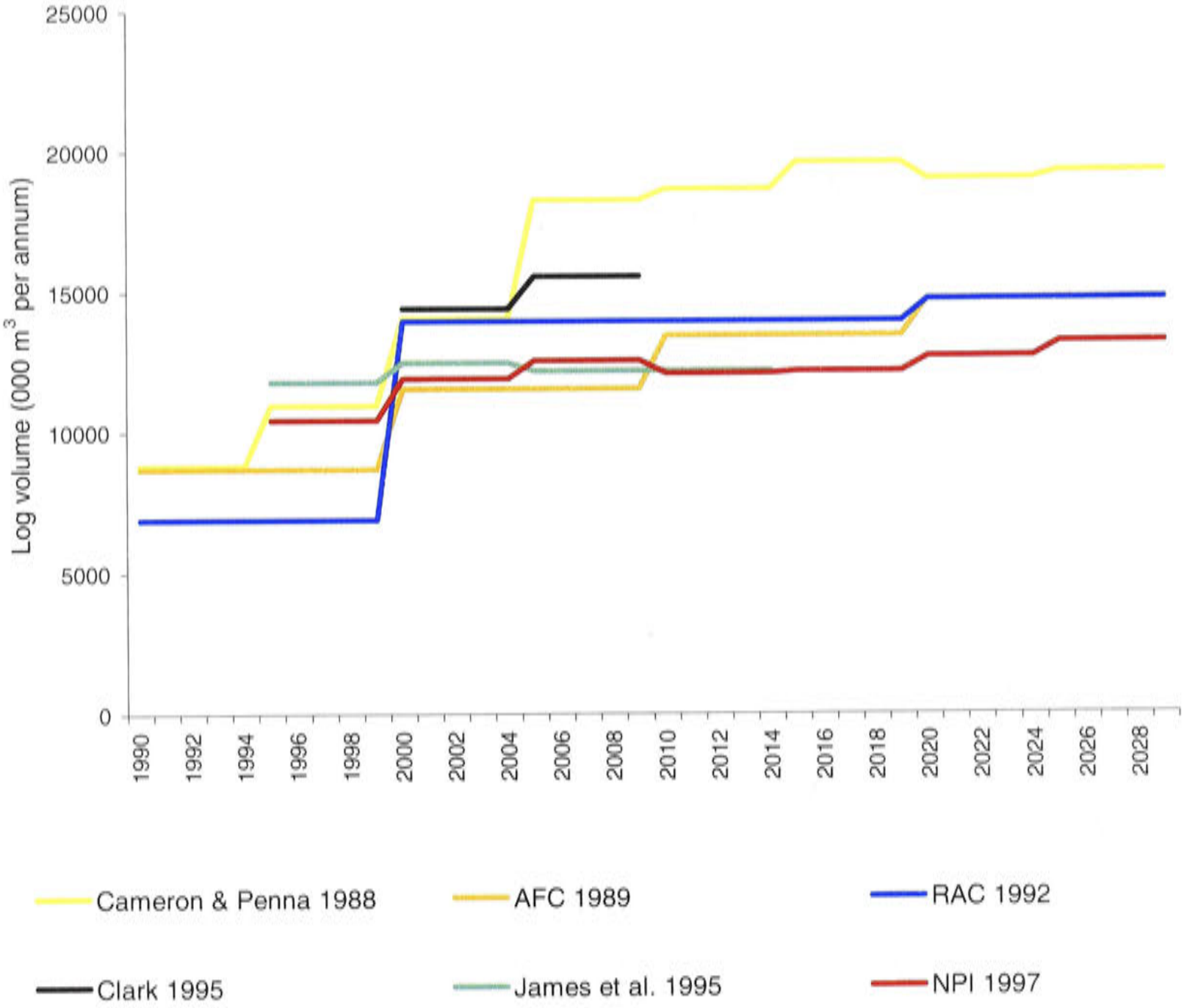
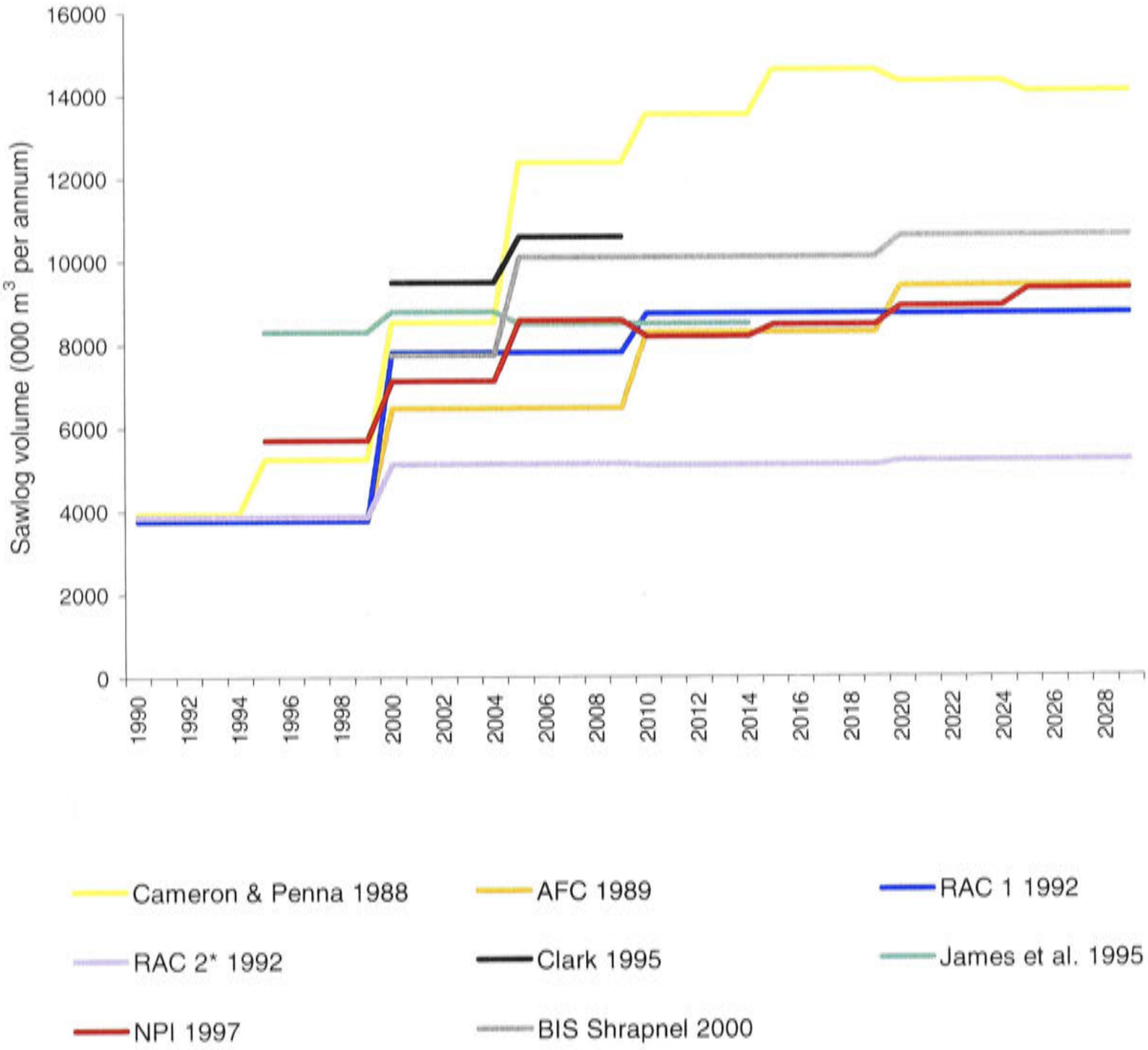


