



Managing tropical forest for Indonesian Papuan's livelihood

Freddy Pattiselanno and Agustina Y.S. Arobaya

School of Marine and Tropical Biology, James Cook University, Cairns,
Queensland 4870, Australia

Universitas Negeri Papua, Manokwari, West Papua, Indonesia

Email: freddy.pattiselanno@my.jcu.edu.au

Abstract

Indonesia's Papua or New Guinea encompasses 404,600 sq km or about 42 million hectares, of which 80% is tropical forest. Many people in Papua rely on benefits from plants and animals from the tropical forests. Gathering and hunting activities to obtain food and collect ceremonial materials also play important roles in traditional cultural life. Forests also provide vital capital for the government through timber concessions. Along with provincial development, dependence on extraction and agricultural industries leads to unsustainable use of forest resources. Conversion, degradation and fragmentation threaten the integrity of Papua's forested ecosystem. What should be done? Limiting forest conversion by regulating extraction and agricultural industries should be among the highest priorities, whilst conserving large road-less areas of intact forest should generally be maximised. Managing timber and mining operations to reduce deforestation and forest degradation should also be considered. Environmental impact assessments (EIA) must be taken seriously. It is urgent that local government agencies improve their overall coordination of development planning. Furthermore, implementation of relevant regulations and strengthened law enforcement is needed to encourage better practices by extraction industries such as logging and mining.

Keywords: forest management; sustainability; biodiversity; development assistance; Papua

Papua: centre of biodiversity and cultural diversity

Indonesia's Papua and West Papua provinces on the island of New Guinea encompass 404,600 sq km or about 42 million hectares (Baplan 2002), of which 80% is tropical forest. Throughout this paper, the one term 'Papua' is used to represent both the provinces of Papua and West Papua. It is currently considered an area of global priority for biodiversity conservation due, in part, to the species-rich forest environment for the Australopapuan fauna as well as many uniquely New Guinean species (Robbins 1971 mentioned in McPhee 1988). It represents one of the highest levels of flora and fauna diversity and endemism in Indonesia: 15,000–20,00 plants, 146 mammals, 329 reptiles and amphibians and 650 birds inhabit the diverse ecosystems of Papua. The 1125 animal species comprise more than 50% of Indonesia's terrestrial vertebrate fauna biodiversity (Conservation International 1999).

Only 13.5 million people live in this extensive area, or about 1.5% of the total of Indonesia's population. Despite this relatively small population, Papua has a much greater diversity of ethnicities and cultures than any other Indonesian province. Mansoben (2007) suggested that about 269 living local languages are spoken in Papua, providing group identity as well as a means of communication. Each ethnic group has its own way of using forest resources, and different species are used to maintain local livelihoods. Papua is the province with the lowest human population density in Indonesia (5 per sq km); more than 70% of the population live in rural areas (BPS Papua 2002). This circumstance, together with environmental factors, have kept people relatively healthy compared to those in other areas of Southeast Asia (Burke et al. 2011).

Forests and the benefits they provide in the form of food, income and watershed protection have an important and often critical role in enabling people around the world to secure a stable and adequate

food supply. Tropical forests are located in the areas of the world with the highest concentration of food-insecure people. They are home to about 300 million people who depend on shifting cultivation, hunting and gathering to survive (Gillman and Hart 1996); many are at risk of not consuming enough food to meet their daily energy requirement on a chronic, transitory or seasonal basis. In addition to these forest inhabitants, millions of people living adjacent to forest areas depend on forests for some aspect of their food security.

Native Papuans and forests

Sastrapradja and Rivai (1989) indicated that of 4000 plant species currently directly used by people in Indonesia, around one-quarter were cultivated. Several studies in Papua indicate that using wild plants is common among ethnic groups there.

In Dabra, Mamberamo, nine species have been identified as being used as construction material (for houses and fences), with two also used as fuel wood. Particular species distributed fairly widely throughout the Papua region that were commonly used for building material and acknowledged as being of high quality include *Octomeles sumatrana*, *Terminalia complanata*, *Podocarpus blumei* and *Intsia bijuga*. The studies of Arobaya and Pattiselanno (2007a) and Peday (2004) found seven species around the highland site of Baliem Valley used by the Dani ethnic group, such as *Podocarpus papuana* for inside wall panels, while outside parts were constructed from *Araucaria cunninghamii*, *Paraserianthes* and other hardwood species found specifically at the upland site. People along the coast use mangroves (*Sonneratia alba* and *Xerriops tagal*) for house construction and fuel wood (Aibekob et al. 2002; Mamoribo et al. 2003).

Certain parts of species that are mostly used for construction (branches and small stems) can also be used for fuel wood. In this study we noted only four species that have been used for fuel wood. Fruit and leaves of two among the four species mentioned earlier were also used for other purposes (food and wrap material). The Dani tribe of the Baliem Valley used about 17 plant species for fuel wood (Arobaya and Pattiselanno 2007b). Peday (2004) found other tree species that have been used as fuel wood by the Dani ethnic group at upland Jayawijaya.

People along the coast benefit from mangrove species that are abundant there, like local communities at Supiori Selatan in Biak Numfor (Mamoribo et al. 2003). Similarly, the Inanwatan of Sorong used certain mangrove species, for example *Ceriops decandra*, *Avicennia* sp., *Rhizophora* sp. and *Sonneratia* sp. as fuel wood (Prayitno et al. 2002). The Senebuay of Rumberpon Island use eight mangrove species for fuel wood and medicine (Leonard et al. 2003).

Rifai (1986) recognised around 329 fruit species including endemic and introduced species in Indonesia, and Uji (2007) compiled a list of about 266 indigenous fruit species with potential in Indonesia from various studies. Using forest sources for staple food like tubers has been practiced for a long time. Tuber crops are a carbohydrate resource; in undeveloped and dry areas like Nusa Tenggara and Maluku, tubers are being substituted with corn and sago (Sastrapradja and Rifai 1989). In Dabra, Mamberamo, 19 native plant species are consumed as edible fruit and vegetable. Some species are commonly used throughout Indonesia, such as banana, cacao, citrus, pineapple, papaya and coconut, while others are locally consumed and used by certain ethnic group occupying the eastern part of Indonesia—for example, *Colocasia*, *Xanthosoma*, sago, canary, beetle nut and piper.

The study of Worabai et al. (2001) found twenty-four plant species used as food sources by the Wondama tribe at Wasior. Uniquely, local communities in Biak and Inanwatan Papua, particularly those who inhabit coastal sites, use mangrove (*Bruguiera gymnorhiza*) as a carbohydrate source for their households (Prayitno et al. 2002; Wanma 2007).

Findings obtained from other studies in Papua showed that local communities were still dependent on medicinal product from particular forest sources (Suebu et al. 2002; Hamzah et al. 2003; Howay et al. 2003). Arobaya and Pattiselanno (2007b) found three species used together as therapeutic items, spice, and edible fruit at Dabra, Mamberamo, while a limited range of species are used as pharmaceuticals by the Dani tribe in Baliem Valley (Arobaya and Pattiselanno 2007a).

Using plants for ornamental purposes has an important role among ethnic groups in Papua because local people were dependent on natural resources (plants and animals) for their traditional ritual and cultural ceremonies. During a survey, seven species were identified in use by the Dasigo for ornamental reasons (Arobaya and Pattiselanno 2007a). The Dani ethnic group used about nine plant species for socio-cultural purposes. People around the coastal site of the Bird Head Area were more dependent on mangrove species (Leonard et al. 2003). Two palm species are commonly used for culture and ritual activities by local communities in the lowland forest of Bayeda, Arguni Bay (Nega et al. 2003).

Though modern medicine is currently provided, native Papuans still rely on traditional medicine. Different studies in parts of Papua indicated that traditional medicines are still in use on Mansinam Island, Manokwari, where 25 medicinal plant species have been identified. Similarly, the Wie-khaya tribe in Arso, Jayapura, use 41 plant species for traditional medicine (Suebu et al. 2002). In Sorong, the Maybrat ethnic group uses 40 plant species (30 families) in their daily life (Howay et al. 2003).

Many people in West Papua rely on benefits obtained from the extraction of plants and animals from the tropical forests. Currently, limited access to domesticated meat and the easy availability of wild meat from the forest are major reasons for those who live in remote areas participating in hunting, which together with gathering plant material, also plays an important role in their traditional cultural life. For instance, some bird species are hunted for both meat and for their colorful plumes for traditional costume decoration (McKinnon 1984; Beehler 1985; Petocz 1994).

Decisions to hunt or trade wildlife depend on both nutritional and economic factors. Opportunities for free food from nature and an alternative income for low-income farmers often drive people to hunt. In Papua, for example, geographic barriers are a problem for the livestock distribution program of the government. Local people therefore take advantage of the copious wildlife sources accessible in the forest for their dietary protein.

Apart from cultural preferences for particular species, using particular species for food has also been important for native Papuans even in modern Papua. Hunting of bower birds by the highland Kebar people is traditionally done seasonally during the mating period of the birds (Sokoy 2004). In Waropen, crowned pigeon, *Goura victoria*, are hunted for food using snare, bow and arrow, and net (Sada 2005). Traditional techniques are also used in cuscus (*Phalangeridae*) hunting at Arui village by a combination of using stick, blade, and felling cover and food trees (Rumpaidus 2005). Similarly, Iyai (2002) found the blade, spear, bow and arrow, as well as 'dodeso' (hand-made rope snare) are used in hunting monitor lizards in Napan. Consumption of monitor lizard meat is common among the people of Warkapi too (Homer 2004).

Emerging threats to biodiversity

Papua is not only rich in renewable natural resources but also in crude oil, gas and minerals such as gold, copper and nickel (Mangubhai et al. 2012). In Papua, land conversion including extractive industries such mining operations, forest concessions and agricultural plantations (oil palm, cacao and coffee) is tending to increase over time. The development of the forestry sector is reflected in an increase in forest concession operations. There are 74 forest concessions registered and 16 of them are classified as non-active concessions, yet data compiled by Conservation International in the Rapid Assessment of Conservation and Economy (RACE) indicate that about 52,000 ha of forest were annually cleared in Papua (Anggraeni and Watopa 2004). Forestry exports are a vital source of income to developing countries worth US\$39 billion in 2006 (Miles and Kapos 2008); Southeast Asia has been prominent in this respect, with Indonesia, Malaysia and the Philippines together exporting more than 80% of all tropical timber during the latter decades of the twentieth century (Johns 1997).

Deforestation and coastal development have escalated over the last 10 years but are yet unmeasured. Logging and road construction cause the loss of mangroves. Although an estimated 85% of Papua is covered by intact forests (GRM International 2009), most of the lowland forests have been designated for logging and agriculture (Mangubhai et al. 2012).

The expansion of commercial plantations increased sharply from 1993 to 1998. In particular, between 1995 and 1996, they rose from 12,668 ha to 33,600 ha per year or more than 16.5%. Over a six year

period, an average growth of commercial plantations reached about 8200 ha/year. In 1998, the plantation area in Papua was about 128,183 ha, but operational licenses issued covered 1,263,742 ha, of which 84% was for oil palm plantations (Anggraeni and Watopa 2004).

Land conversion including extractive industries such as mining, forest concessions and agricultural plantations (oil palm, cacao and coffee) has tended to increase over time as a result of efforts to boost the West Papuan economy. The Indonesian government has a commitment to establish 5.6 million ha of oil palm plantations over the next decade to supply the global demands for biofuels (GRM International 2009). About 50–60% of the Gross National Domestic Product (PDRB) of West Papua is derived from mining, oil and natural gas. The high dependency of the local government on the extractive industries sometimes results in neglect of their negative impact on the environment.

In addition to land conversion, spatial analysis shows that new road connection will reach 2700 km; about 25% of protected areas in Papua are located less than 20 km from established roads (Anggraeni and Watopa 2004). Once roads are established, new entry points are created and provide more opportunities to access remote forest areas. Currently, road development is the highest priority of local government of West Papua, although its negative impact has not been anticipated.

Protecting forests for future Papua

Human activities are highly variable in their influence on the components and attributes of biodiversity. Any human activity that results in substantial resource extraction or modification will always entail significant, often unknown and almost always unappreciated consequences for one or more biodiversity components, primarily by re-directing matter and energy flows. This cumulative redirection is enormous at the planetary scale (Vitousek et al. 1997), as the following three examples illustrate: (1) Vitousek et al. (1986) calculated that 40% of the Earth's terrestrial primary productivity was being appropriated by humans; (2) Roberts (1997) estimates that 25–35% of the primary productivity of continental shelf marine ecosystems is consumed by humans; and (3) Postel et al. (1996) report that humans now appropriate 26% of total evapotranspiration and use 54% of all runoff in rivers, lakes, and other accessible sources of water. As W.E. Rees has said 'in effect, thermodynamic law dictates that all material economic 'production' is really consumption, and in this simple reality lies the root of our environmental crisis.'