Figure E2 Projections of saw and veneer log supply from Australia's softwood plantations 1990-2029. Source: Appendix E, table E2.



* RAC 2 1992 are projections of sawn timber production (consumption) converted to sawlog equivalent volume.

Appendix F

Plantation and native forest wood and wood products substitutability

F1 Introduction

This appendix establishes the technical capacity of Australia's plantation resource to substitute for its current use of native forest wood. Firewood, from native forests and woodlands, and charcoal are included in the analysis. Technical substitution is based on technologies in commercial use. Whether substitution is realised depends on price competitiveness, non-price competition factors (e.g. customer service, quality assurance, product attributes), building regulations, buyer behaviour and wood availability in volumes to support scale economies in new processing facilities. Substitution is examined for Australia as a whole. The smaller regional outcome (e.g. south west Western Australia, south east Queensland, south east NSW) will depend largely on how successful each region is in securing additional plantation processing investment because the location of Australia's plantations is highly correlated to the areas where native forest wood production occurs, the main exception being East Gippsland (for a mapping of Australia's native forest types and plantations see National Forest Inventory 1998; for a more detailed plantation location see Wood et al. 2001).

In chapter 5, I argued that a plantation processing industry policy should accompany substitution of plantation wood for native forest wood. The structural change in Australia's wood and wood products industry (if domestic integration in the plantation industry increases together with substitution) will significantly affect the value of industry production and employment in some regions. For example, Tasmania's eucalypt plantation resource could supply a world competitive pulp and paper making complex, which contrasts with its existing largely native forest based export woodchip industry.

Each of the main uses for Australia's current native forest wood resource is examined for technical substitution. The investigation is accompanied by a brief discussion on plantation resource availability and location. Industrial wood uses are examined in order of the volume of native forest wood logged, followed by a brief examination of native forest (and woodland) use for firewood and charcoal.

F2 Plantation substitution of native forest industrial wood

F2.1 Native forest hardwood chips for export and domestic pulp and paper production

Approximately 60 per cent of the 11 million m^3 of wood sourced from Australia's native forests in 1999/00 was exported as chips or used for domestic pulp and paper production (appendix D). Eucalypts account for all the resource. There is consensus that Australia's eucalypt plantations present a perfectly substitutable resource. Some eucalypt plantation growers argue that their resource is superior to native forest wood on quality grounds (see for example Pacific Forest Corporation Ltd. 1999).

The chiplog supply potential of Australia's existing eucalypt plantations in 2000 was estimated to be 2.1 million m^3 per annum, with supply increasing to 6.6 million m^3 per annum by 2005 and 9.8 milliion m^3 per annum by 2010 (Duggie 2000, table 4). The resource presents a significant substitution opportunity, although the domestic processing issue should not be discarded. In 1999/00, Australia's eucalypt plantations provided 0.7 million m^3 of wood for domestic and overseas paper production (Australian Bureau of Agricultural and Resource Economics 2001b, p. 63) - a possible warning of plantation resource stockpiling. The eucalypt plantation resource in Western Australia is sufficient to supply a greenfield pulp and paper facility within the five years of mill planning, approval and construction (based on projections presented in Duggie 2000, table 4). The Tasmanian eucalypt plantations can also supply such a processing complex by 2010, i.e. shortly after the five year planning, approval and construction period (based on projections presented in Duggie 2000, table 4). Alternative, but significantly lower resource intensive, uses of the eucalypt plantation supply include wood-based panels and sawn timber.

Despite structural and chemical differences between hardwood and softwood, their degree of interchangeability in pulp and paper is high, as shown by the varying dependence on one or the other resource in different countries depending on resource availability (Higgins 1991). Higgins reported that in general hardwoods and softwoods are largely interchangeable in pulping, but not completely so - hardwoods are not suitable for mechanical pulping without chemicals. In paper making the two resources are highly interchangeable with the main limitations being where papers require a high tearing strength (a considerable part of the furnish should be long fibred softwood pulp), and papers that require printing surfaces for good image reproduction (a high proportion of hardwood fibre is normally required, although softwood can be processed to generate the qualities) (Higgins 1991, p. 31). If hardwood fibre becomes significantly more important in the pulp and paper raw material mix, it could affect Australia's softwood sawn timber industry to the extent that markets for softwood plantation thinnings become more competitive.

F2.2 Native forest sawn timber

Australia produced 1.3 million m^3 of native forest sawn timber (92 per cent hardwood) in 1999/00 (appendix D), the second main use of Australia's native forest wood. BIS Shrapnel's research into the Australian sawn timber market shows that housing accounted for approximately 70 per cent of the hardwood sawn timber consumed in Australia in 1999 and the inclusion of non-dwelling building means that building accounted for nearly 80 per cent of Australia's hardwood sawn timber consumption in 1999 (table F1). These market shares (i.e. including imports) give a reasonable approximation of the markets for Australian native forest hardwood sawn timber because imports accounted for only 9 per cent of Australian hardwood sawn timber consumption and exports of Australian hardwood sawn timber accounted for only 3 per cent of Australian hardwood sawn timber production in 1999 (Australian Bureau of Agricultural and Resource Economics 2001b).