Limiting forest conversion

Broadly, forest conversion can be thought of as the enemy of forest sustainability. Although essential in many cases for human activity and economic development, uncontrolled or poorly planned conversion can result in irreparable damage to or destruction of forests. Most significant forces for conversion of forest in Indonesia are largely exogenous to the forestry sector per se: oil palm and cocoa projects, livelihood-based agriculture and transmigration (The World Bank 1998).

The Government of Indonesia's forest moratorium policy was implemented in relation to the allocation of forested land for conversion to oil palm and other agro-industrial crops in late 1998. This moratorium should be maintained at least until detailed surveys have been carried out to determine whether appropriate non-forested areas are available for such projects and until existing legal claims on such lands have been resolved (Barr 2001).

The immediate effects of a logging operation in a primary tropical forest consist of significant alterations to the physical structure of the forest (Bawa and Seidler 1997). Structural alterations may affect biodiversity values in a wide variety of ways. Logging disturbance typically results in a landscape of patchily distributed areas characterised by different degrees of canopy opening (Cannon et al. 1994).

Maintaining large roadless areas

Roads are considered a major contributor to habitat fragmentation because they divide large landscapes into smaller patches and convert the interior habitat into an edge habitat. Human development brings with it an increase in the number of roads to fulfil transportation needs, but this rise has costly implications for nature. Why are roads so bad for rainforests?

First, from a biological perspective, rainforests maintain species that rely on forest-interior and understorey conditions that are susceptible to the environmental changes associated with roads and clearings. Second, from a socioeconomic perspective, 'almost-developed' nations experience rapid economic development and intense natural-resource exploitation that provide an economic impetus for the expansion of roads and infrastructure.

Hence roads are rainforest-killers that directly eradicate a myriad of species within and around them. The expansion of roads not only leads to increasing loss of forests at a rate of 50 football-fields a minute, but it also spews billions of tons of greenhouse gases into the atmosphere each year. Scientific evidence shows that roadless areas are critical in maintaining biodiversity, ecosystem processes, connectivity and overall ecosystem integrity.

Large, well connected patches of forest increase landscape connectivity and complement the network of protected areas (e.g. Loucks et al. 2003; Crist et al. 2005). Roadless areas sustain important elements of ecosystem integrity, such as the ability of species to move and natural processes to function. They largely contribute to the preservation of native biodiversity and contain more species and individuals, species with large spatial requirements (e.g. top carnivores), and species sensitive to human disturbance (Blake et al. 2008; Chen and Roberts 2008). They have the potential to ensure sufficient habitat for viable populations of species of conservation concern, as well as to increase the representation of rare ecological communities (Loucks et al. 2003; Crist et al. 2005).

They serve as a barrier against pests, diseases (of wildlife, livestock and humans, e.g. the Lyme disease) and invasive species (Strittholt and DellaSala 2001; Gelbard and Harrison 2003; Holdsworth et al. 2007; von der Lippe and Kowarik 2007). They ensure crop pollination, air quality, water supply and erosion control. It is in these large areas of unfragmented land that ecosystem services, vital for human societies, are rendered (Millennium Ecosystem Assessment 2005).

Roadless and low-traffic areas are of special importance in the context of climate change because they are more resilient than areas more fragmented by roads, and because they have a vast buffering capacity (McGarigal et al. 2001). Their ecosystem dynamics are still internally driven, as opposite to the dynamics of fragmented patches, which are predominantly driven by external forces (Saunders et al. 1991). Ecosystems already fragmented and stressed by human activities will be more vulnerable to climatic threats, while large intact areas better resist and recover from climate change impacts (Laurance and Williamson 2001; Opdam and Wascher 2004).

Managing timber and mining operations

Over the last 15 years the policy dialogue in Indonesia's forestry sector has been dominated by proposal to reform the HPH – Forest Exploitation Right related to timber concession system. The central aim of this reform has been to reduce Indonesia's aggregate timber extraction rates to supposedly sustainable level of 25 million cu m per year. Indeed, the government has to enforce its selective cutting guidelines to increase its capture of timber resource rents; and to encourage market-based efficiency in log-harvesting, processing, and trade (Barr 2001). Furthermore, the implementation of relevant regulations and strengthened law enforcement is needed to encourage better practices by extraction industries such as logging and mining.

The most controversial mine in Eastern Indonesia, owned by Freeport Indonesia, is responsible for the discharge of 125,000 tonnes/day of mine tailings into the Ajkwa River (Brunskill et al. 2004), and associated environmental damage. In fact, mining companies operate without proper control of excavation run-off and with little or no social responsibility (Mangubhai et al. 2012). Government policies are being revised to encourage the rapid expansion of oil and gas exploration and production throughout the Indonesian archipelago.

Potential impacts from unregulated seismic surveys (without public consultations or adherence to international standards) include disturbance to migratory species such as cetaceans and turtles which become displaced (McCauley et al. 2000), lethal and sub-lethal effects on adult fish, fish larvae or fish eggs (Hirst and Rodhouse 2000), and negative impacts on community fisheries (Hirst and Rodhouse 2000).

Improving environment impact assessment (EIA)

EIA is now practised in more than 100 countries world-wide (Donnelly et al. 1998); there are huge differences in EIA systems. Despite this variation, on the whole EIA in developing countries tends to be very different from EIA in the developed world. The most conspicuous difference relates to the fact that the first EIAs to be carried out in developing countries were usually demanded by development assistance agencies on a project-by-project basis, not as a response to a widespread indigenous demand for better environmental protection. However, Lohani et al. (1997) noted that the emergence of the sustainable development agenda was also an influential factor in the development of some Asian EIA systems.

There are now many examples of EIA being undertaken in developing countries, by no means all as a result of donor agency pressure such as in Indonesia (Boyle 1998). Kennedy (1999) concluded that essential requirements of best-practice EIA include specific legal provisions, preparation of environmental impact statements, and accountability of authorities to take results into consideration in decision-making.

Legislation is the essential pre-cursor to an effective EIA system (Wood 2002) however the legal basis of EIA systems in many developing countries may be weak, non-mandatory or non-existent. A common weakness of legal provisions for EIA in developing countries is that they are often expected, unrealistically, to resolve environmental problems resulting from the absence of, or shortcomings in, environmental planning and pollution control systems.

The organisations responsible for implementing EIA provisions in developing countries are frequently new, lacking in status and political clout, and working in a culture where an absence of information-sharing considerably reduces their influence. Environment ministries are often 'bypassed' by other, more powerful, ministries. This lack of organisational capacity explains why EIA largely remains a 'top-down' requirement imposed by external agencies (Rayner 1993).

Coordination for development planning and strengthening law enforcement

Indonesia has more than 100 national laws and regulations related to management of natural resources in various ecosystems. However, a lack of capacity, coordination and understanding of the essence of relevant laws by local government officials to some extent hinders the enforcement of the law.

Furthermore, in terms of coordination, as many as 34 ministries and agencies in Indonesia have, to some degree, the function of managing nature conservation among their tasks. Therefore, the problems of overlapping, uncoordinated and sectoral interests are very prominent in discussing nature conservation in Indonesia.

It is particularly urgent that local government agencies improve their overall coordination in order to provide the more efficient counselling, increased monitoring and strengthened law enforcement needed to encourage better mining practices. Periodic monitoring is important to ensure that contractors comply with commitments to minimise environmental impact. Such monitoring can also improve working conditions for employees and fulfil their social responsibility. Sanctions over substandard compliancy need to be implemented as a disincentive for poor performance.

Local governments need to work shoulder-to-shoulder and make the best use of local stakeholders' assets and expertise. Doing so will not only improve accountability, transparency and legitimacy of the approaches taken but will also fill in for the lack of competency of local authorities. Provincial governments can institutionalise stakeholder participation by establishing a formal independent body from which district governments can expect strategic feedback, as well as channelling corporate social responsibility funds or other capacity-building incentives.

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An Australian abroad: one year in Viet Nam and perceptions of forest policy, implementation and the challenges

John D. Kellas¹ and Pham Duc Chien²

¹Mount Gambier, SA 5290, Australia

Email: jdkellas1@gmail.com

²Vietnamese Academy of Forest Sciences, Hanoi, Vietnam

Summary

A year's volunteering under the Australian Volunteers for International Development at the Forest Science Institute of Viet Nam (FSIV) gives one an interesting view of life in another country.

Following prolonged exploitation and degradation, Viet Nam has rapidly re-established tree cover, from about 27% in 1990 to nearly 40% in 2011, through a number of programs, some with international assistance. At 2011, the forest estate comprised 10.3 million ha of natural forest and 3.2 million ha of plantations.

Under the Forestry Development Strategy (2006–2020) which aspires to increase tree cover to 47% by 2020, annual harvesting in the natural forest is limited to 200,000 m³ (MARD 2010), while plantation production was about 4.49 million m³ (GSO 2012), such that Viet Nam has become the world's largest exporter of hardwood woodchips.

Many rural people and ethnic minorities live in or near the forest and utilise timber and non-timber forest products. Reforestation programs have involved these local communities in employment, training and capacity-building to reduce levels of poverty.

Climate-change scenarios predict serious inundation, storm damage and salinisation of the main food-producing areas on the Red and Mekong River deltas, and also the conversion of forests to agriculture, undoing the recent gains in tree cover and further threatening an already-diminished biodiversity.

Forest management is being progressively devolved to commercial enterprises and local communities. However, supporting regulations and guidelines inevitably lag behind the associated legislation or decrees, leading to a poor communication of responsibilities—a state of affairs which has the potential to convert forested land to agriculture.

A review of the first five years of the Forestry Development Strategy has identified some barriers to the strategy's implementation and has suggested a reduction in targets to those that are achievable in a wider context (MARD 2010).

Introduction

One of us (JDK) was a volunteer forestry advisor at the Forest Science Institute of Vietnam (FSIV) (now the Vietnamese Academy of Forest Science, VAFS) from August 2011 to August 2012 under the Australian Volunteers for International Development. The other is manager and liaison officer for international relations for VAFS.

Vietnam, located on the Indochina Peninsula between latitudes 8° and 24°N and longitudes 102° to 110°E, is well known to Australians, and Australian foresters are well known in Viet Nam.

The country has a land area of about 33.1 million ha, with neighbours China, Laos and Cambodia to the north and west and the East Sea (also known as the South China Sea) to the east. The terrain is split between highlands (about 75% of area) and major river deltas, with total tree cover being about 40% (Fig. 1).