Table F1 Australian consumption of hardwood and softwood sawn timber 1999. Consumption includes domestically produced production and imports. Imported hardwoods accounted for 9 per cent of Australia's hardwood sawn timber consumption. Source: BIS Shrapnel Forestry Group Pty. Ltd. (2000, table 7.4).

Application	Hardwood (000 m^3)	Softwood (000 m^3)	Softwood as per cent of total (%)
Housing including alterations and additions	984	2 349	70.5
Non dwelling building	137	270	66.3
Furniture	63	313	83.2
Other	247	158	39.0
Total	1 431	3 090	68.3

An array of non-wood (e.g. steel, aluminum, plastic composites, bricks, concrete) and wood products compete in the market to meet the various building needs (Sedjo & Lyon 1990; Lippke 1994; Clark 1995a; BIS Shrapnel Forestry Group Pty. Ltd. 2000). The Australian competition within the sawn timber component is largely between hardwood and softwood. With most hardwood consumed in Australia being sourced from Australian native forests and most softwood from plantations (Australian and New Zealand), the competition is effectively between native forests and plantations. BIS Shrapnel research indicates that the two resources are substitutable in all applications in the Australian housing market (table F2) with differences in market share reflecting price, availability, quality, building regulations, buyer behaviour etc. The Tasmanian Wilderness Society (TWS) One Stop Timber Shop provides an online advisory service to buyers seeking plantation alternatives to native forest products including product guides, product sourcing information and professional guidance on specifying environmentally preferred products (The Wilderness Society One Stop Timber Shop).

Table F2 Australian consumption of sawn timber for building houses and multi-dwellings and alterations and additions 1999. Source: BIS Shrapnel Forestry Group Pty. Ltd. (2000).

Application	Total consumption	Australian native forest hardwood	Imported hardwood	Radiata pine	Other softwood
	($000\ m^3$)	(%)	(%)	(%)	(%)
Floor bearers & joists	291.1	69.2	0.3	14.3	16.2
Floor boards	106.9	63.4	8.0	12.0	16.6
Ceiling frames	375.2	6.6	1.8	86.0	5.6
Wall frames	736.4	7.7	0.5	86.0	5.8
Roof frames & trusses	710.2	14.4	0.1	78.0	7.5
Architraves & skirtings	91.4	17.7	31.5	37.5	13.3
Facia boards	49.3	17.3	0.6	50.8	31.3
Window frames	69.8	20.5	32.8	9.9	36.9
Decks	50.6	26.0	34.7	35.1	4.2
Pergolas	36.2	17.2	0.5	49.0	33.2
Fencing	414.9	50.5	1.2	45.0	3.3
Doors	43.2	19.5	54.1	8.4	18.1
Other	357.0	18.5	50.5	14.7	16.4
Total %		23.8	9.0	57.3	9.9
Total m^3	3 332.2	794.6	299.4	1 908.3	329.9

High substitutability between native forest and plantation sawn timber is also evident in the non-residential building market, which is supplied mainly by non-wood products (BIS Shrapnel Forestry Group Pty. Ltd. 2000, pp. 109-17).

Plantation softwood has a wide market application because it can be processed into a diverse range of products. Sawn to specification engineered products made from laminated veneers provide strong beams spanning large distances; preservative treatment enhances durability; and wood-based panels made from reconstituted particles of wood are made for a plethora of applications traditionally met by sawn timber and non-wood products (von Weizsäcker et al. 1997; Gray & Hall 1999).

The furniture market absorbs a relatively small proportion of Australia's native forest sawn timber (as indicated in table F1 but, note that the figure includes imports) and draws on about 1 per cent of Australia's native forest wood cut. Softwood accounts for most (83 per cent) of the sawn timber used in Australian furniture production in 1999 (table F1) and this share increases markedly with the inclusion of softwood wood-based panels, notably medium density fiberboard (MDF). The requirement for native forest hardwoods and softwoods for high appearance uses such as furniture, joinery and paneling is based primarily on customer preference and represents a relatively low-volume specialist niche (Resource Assessment Commission 1992a, R14). Consumer tastes change (notable examples being the declining consumption of whale products and fashion furs) and hardwood and softwood plantations can present an alternative raw material to satisfy high appearance quality requirements. For example, Finlayson Timber & Hardware Pty. Ltd. processes hoop pine plantations in Queensland into high appearance joinery products and its business is expected to grow following the south east Queensland Forests Stakeholder/Government Agreement (chapter 6).

Other uses for Australian native forest sawn timber include pallets and cases; pickets; bridge, wharf and jetty construction; and a plethora of minor products such as ladders, tool handles, signs etc. Pallet and case production and repair requires approximately 200 000 m^3 of sawn timber per annum and hardwood and softwood is used in roughly equal amounts (BIS Shrapnel Forestry Group Pty. Ltd. 2000, p. 132). Substitution also exists in the production of ladders, tools (softwood application can be broadened with wood densification treatment), signs, pickets etc. This leaves sawn timber for bridge, wharf and jetty construction. BIS Shrapnel Forestry Group Pty. Ltd. (2000, pp. 132-3) reported that native forest hardwood (sawn) timber accounts for half the raw materials in wharf and jetty construction and is used to repair bridges. Volume data are not provided. The RAC considered that softwood cannot substitute for hardwood in bridge construction (Resource Assessment Commission 1992a, R14), although preservative-treated softwood sawn timber has been used in jetty and pier construction and repair (A.Walker-Morrison pers. comm. 2001).