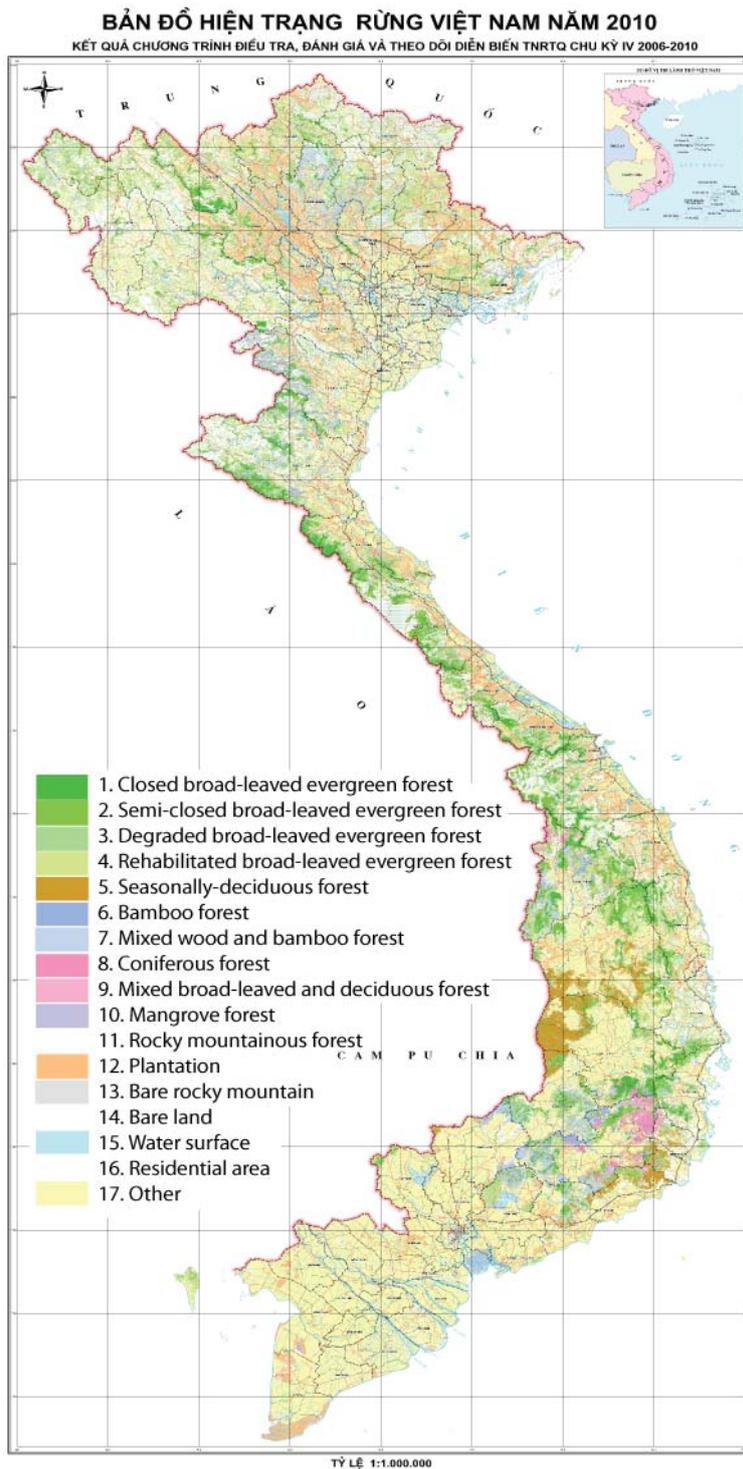


Figure 1. Tree cover in Vietnam, 2010 (MARD 2012)

Indonesian flora, so has a great number of plant species that formerly covered about 75% of Vietnam, predominantly in a hilly and mountainous landscape (Chien 2006). However, Vietnam's forests have long been exploited for their timber and non-timber forest products to such an extent that many species are listed in the IUCN and Vietnam Red Books as threatened or endangered, and about 150 species are critically endangered or vulnerable (IUCN 2011).

In addition, with large areas on the Red and Mekong River deltas, Vietnam faces serious challenges from climate change. These low-lying areas will increasingly be threatened by storm surges, salt intrusion and general flooding.

With a population of about 90 million, there is considerable pressure on land for agriculture, on forests for timber and non-timber forest products and on waterways for aquaculture. Thus resource use is at a premium for a country that has about 4.3% of the area and a population four times that of Australia.

Climatically Viet Nam, while in the tropics, has three zones: the Northern zone with four distinct seasons, including a cold winter as a consequence of the winter monsoon which is effectively influenced by the cold Siberian winds crossing China and circulating off the East Sea; the Middle zone being a mix of the Northern and Southern zones but with the rains coming later, between August and November; and the Southern zone which has high temperatures all year and a wet season that produces 90% of the total annual rainfall. The climates of mountainous regions are modified by altitude.

Floristically Vietnam is represented by Himalaya–Yunnan–Guizhou, Indo–Myanmar and Malaysia–

Ethnically Viet Nam consists of 54 groups, with the main group, the Viet or Kinh making up 86%; the other groups (about 12 million) predominantly live in the hilly and mountainous regions, at or near the poverty line and often depending on the forests for their livelihood.

Economically Viet Nam has advanced to ‘middle income’ status, with an average GDP per person of about US\$1400 (World Bank 2012), through developing its agricultural and manufacturing industries and through other resource development. Viet Nam is amongst the largest exporters of rice, coffee, rubber, pepper, tea and seafood. Production, however, tends to be dominated by quantity rather than quality, and there is often no onshore value-adding.

GDP has increased rapidly, averaging 6.6% per annum since 2000, and forestry is estimated to contribute 3–4% to national GDP (MARD 2010). An estimated 25 million Vietnamese, including most of the ethnic minorities, rely to some extent on forests for their existence and survival (GoV 2005). It can be inferred that there has been a flow-on of employment and business opportunities from the more prosperous areas to those working in and near the forests, helping to lift these communities out of poverty.

Forest history

During and since the colonial period, selective and destructive harvesting combined with prolonged periods of conflict reduced the total forest cover of Viet Nam from about 43% in the 1940s (MARD 2010 and 2012) to about 27% by 1990 (MARD 2008; FAO 2009) (Fig. 2). Nghia (2000) and Chien (2006) have documented the consequences of these activities for plant biodiversity and potential species loss, the result being degraded forests and the creation of unproductive grasslands. In addition, the traditional users of the forest have practised shifting cultivation for their living and survival. With a declining forest area, the cycle time of cultivation becomes reduced, further degrading the remaining forest area.

The overall impact of these changes in vegetative cover has been an increase in soil erosion, siltation of water catchments, declining agricultural productivity and increased poverty.

Revegetation/rehabilitation/reforestation

Dramatic changes in forest cover have occurred over the past several decades with international, national and community involvement.

Viet Nam, in conjunction with international agencies, developed policies and programs to reforest cleared/bared areas (mostly grass and scrublands), to enhance remnant native forests by inter-planting with both endemic and exotic species, and to establish new commercial-scale plantations. These programs have provided employment and training for local people, particularly the ethnic minorities, to assist in moving them out of poverty.

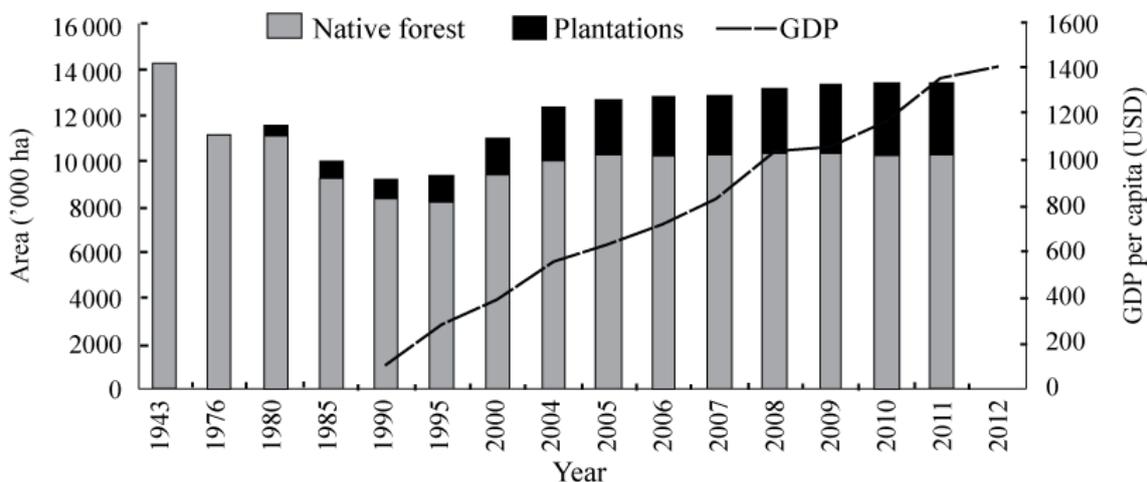


Figure 2. Changes in forest cover 1943–2011 and GDP 1990–2012, Viet Nam

Beginning in the 1950s, the *Scattered Tree Planting* program commenced in the North and became the annual Tet Tree Planting Festival in 1959, with widespread participation by the community. It is estimated that up to four billion trees were planted under the program (de Jong *et al.* 2006).

The first major international involvement was the *World Food Program* (1975–2000). WFP invested about US\$500 million in Viet Nam, with US\$160 million being dedicated to a range of forestry programs, sometimes in conjunction with other international donors, to develop 450,000 ha for commercial plantations and infrastructure that involved local community participation. In addition, the Vietnamese government devolved land ownership from the Central Government to the communes and communities to encourage farmers to develop and manage their own forests (de Jong *et al.* 2006).

Often the first stage, especially for degraded and bared areas, was the introduction of exotic species of *Eucalyptus* and *Acacia* from Australia and/or Papua New Guinea. These initial programs, involving the WFP, incorporated Australian input via CSIRO and the Australian Tree Seed Centre. Extensive areas of these exotics were established, effectively re-foresting over one million ha by 1995 (MARD 2010). Close co-operation between Australian organisations and the Vietnamese Academy of Forest Sciences (VAFS) has developed new approved genetic lines, including hybrids, better suited to Vietnam's environment.

This program provided the local communities with skills and training in forestry management, employment and new business opportunities, and encouraged the adoption of agroforestry within the farming sector. While there has been some criticism about the concentration on planting *Eucalyptus camaldulensis*, considerable collaboration with Australian researchers and VAFS has led to the introduction of several *Acacia* species and the still-continuing development of more productive *Acacia* hybrids suited to local climates, soils and nutrition, silviculture and potential markets.

The *Greening the Barren Hills Program* (1992–1997) was a wide-ranging environmental program that afforested open land and barren hills, protected and enhanced existing forests (including plantations), and improved protection of vulnerable landscapes, especially in the highlands. From 1995 the program re-focussed on protecting critical watersheds, with an emphasis on special use and protection in preference to production forestry, especially in the Northern and Central Highlands.

The achievements of this program, which also involved devolution of land management (and ownership) to the community, have been uneven (de Jong *et al.* 2006). Certainly considerable areas have been forested or enhanced, new farming practices have been introduced, new species trialled and endemic species also used, but management and productivity were often less than optimal.

These two programs have also provided employment opportunities for local communities and opportunities to develop skills and start small forestry enterprises for the future management of community forests. Most importantly, these programs reduced the level of poverty amongst rural people.

The next program was the *Five Million Hectare Reforestation Project* (1998–2010) with the objective of reforesting 5 million ha, including 2 million ha of special-use and protection forest, to increase timber supply (including firewood), and to provide employment to alleviate poverty and hunger in the rural mountainous areas.

Interestingly, the production forestry component was to be on a commercial footing and not reliant on government subsidies. At the conclusion of the program a reported 5.6 million ha had been reforested (MARD 2010) and poverty had been reduced.

With the maturation of these programs exotic species are being progressively replaced or interplanted with local species to simulate 'natural' forests and encourage a return of the former biodiversity. However, the range of species used is often small compared to the original species composition because of scarcity of propagation material and silvicultural challenges.

Viet Nam Forestry Development Strategy (2006–2020)

The Viet Nam Forestry Development Strategy (2006–2020) (GoV 2007) was released in 2007 following the Prime Minister's decision 18/2007QS-TTg. It has the following objectives:

- sustainably establish, manage, protect, develop and use 16.24 million ha of land planned for forestry
- increase the ratio of land with forest up to 42–43% by the year 2010 and 47% by 2020
- ensure wider participation from various economic sectors and social organisations in forest development
- increase the contribution of forestry to socioeconomic development, environmental protection, biodiversity conservation, and the supply of environmental services
- reduce poverty and improve the livelihoods of rural mountainous people
- contribute to national defence and security.

The overall target was to increase forest cover to 47% by 2020. The strategy basically gave the government's imprimatur to continued implementation of sustainable forest management incorporating economic, social and environmental considerations together with forest protection, biodiversity conservation, environmental services, research, education, value-adding of forest products, trade, policy, planning and monitoring (MARD 2010).

Subsequently the Viet Nam Forestry Research Strategy to 2020 (MARD 2008) was released. As an aside, the National Climate Change Strategy (GoV 2011) (Prime Minister's decision 2139/QD-TTg) was released in 2011. Strategies and policies are regularly released by the government, but one of the problems is that the supporting legislation and regulations can be released a considerable time after the Prime Minister's decision, resulting in varied interpretations and applications of new policies at a provincial, district, commune and local community level.

The overall objective of the Research Strategy was:

Contribute to and orient forestry sector development; effectively implement the forest development strategy and master plan of agriculture research in Viet Nam towards 2020; meet the requirement of industrialization and modernization, and rural area development in Viet Nam till year 2020.

Specific objectives were:

- Orientation for forestry sector development: to form the scientific foundation for forestry sector development with full participation of the whole society, and for promotion of forestry related capacity of commodity and environmental services.
- Meet the target for forest production and biodiversity conservation: to improve research effectiveness, closely link scientific research with practical demands of production, increase the contribution by science to sector development to reach the following targets:
 - increase the natural forest yield by 1.5 times for tree species with high economic value
 - develop production plantations focusing on key tree species of high and sustainable productivity (increasing yield by 1.5–2 times)
 - maintain and promote the protection function of various types of forests, especially watershed protection forests and coastal forests
 - conserve, develop and utilise various sources of biodiversity, genetic resources of forest trees in a sustainable manner, and especially non-timber forest products (NTFP)
 - improve the technology used for exploitation activities to ensure minimal disturbance on natural forests, develop timber processing technology at the small and medium scale, and diversify raw material sources.
- Strengthen research capacity and improve the organisational system, combining research with training, develop human resources, promote international cooperation to enable forest technology to develop at the same level with that of other regional countries. The set targets for research include:
 - an effective and appropriate organisational system; a close relationship is to be established between research, training and extension
 - researchers are trained so that they will be capable of meeting practical demands and international integration, leading staff of the forestry sector are qualified and work based upon the results and experience obtained so far
 - provision of infrastructure and modern equipment and facilities in service for research are to be in line with the real situation of regional countries

- develop a reliable system of information, technology and database in service of research and application of forestry research results into practice.