In summary, softwood plantation sawn timber (and wood-based panels) can substitute for nearly all current uses of Australian native forest sawn timber. Whether there is sufficient resource in Australia's existing plantations for such a substitution is a key piece of information for policy. This information remains shrouded in confusion (chapter 7), but time is appearing to bring some clarity (see for example appendix G). Australia's consumption of sawn timber, from all domestically produced sources and imports, has remained static averaging around 4.2 million m^3 per annum over the past three decades (figure 5.4). Projections of Australia's softwood plantation sawlog supply separate into two groups, those that project Australia's potential to meet its consumption virtually immediately (namely Clark 1995a and BIS Shrapnel Forestry Group Pty. Ltd. 2000) and all government based projections that identify a significant shortfall. The projections, in m^3 of sawlog units, are presented in appendix E and in the following discussion have been converted to sawn timber equivalent units using a standard 0.4 per cent sawn timber conversion factor. Clark (1995a) projected that Australia's softwood plantations can produce 3.8 million m^3 per annum of sawn timber by 2000, increasing to 4.2 million m^3 per annum by 2005. BIS Shrapnel Forestry Group Pty. Ltd. (2000) projected a softwood plantation sawn timber supply potential of 4.0 million m^3 per annum by 2005 (appendix E, table E2 with log volumes converted to sawn timber units). As noted above, all government-generated projections indicate a continuing softwood plantation sawlog supply shortfall although supply is projected to increase (appendix E, table E2 with log volumes converted to sawn timber units). Wood-based panels made from softwood and hardwood plantations add to the capacity for plantation products to substitute for native forest sawn timber. It is unlikely that sawn timber imports will be completely eliminated. Export markets will be essential if the Australian sawn timber industry is to process all the available plantation resource.

The location for the softwood processing expansion is and will continue to be widely distributed throughout Australia because all states participated in the 1960s softwood plantation program (and the ACT through a separate Cabinet decision) and continued their planting programs through to the early 1990s (chapters 2 & 3). A profile of the processing potential in each of the plantation regions is presented in Clark (1995a).

F2.3 Native forest use for wood panels

Small volumes of native forest hardwood are used to make wood-based panels. Plantation hardwood can readily substitute for this resource. Smaller volumes of native forest wood are used to make veneer for plywood (appendix D, table D1). Most Australian plywood production is softwood plantation based (appendix D, table D1). The strength attribute of hardwoods means that plywood manufacturers require a hardwood resource for some applications (Resource Assessment Commission 1992a, R12) although the volumes will be small and the capacity for plantation product development to fill the niche remains to be explored. Decorative applications for native forest veneer and plywood face the same consumer choice issues as high appearance sawn timber discussed above.

F2.4 Native forest use for other products

The main products in the other category are sleepers, poles, and posts. Australia's use of native forests for railway sleepers has declined markedly over the last three decades as railway lines have been progressively converted to concrete sleepering. Australia produced 40 000 m^3 of railway sleepers in 1999/00 - a 40 per cent decline on the previous year (Australian Bureau of Agricultural and Resource Economics 2001b, p. 16). Railway authorities are expected to reduce their demand for native forest hardwood railway sleepers, favouring concrete and steel with their significantly longer track life (BIS Shrapnel Forestry Group Pty. Ltd. 2000, p. 13). Softwood and eucalypt plantations will add to the supply of poles and posts. Preservation treatment enhances their durability, particularly for in-ground applications, and extends their substitution potential.

F3 Plantation substitution of native forest wood used for firewood and charcoal

F3.1 Firewood

It is estimated that Australia consumes around 6 million tonnes of firewood per annum (Resource Assessment Commission 1992a, p. 248), similar in volume to native forest chip exports. Hanson (1962a, p. 14) reported that data on fuel wood consumption were the most incomplete of all the wood statistics, but Forestry and Timber Bureau estimates suggest that in the early 1960s Australia consumed approximately 4 million tonnes of firewood per annum. Traill (2000) argued that most firewood is sourced from woodlands and that high extraction rates are further threatening woodland ecosystems. Pears (2000) argued that changes in building energy requirements, tightening environmental constraints and technology have the potential for enhancing the firewood and wood burning heater industry's environmental soundness and also significantly reduce domestic firewood demand. He reported on the potential for increased use of biomass for commercial and industrial heat, cogeneration, electricity generation and transport fuel. Native forest and plantation wood is substitutable in these applications.

Auspine Ltd. is proposing to develop a biomass fueled power station at Tarpeena South Australia using softwood plantation wood and sawmill residues (Auspine Ltd. 2001).

Maxwell (2000) reported on government and environment movement initiatives aimed at addressing the environmental impacts of the firewood industry and firewood consumption in Canberra. Substituting cleaner energy systems for wood burning heaters forms a major part of the approach combined with measures to supply wood from more environmentally friendly sources. Maxwell reported that a small quantity of softwood plantation wood is currently used for firewood in Canberra and increased use could be facilitated if the Australian Standards for wood heaters are amended so that wood heaters are tested using both hardwoods and softwoods. Parlane & Clark (2000) presented preliminary estimates of the potential plantation firewood supply suggesting that, after allowing for full use of the resource for industrial products, logging residues from Australia's existing softwood plantations could supply between 1.3 to 1.7 times Australia's current firewood consumption. This estimate excludes the eucalypt plantation resource, does not include plantations in the warmer regions (northern NSW, Qld and NT), and assumes all firewood currently consumed is high density forest red gum – therefore requiring a greater amount of softwood to generate the equivalent heat.

F3.2 Charcoal

Approximately 150 000 tonnes of jarrah was used for charcoal production in Western Australia in 1999/00 (Department of Conservation and Land Management 2000, p. 20). A similar project, using native forest hardwoods, is proposed for south east NSW with the charcoal also used in silicon production (Australian Silicon Pty. Ltd. 2001). In its public consultation, the developer advised that the charcoal plant will shift to hardwood plantations to be established in the Murray Darling Basin (Australian Silicon Pty. Ltd. 2001, p. 4). Further research is required to verify the technical feasibility of charcoal production based on Australia's existing hardwood plantations particularly those planted to species other than the high ash producing *Eucalyptus globulus*. Charcoal can also be produced from other raw materials, notable coal.

F4 Summary

The above product analysis indicates that Australia's softwood and hardwood plantation wood and wood products can technically substitute for virtually all current Australian native forest wood uses. The exceptions are unknown, but may include very small amounts of native forest hardwood used for wharf and bridge building and very small amounts of high-appearance native forest sawn timber and veneer reflecting consumer preference for such products.

Projections of Australia's plantation wood supply indicate a sufficiency of resource to enable a total substitution of native forest wood supply and imported products with potential for additional exports of plantation wood products. Whether these opportunities are realised depends largely on the level of investment in plantation processing in Australia.