From a climate change perspective, Viet Nam is predicted to be one of the most-affected countries, with the Mekong River Delta being one of three most vulnerable deltas in the world, together with the Nile and the Ganges. The Vietnam climate change scenarios show that, by the end of the 21st century, annual average temperature will rise by 2–3°C; total rainfall and rainy season rainfall will increase, while there will be a decrease in the dry season; sea level will rise by 75 cm to one metre relative to the 1980–1999 level meaning that about 40% of the Mekong River Delta, 11% of the Red River Delta, and 3% of other regions will be submerged, with 20% of the Ho Chi Minh City area under water; 10–12% of the population will be directly affected, and economic damages will cost about 10% of the GDP. Climate change consequences in Vietnam are severe: it is an explicit threat to the poverty alleviation and hunger eradication goals and the achievements of Millennium Development Goals and sustainable development of the country (VoG 2011).

The overall objectives of the Climate Change Strategy are:

- Utilise the national resources; carry out adaptation measures and GHG emission reduction; safeguard people's lives and properties; ensure the sustainable development goals.
- Strengthen human and natural system resilience to climate change; develop the low-carbon economy to protect and enhance quality of life; ensure national security and sustainable development in the light of climate change and join forces with international community to protect the global climate system.

With some specific objectives:

- Ensure food security, energy security, water security, poverty alleviation, gender equality, social security, public health; enhance living standards, conserve natural resources in the context of climate change
- Consider low-carbon economy and green growth as principles in achieving sustainable development; GHG emission reduction and removal to become a mandatory index in social and economic development
- Raise awareness, involvement, and coping capacity of stakeholders; strengthen scientific and technological potential and human resources; strengthen institutional arrangements to utilise the financial assistance, enhance the economic competitiveness and status of Vietnam; take advantage of climate change opportunities for social and economic development; promote climate-friendly behaviours
- Join forces with international communities in addressing climate change; increase international cooperation to address climate change effectively.

Achievements

As indicated in Figure 2, there has been a rapid increase in tree cover across Viet Nam since the 1990s to about 40% in 2012 (GSO 2012). Interestingly rubber plantations (estimated in 2007 at 550,000 ha, FAO 2010), other horticultural crops and a rapidly developing interest in palm oil are not included in the tree cover statistics released by MARD. For some reason those figures are collated 'by another department' and are not consolidated with the forest tree cover data. A number of international agencies regularly quote Viet Nam's tree cover as 44%.

Associated, but not necessarily correlated, has been the increase in the GDP per person (World Bank 2012), lifting Viet Nam to middle-income status. There is no doubt that the involvement of the local population in forestry programs has provided an opportunity for employment, training and development of small enterprises to increase rural incomes and reduce rural poverty.

The outcome of the Five Million Hectare Reforestation Project exceeded its target by 0.6 million hectares (MARD 2010). These works not only included plantings in natural forests, regeneration following harvesting and establishment of new plantations, all for commercial production, but also operations in Protection and Special-use forests.

Harvesting from natural forests is limited to 200,000 m³ y⁻¹ and plantation production for 2010 was planned to be 4.9 million m³. Interestingly the MARD review speculated that more than the allowed 200,000 m³ may have been harvested from natural forest, the same review suggesting that under-reporting may be due to inefficient record keeping.

Devolution of forest management from the Central Government to the community has seen about a third of the forest area turned over to non-state entities including householders, with the balance managed by state-owned entities.

Overall the review indicated that there has been a significant decline in rural poverty in provinces with large forest areas.

Viet Nam is also involved in various regional forestry networks dealing with sustainable management, rehabilitation, climate change and REDD programs.

Environmental services payments

Viet Nam has legislated for the introduction of Payment for Forest Environment Services (PFES) from 2011 aimed to protect and preserve the forested areas. The three types of PFES included are associated with water management, soil conservation and landscape aesthetics. Based on a user-pays system, the main contributors are publicly-owned electric and water utilities and tourism operators and may potentially yield US\$40 million annually from about 10 million ha of natural forests. The funds can be used to protect and develop forests at a local level. The program plans to raise awareness among farmers and the community of the importance of ecological services in forest areas used to collect water for hydro-power and irrigation. While the payments may be small, at a group level they will potentially be substantial enough to help turn around local economies. One major problem, however, has been users fail to pay the fees. The biggest debtor is Electricity of Viet Nam, which failed to pay its 2011 fees worth nearly \$26.2 million (VN News 2012a).

Certification

There are a number of state-owned forestry enterprises (SOFE) that all seem to manage about 5000 ha of plantations. These SOFEs tend to be concentrated around the former Demilitarized Zone; areas subjected to heavy defoliation and bombing during the ‘American War’. These areas required clearing of unexploded ordnances and rehabilitation before reforestation. Many of these are now plantations of *Acacia*, primarily grown for export woodchip production. Note about 20% of Viet Nam is contaminated by unexploded ordnance and at the current rate of de-mining, it will take 300 years for complete clearance. Meanwhile, 3800 people are killed or injured annually (VN News 2011).

In addition to the SOFEs there are numerous small private growers, but because of collectivisation holdings are often small (only about 3500 square metres in the north, but larger in the south) and in addition there are legal restrictions on ‘purchasing’ or leasing additional land. However, some seem to have imaginatively overcome these limitations to establish perhaps 10–20 ha of plantations, also mainly *Acacia*.

While the short-rotation woodchip has appeal, some growers are prepared to grow the plantations out to about ten years to produce sawlogs for furniture manufacture. There are, however, new requirements imposed by US (Lacey Act) and European (EU Timber Legality Assurance System) importers for verification/certification of the wood source. This is particularly relevant to Viet Nam; a third round of talks was held with the EU in November 2012 and it is anticipated that agreements covering forestry law enforcement, governance and trade to ensure that only licensed timber is exported will be concluded in September 2013 (VN News 2012d).

While self-sufficiency by 2020 is an aspiration, Viet Nam still imports 70–80% of the raw material for furniture manufacture (VN News 2012b), worth US\$1.3 billion in 2011 (GSO 2012), predominantly from other ASEAN nations. On the upside, the value of exported wood and wood products was US\$3.5 billion in 2011 (GSO 2012). Paper products imports in 2011 totalled US\$1.1 billion over the same period. Thus certification and chain of custody are highly important.

With respect to the national forestry development strategy, a target of 30% of the production forests are to be certified by 2020 (GoV 2007). The reality is that progress has been slow (MARD 2010), with only 6 FSC certificates covering 45,170 ha being issued (FSC 2012). However, as there are considerable volumes of timber and non-timber forest products exported, 281 FSC chain-of-custody certificates have been issued to Vietnamese enterprises (FSC 2012).