Appendix G

Resolving the difference between CALM and Clark over Western Australia's softwood plantation sawlog supply

G1 Background

The Western Australian Department of Conservation and Land Management (CALM) presented softwood plantation wood supply projections in their 1987 wood and wood products industry strategy (Department of Conservation and Land Management 1987). The projections show a 3.5 times increase in annual sawlog supply from public softwood plantations over the period 1987 to 2002^{+} to 410 000 m^3 per annum (Department of Conservation and Land Management 1987, p. 52). The projections excluded the private resource (20 per cent of the then softwood estate) and did not extend past 2002-2005.[99] The ending point made the projections particularly sensitive to the rotation assumptions. Radiata pine (the dominant species) plantings reached their peak around 1970, which meant that a rotation assumption of 35 plus years would result in a large increase in sawlog supply not depicted in the projections.

The AFC in 1989 (Australian Forestry Council 1989, pp. 65-7) published projections of Western Australia's softwood plantation sawlog supply including the private resource. Significant volumes of softwood plantation sawlogs were projected to come on stream by 2020 however the projected supplies for 2000-2010 were relatively small (ranging between 488 000 to 580 000 m^3 per annum). The projections are unfortunately inadequately documented.

In 1993 the Western Australian Forest Alliance invited Clark to investigate the role of plantations for Western Australia's wood products industry. The paper (Clark 1993), using CALM data and allowing for the private resource, identified significant opportunities for growth based on processing increasing supplies of softwood and eucalypt plantation wood into sawn timber, wood panels and pulp and paper. With the support of Federal Government funding for the national plantation study (Clark 1995a, see chapter 7 for background discussion), Morris & Clark (1995) undertook a more detailed examination of the state's plantation resource and processing opportunities. They identified a plantation sawlog supply by 2000 ranging between 680 000 to 790 000 m^3 per annum increasing to 780 000 to 960 000 m^3 per annum by 2005 (Morris & Clark 1995, p. 232). These projections showed a considerably larger plantation sawlog supply available by 2000 than previous work.

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[99] The last projection period was defined as 2000^{+} for two of the three regions. Whilst the projections presented numerically ended in the early 2000s, graphical presentations extended the projections in a horizontal line to 2040 (Department of Conservation and Land Management 1987, p. 54).

In 1997 the BRS presented projections of Western Australia's softwood plantation sawlog supply in its National Plantation Inventory (NPI). They projected relatively small volumes of sawlogs coming on stream by 2000 (436 000 m^3 per annum) and a significant peak in supply (to 1 005 000 m^3 per annum) over the period 2005-2009 (National Plantation Inventory 1997, p. 81).

Insufficient documentation of the NPI projections significantly constrains peer review. An interactive process identified an average productivity for the state's softwood plantations of 11 m^3 per hectare per annum (Clark 1997f). This was significantly lower than the MAI's reported by the Resource Assessment Commission (RAC) for Western Australian softwood plantations: 13.5 to 20 m^3 per hectare per annum for public radiata pine plantations; 17 to 20 m^3 per hectare per annum for private radiata pine plantations; and 13 m^3 per hectare per annum for pinaster pine plantations (Resource Assessment Commission 1992b, chapter 4 p. 7). The plantation productivities implied in the NPI projections also contradicted those prepared by Turner and James from the ANU Department of Forestry engaged as consultants to the NPI team. The indicative yield tables they prepared for Western Australia's plantations used a MAI of 20.7 m^3 per hectare per annum for radiata pine plantations managed over 30 years and 10.7 m^3 per hectare per annum for pinaster pine managed over 45 years (Turner & James 1997a, p. 8).[100]

At a symposium organised by the National Trust of Australia (WA) on the RFA, Clark presented a paper aimed at clarifying the plantation supply potential and its implications for industry policy and public choice about native forests (Clark 1998a). The paper included projections of the softwood plantation resource using projection periods that were compatible with the NPI.

G2 Establishing the difference between CALM and Clark

Whilst CALM publicly criticised my projections (see for example Department of Conservation and Land Management 1996; Coatney 1996), establishing the difference between CALM and Clark on the state's softwood plantation sawlog supply potential was difficult. This was largely due to the shield CALM created by first using the projections in James et al. (1995) and later the National Plantation Inventory (1997) to criticise Clark's projections rather than releasing their own up-to-date projections.

CALM also distanced itself from the NPI projections arguing, through its Minister, that the ANU consultants prepared the NPI projections (Edwardes 1997). This contradicted the NPI that advised that CALM had provided the resource information and that that information was accepted as up-to-date and correct and used instead of resource information separately provided by individual private growers (National Plantation Inventory 1997, p. 17).

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[100] Radiata pine accounts for 70 per cent of the softwood plantation estate and pinaster pine 30 per cent (National Plantation Inventory 1997, p. 18).

To clarify the plantation resource situation Dr Edwards, ALP shadow Minister for the Environment, asked the Minister for the Environment in the Western Australian Parliament whether CALM was satisfied with the data underpinning the NPI and the conclusions of the NPI about plantation wood supply, and asked for the Minister's explanation for the substantial discrepancies between the NPI and Clark (Edwards 1999). The Minister answered as follows:

> Answer:
> 1. *'CALM does not have access to all of the data underpinning the National Plantation Inventory, so it is unable to provide comment.*
>
> 2. *The National Plantation Inventory of Australia, as published by the Bureau of Resource Sciences in 1997, does not contain or draw any conclusions about the availability of plantation timber for the local market. It does contain "approximate and broadly average woodflows for each region" with Western Australia comprising one region. These estimates were based on wood flow forecasts by growers, and where these were not available, predictions provided by the Department of Forestry at the Australian National University. The wood flow estimates provided in the NPI report "present only one scenario. Other scenarios based on a number of defined management strategies are also possible." It is therefore not appropriate for CALM to be either satisfied or dissatisfied with their projections.*
>
> 3. *CALM does not have responsibility for the data or analysis prepared in the NPI. Detailed inquiries should therefore be directed to the Bureau of Resource Sciences. However, CALM understands that the differences probably arise from the differences in the resolution and quality of the data used. For example, Judy Clark's analysis applied a single yield regime to all plantations by species irrespective of their condition, stocking or site quality. Such analyses can only provide, at best, a very broad, imprecise indication of future resource availability.'* (Edwardes 1999).

The Minister's answer created the perception that CALM did not prepare the Western Australian projections presented in the NPI and therefore had no responsibility in resolving the differences with Clark.[101]

Dr Brian Turner, one of the consultants engaged by the NPI to assist in compiling national plantation wood supply projections, confirmed that the Western Australian wood supply projections for the period 1995 to 2014 were prepared by CALM. CALM's projections were disaggregated into private and public plantation wood supplies, but this disaggregated information remains confidential (B. Turner pers. comm. 2001). All data provided by growers to the NPI are protected under data transfer arrangements (National Plantation Inventory 1997, p. 2).

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[101] For the record, CALM misrepresented Clark's methodology as described in Clark (1997f, 1998a).

With this clarification of the authorship of the NPI projections for Western Australia, the differences between CALM and Clark can now be established. The difference narrows down largely to the supply projections for 2000-04 where Clark projects a softwood plantation sawlog supply 70 per cent higher than CALM (table G1). The large difference in the volumes projected for the immediate future has significant implications for both native forest conservation and industry policy.

Table G1 Projections of sawlog supply from Western Australian softwood plantations presented in the NPI (prepared by CALM) and prepared by Clark. Source: National Plantation Inventory (1997); Clark (1998a).

	CALM projections for NPI 1997 ($000 m^3$ per annum)	Clark 1998 ($000 m^3$ per annum)	Difference (%)
1995-99	313	412	31.6
2000-04	436	747	71.3
2005-09	1 005	971	-3.4
2010-14	677	670	-1.0

G3 Resolving the difference between CALM and Clark

The difference between CALM and Clark started to break down in October 1999 when Dr Shea Executive Director CALM wrote to Clark enclosing the document *An analysis of Judy Clark's softwood sawlog yield predictions for Western Australia* (Shea 1999a; Department of Conservation and Land Management 1999). The Minister did not approve the release of the document because she perceived it to be too personal, wanting the emotion taken out and a factual report on the projections (Edwardes pers. comm. 12 November 1999).[102] It was an important document containing important new (and publicly available) information. Specifically, CALM presented new projections of softwood sawlog supply from public plantations (Department of Conservation and Land Management 1999, pp. 11-2).[103] The projections were presented graphically, with the exception of the years 2000 and 2005. Numerical estimates of the projections were derived using the ANU's Data Grabber software[104] and are presented in table G3.

The next task is to clarify the private softwood plantation sawlog supply potential - virtually all planted with radiata pine. The NPI did not distinguish between different plantation ownership classes and, as mentioned earlier, wood supply projections disaggregated by ownership class remain confidential. In this exercise, the sawlog supply potential from Western Australia's privately owned softwood plantations was estimated using a sawlog MAI of 10.0 m^3 per hectare per annum applied to age profile data collected by CALM's National Forest Inventory Project Team and presented in

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[102] The release of the document could have been triggered by my meeting with the Premier Richard Court on 16 July 1999 who wished to be briefed on the state's plantation resource supply and my Keynote address *Can Plantation Forests Solve the Old Growth Forest Debate*? to the Western Australian Business Forum on 7 October 1999. Representatives from major resources companies, finance sector, media, government departments (including the Office of Public Accountability), academia and political parties attended.

[103] The projections relate to CALM managed plantations and include sharefarm plantings managed by CALM.

[104] Developed by Steve Roxburgh Ecosystem Dynamics Group of the Research School of Biological Sciences, ANU.

table G2. Dr Turner confirmed the MAI assumption as being consistent with CALM's view (B. Turner pers. comm. 2001).

The sawlog yield table for the private estate was developed as:

	Sawlog yield (m^3 per hectare)
Thinning at age 18	30
Thinning at age 24	45
Clearfell at age 30	225

The projections are presented in table G3.

Table G2 Western Australia's private softwood plantation age profile.[a] Source: National Forest Inventory Project Team 1993.

Net area planted in:	Hectares
<1962	116.6
1962	15.2
1963	40.3
1964	50
1965	57.6
1966	77.9
1967	49.1
1968	63.4
1969	353.8
1970	894.2
1971	1 236.7
1972	861.0
1973	978.0
1974	651.9
1975	1 275.7
1976	1 716.3
1977	843.6
1978	628.5
1979	358.1
1980	209.2
1981	290.9
1982	231.9
1983	214.8
1984	215.3
1985	839.6
1986	803.8
1987	727.6
1988	816.7
1989	777.4
1990	448.2
1991	208.1
1992	201.1
1993	47.9
Total	16 300

a. Plantings undertaken in the early 1990s are not fully recorded.

Table G3 CALM's projections of sawlog supply from Western Australian public softwood plantations and projected sawlog supply from private softwood plantations (000 m^3 per annum). Source: Department of Conservation and Land Management (1999, figure 4) for public resource; projections of private resource supply based on CALM information as detailed in the discussion.

	Public plantations [a]	Private Plantations	Total
<1995		380	
1995		94	
1996		75	
1997		66	
1998		50	
1999	306	146	452
2000	366	285	651
2001	514	323	837
2002	567	228	795
2003	616	261	877
2004	616	180	796
2005	616	322	938
2006	616	421	1 037
2007	616	223	839
2008	616	165	781
2009	616	125	741
2010	616	89	705
2011	648	100	748
2012	648	90	738
2013	652	85	737
2014	666	71	737
Average annual supply 1999 to 2014	581	195	776

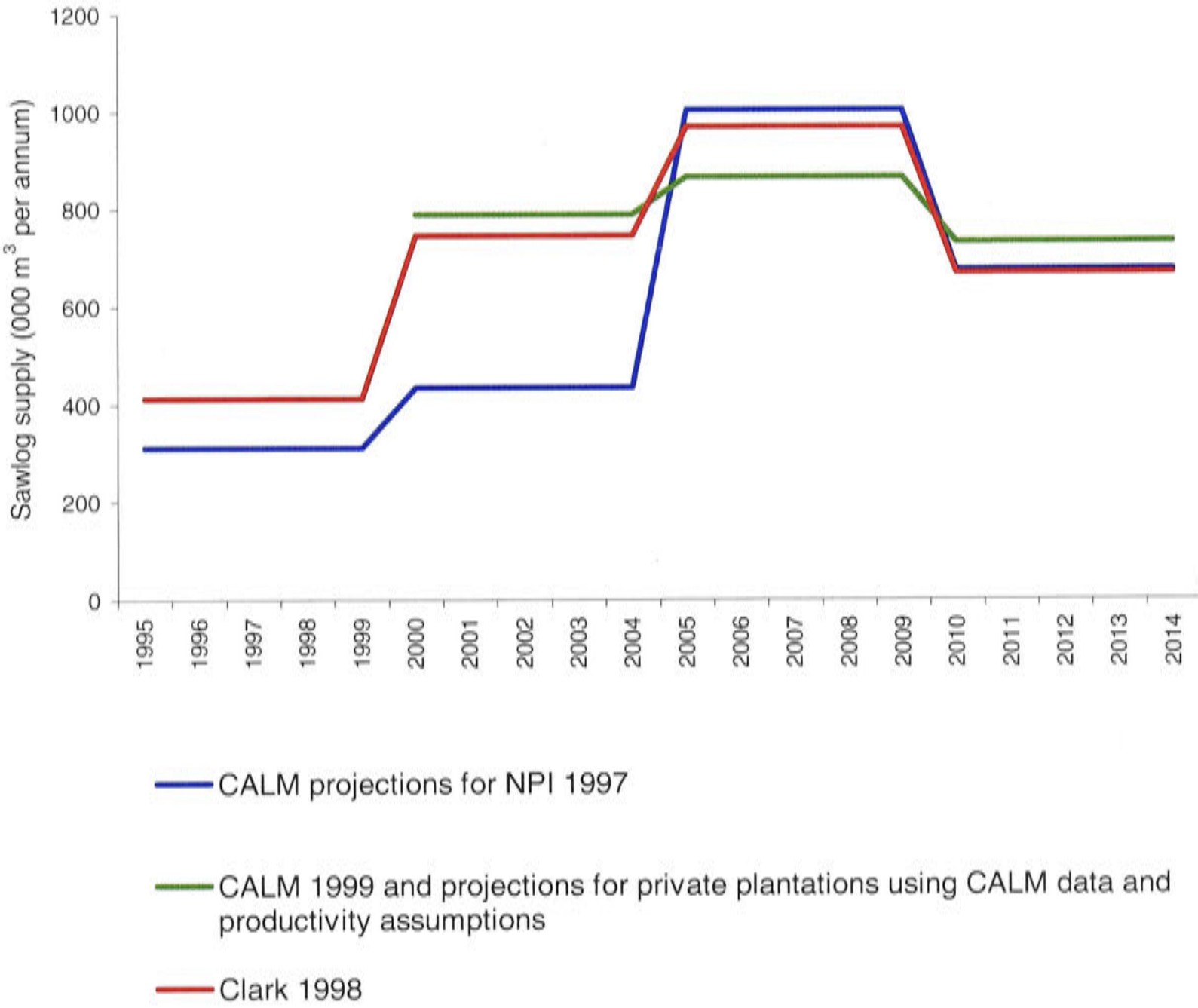
a. Projections presented graphically converted to numerical data using ANU's Data Grabber software.

The three sets of projections, namely those prepared by CALM for the NPI; CALM's revised projections for the public plantations combined with the private resource supply; and Clark (1998a), are presented in table G4 and figure G1.

Table G4 Projections of sawlog supply from Western Australian softwood plantations presented in the NPI (prepared by CALM); CALM (1999) and private plantation projections; and Clark (1998a) (000 m^3 per annum).

	CALM projections for NPI 1997	CALM 1999 and projections for private plantations using CALM data and productivity assumptions	Clark 1998
1995-99	313		412
2000-04	436	791	747
2005-09	1 005	867	971
2010-14	677	733	670

Figure G1 Projections of sawlog supply from Western Australian softwood plantations presented in the NPI (prepared by CALM); CALM (1999) and private plantation projections; and Clark (1998a). Source: Table G4.



The upwards revisions in CALM's projections of sawlog supply from public softwood plantations and incorporation of the private resource brings CALM's projections into agreement with those prepared by Clark (table G4, figure G1). CALM's explanation, presented to Parliament, of the differences between its projections and those prepared by Clark was spurious because there actually was little difference (figure G1). The Clark projections were based on CALM age profile data and productivity assumptions and management regimes drawing on CALM information.

CALM's 1999 projections for the public estate combined with the projections for the private estate have important and immediate policy implications with plantation sawlog supply over 2000-04 being nearly double what CALM had projected for the NPI. The three years of debate between CALM and Clark over the wood supply potential of Western Australia's plantations could have been avoided if the BRS had a policy of fully documenting the projections it publishes in the NPI to enable critical review.

Abbreviations

ABARE	Australian Bureau of Agricultural and Resource Economics
ABC	Australian Broadcasting Commission
ABS	Australian Bureau of Statistics
ac	calculated by the author of this thesis
ACCC	Australian Competition and Consumer Commission
ACF	Australian Conservation Foundation
ACT	Australian Capital Territory
ACTU	Australian Council of Trade Unions
AFC	Australian Forestry Council
AHC	Australian Heritage Commission
ALP	Australian Labor Party
AMIC	Australian Mining Industry Council
ANM	Australian Newsprint Mills Ltd.
ANU	Australian National University
ANZAAS	Australian and New Zealand Association for the Advancement of Science
ANZSIC	Australian and New Zealand Standard Industrial Classification
APM	Australian Paper Manufacturers Ltd.
APPITA	Technical Association of the Australian and New Zealand Pulp and Paper Industry
APPM	Associated Pulp and Paper Mills Ltd.
ASX	Australian Stock Exchange
AUSTIS	Australian Timber Industry Stabilisation Conference
AWU	Australian Workers Union
BAE	Bureau of Agricultural Economics
bdt	bone dry tonne
bdu	bone dry unit
BRS	Bureau of Rural Sciences (previously Bureau of Resource Sciences)
CALM	Department of Conservation and Land Management, Western Australia
CFMEU	Construction, Forestry, Mining and Energy Union
CIE	Center for International Economics
CO_2	carbon dioxide
cm	centimetre
CRES	Centre for Resource and Environmental Studies, ANU
CSIR	Council for Scientific and Industrial Research
CSIRO	Commonwealth Scientific and Industrial Research Organisation
CSR	Colonial Sugar Refiners Ltd.
DUB	diameter under bark
ESD	ecologically sustainable development
ESFM	ecologically sustainable forest management
ESTIS	Eastern States Timber Industry Stabilisation Conference
FAFPIC	Forestry and Forest Products Industry Council
FAO	Food and Agricultural Organisation of the United Nations

FICA	Forest Industries Campaign Association
fob	free on board
FORUM	forest resource use model
FORWOOD	Forestry and Wood-Based Industries Development Conference
FPS	Forest Protection Society
FTB	Commonwealth Forestry and Timber Bureau
GATT	General Agreement on Tariffs and Trade
GDP	gross domestic product
ha	hectare
IFA	Institute of Foresters of Australia
INFORM	integrated forest model
MAI	mean annual increment
mm	millimetres
m^3	cubic metre
MDF	medium density fibreboard
na	not available
NAFI	National Association of Forest Industries
NFF	National Farmers Federation
NFI	National Forest Inventory
NFPS	National Forest Policy Statement
NPI	National Plantation Inventory
nr	not reported
NSW	New South Wales
NT	Northern Territory
NZ	New Zealand
pa	per annum
PPMFA	Pulp and Paper Manufacturers Federation of Australia
PTAA	Plantation Timber Association of Australia
Qld	Queensland
RAC	Resource Assessment Commission
RFA	Regional Forest Agreement
RMIT	Royal Melbourne Institute of Technology (now RMIT University)
SA	South Australia
SAPFOR	South Australia Perpetual Forest (now Auspine Ltd)
Tas	Tasmania
TWS	The Wilderness Society
UNESCO	United Nations Educational, Scientific and Cultural Organisation
UNFCCC	United Nations Framework Convention on Climate Change
USA	United States of America
Vic	Victoria
VPC	Victorian Plantation Corporation
WA	Western Australia

Glossary

Afforestation	planting trees on unforested land – in Australia often incorrectly used to mean clearing native forests to plant tree crops.
Agriculture	cultivating land and rearing crops and livestock – farming.
Bone dry tonne	(for woodchips) a standard measure of the weight of oven dry woodchips.
Bone dry unit	(for woodchips) equals 2 400 pounds or 1.0886 bone dry tonnes.
Chiplog	logs that are below sawlog quality but can be chipped usually for pulp or wood-based panels. Sometimes referred to as pulplogs or pulpwood.
Commodity	reasonably standardised product competing primarily on price.
Ecological integrity	of an ecosystem is reliant on the maintenance of ecological and evolutionary processes that underpin ecosystem function and support biological diversity. Threats to the biological composition and structure and function of an ecosystem threatens its ecological integrity.
Forest	wooded area with a thick growth of trees – includes plantations and native forests.
Forest agency	that part of the State Government agency with specific responsibility for managing public native forests or plantations for wood production.
Free on board	the price of exported product excluding customs, insurance and freight costs.
Green tonne	(for wood and woodchips) a standard measure of the weight before drying.

Hardwood	wood from flowering trees (angiosperms) includes eucalypts, wattles, poplar, most rainforest species, oaks, birches, etc. Also referred to as broadleaves. Many hardwoods can be physically soft.
Industrial wood	wood used to make the industrial wood products sawn timber, sleepers, veneer, plywood, wood-based panels, pulp, poles and posts. Includes sawlogs, veneer logs and chiplogs but excludes wood used for fuel and charcoal.
Kraft pulp	wood-based pulp made using a chemical (principally sodium hydoxide and sodium sulphide) pulping process.
Log equivalent	see roundwood equivalent.
Mean annual increment	the average annual increase in wood volume for a specified growing period (usually a crop rotation) recorded as m^3 per hectare per annum.
Multiple use	(of native forests) means the management of native forests for a variety of uses. In Australia, multiple use native forest areas allow wood production.
National Estate	those parts of Australia's natural and cultural environment listed on the Register of the National Estate for their aesthetic, historic, scientific or social significance or other special value.
Native forest	forests with trees predominantly native to the locality and where natural regenerative processes operate either fully or in part for the recovery of canopy structure following natural or artificial disturbance.
Old-growth native forest	native forest that is ecologically mature where the effect of any human land use activity is now negligible.
Particleboard	reconstituted wood-based panel made by compressing wood particles (such as shavings, sawdust and chips) and resin at high temperature.
Plantation	trees planted and managed in an agricultural context primarily for wood production.
Plywood	wood panel made by gluing and compressing veneer.
Public interest	as in policy making for the public good, taking a disinterested, long term and wide perspective. The tools

	of deliberative democracy can assist in establishing the public interest on specific issues.
Pulplog	see chiplog.
Regional forest agreement	an agreement between the Commonwealth and State Government about the long-term use and management of forests in a defined region.
Regrowth native forest	native forest dominated by early stages of succession following natural or artificial disturbance.
Rotation length	time taken from planting until the final crop (sawlog or chiplog) is harvested.
Roundwood equivalent	volume of wood in log form required to produce the wood product.
Sawlogs	logs suitable for processing into sawn timber and veneer. Can be used for other products including sleepers and chips depending usually on market conditions.
Sawmill residues	residues from the manufacturing of sawn timber from sawlogs. Includes slabs and edges, sawdust, fines and shavings. In this thesis sawmill residues refer to slabs and edges used for chip production.
Sawn timber	construction and other material produced by sawing wood.
Silviculture	the growing and tending of trees.
Sawlog stockpile	volume of sawlogs in plantations past their commercial clearfell harvest age.
Softwood	wood from trees with exposed seeds (gymnosperms) includes pines, cypresses and other conifers. The wood is usually softer than hardwoods but there are many exceptions.
Stakeholder	groups or individuals whose participation in the policy processes is governed by a self-interested stake in the outcome or who through participation define themselves as an interest group.

Stumpage	price paid for logs still standing – excludes cost of logging and transporting to mill or port.
Timber	variously refers to wood and sawn timber and for clarity is best avoided.
Unprocessed wood	logs, woodchips and other wood particles.
Value added	the net $ value of economic production by a firm - i.e. the difference between a firm's total value of production and the cost of all material inputs and purchased services that it uses. The extent of kiln drying is sometimes used as a proxy for value adding in Australia's native forest sawn timber industry, although value added declines if the additional costs of processing past the green sawn timber stage are not offset by increased revenue.
Veneer	thin layer of wood obtained by peeling or slicing logs.
Wood	fibre under the bark of trees.
Wood-based panels	products made by compressing and gluing particles or pieces of wood, e.g. medium density fibreboard, particleboard, hardboard and oriented strand board.
Wood panels	veneer sheets, plywood and wood-based panels.
Wood products	products manufactured from wood - consistent with the United Nations FAO definition of industrial wood products. Includes sawn timber, plywood, wood-based panels, pulp and paper. Excludes fuel wood and charcoal.

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