Within Viet Nam, traditional FSC certification would be virtually impossible for individual small growers (<10 ha), so the World Wildlife Fund and the Forest Stewardship Council have developed and piloted a small-group certification scheme in Quang Tri Province. This offers a possibility for growers to obtain the benefits of certification. The Quang Tri group has been able to get commitments from the WWF-related Global Forest and Trade Network for a 25% premium on their future sales (WWF 2010).

Challenges

Viet Nam has rapidly increased forest tree cover across the country from about 27% in 1990 to 40% by 2011, but the natural ecosystems have been severely degraded in quality and diversity. Around 356 tree species are listed as threatened, with many facing extinction (Nghia 2005; Chien 2006). About 8% of Viet Nam has been set aside in national parks and nature reserves to protect and conserve the main ecosystems, but controlling human activities has proved difficult as many local people rely on the forests for a living including the practice of agriculture, harvesting timber and non-timber forest products, hunting and fishing. Without raising the population's awareness of the importance of protecting these areas, human interference will continue. One attempt to reduce the people's reliance on the forest has been the introduction of the PFES scheme, allowing for the redistribution of monies to compensate local communities for reduced access to the forests—provided the fees are collected.

The devolution of forest management to SOFES (50%) and the community (27.5%) has not occurred equally or smoothly. As often happens, legislation is promulgated, but the associated regulations and guidelines are often delayed or misinterpreted, leading to the observation that many state-owned enterprises managed large areas of forests but only made modest profits, and if the land was managed by People's Committees at commune level, the situation was even worse because there were no resources available for management and protection activities. Also many localities failed to properly communicate the purpose of the devolution of management to the local farmers and community, thus making it difficult to punish those who have on-sold the forests or have illegally used them for other purposes such as agriculture (VN News 2012c).

Anecdotally, many communities determine that they would be better off economically by reverting parts of their forests to agriculture or shifting cultivation, as they had done prior to reforestation because their management role has not been fully explained. Such encroachment on the forest estate will continue to be an issue, especially in the mountainous regions where management and patrols are limited. A drive along many of the roads in these regions will show evidence of recent clearing and burning to allow expansion of agriculture.

Another cause for loss of forest area is the revocation of forest for agriculture as was recently observed in Quang Binh Province, where 890 ha was reallocated from a SOFE to the local community (VN News 2012e).

Another issue has been population relocation, especially with the development of new hydro dams, particularly in the north-west of Viet Nam. Relocation places additional pressure on forests as encroachment for other uses becomes an issue. Agroforestry and the integration of trees (horticulture/timber and non-timber forest products) into farming can offer new opportunities for additional income and training in new skills and business enterprises. ACIAR, in collaboration with the World Agroforestry Centre, has initiated a new project in the north-west provinces to improve the performance of smallholder farming systems. The project seeks to increase productivity leading to more diverse and sustainable production systems and better income from tree products (ACIAR 2012a).

Opportunities for small private growers are somewhat restricted by land ownership laws. Individuals are quite restricted in the land they may accumulate, making even small-scale forestry plantations a

challenge, and while there is a demand for sawlogs, many growers, especially in the central region of Viet Nam, opt to sell their wood into the export woodchip market, rather than grow the trees to sawlog dimensions. One of the potential outputs from the ACIAR *Acacia* silviculture project (FST/2006/087) is to develop practical and cost-effective silvicultural systems to assist smallholders to make comparisons between short-rotation pulpwood and longer-rotation sawlogs (ACIAR 2012b). It is also important to develop these economic options as, after harvesting, tree plantations can readily be converted to agriculture or other commercial plantation species such as rubber and palm oil or to horticultural crops such as cashew.

Foreign investment

Foreign investment comes in two forms: overseas development assistance (ODA) and overseas development investment (ODI). Several international forestry and paper companies have established partnerships with SOFES and small growers to access wood for export, primarily woodchips. Viet Nam recently became the world's largest hardwood chip exporter, ahead of Chile and Australia (PPNews 2012). Much of the investment has come from Japan, Korea and China.

Overseas development assistance (ODA) or aid comes from many sources such as Korea, Japan, Scandinavia, the European Union, Australia, USA, etc. As Viet Nam's GDP has risen above the notional per capita poverty level of US\$1000, aid programs have been wound back. In addition to the international aid providers, there is a strong presence of international and local non-government organisations operating in the economic, social and environmental areas, all providing knowledge and experience to an already knowledgeable Viet Nam.

Climate change

As mentioned, low lying areas of Viet Nam are at risk with respect to sea-level rise associated with climate change. It has been predicted that by 2100 about 40% of the Mekong Delta will be flooded by a one-metre rise in sea level, affecting crop production and livelihoods, but the process of putting climate change issues into social and environmental policies has been slow (VN News 2012f). As the major land use in the delta areas is agriculture, any loss of area (temporary or permanent) will directly affect food production both for internal consumption and export, and probably increase pressure on forested areas for conversion to agriculture. Population pressures are likely to put food before forests, despite recent major gains in forest tree cover.

With increasing population and economic growth, Viet Nam's demand for energy is increasing. While 56% of electricity production is from hydro generation and the balance from thermal coal-fired stations (CIA 2012), to meet future demands a policy, which potentially compromises climate change initiatives, is the proposal to construct 70 additional thermal coal-fired generating plants by 2030. These would consume 160 million tonnes of coal, requiring the importation of 130 million tonnes (VN News 2012g); this is 5 million tonnes more than Australia exported to Japan in 2009/2010. As an aside, Viet Nam is also committed to the construction of two nuclear power plants to generate 8000 MW by 2020. Further, there is an ambitious target of 15–16 nuclear reactors operating by 2030 (VN News 2012h).

Thus Viet Nam has some major issues with respect to climate change: loss of productive agricultural land and associated food production; increasing demands for energy on a domestic level and export to neighbouring countries; and loss of tree cover—issues common to most developing countries.

Conclusions

Viet Nam has overcome the destruction of its forests due to war, overharvesting and shifting cultivation or slash and burn agriculture with positive programs that have increased tree cover from 27% of the country in 1990 to about 40% in 2011. There have, however, been significant impacts on biodiversity, and many trees species are listed as threatened or endangered. Reforestation has included supplementary planting of many native species in an attempt to prevent further degradation of the biodiversity. About 8% of the country has been placed in protected areas, but is still subject to local human interference as many rural people have traditionally relied on the forests for timber and non-timber forest products.

In 2011 the forest area totalled 13.5 million ha, comprising 10.3 million ha of natural forest and 3.2 million ha of plantations (MARD 2012). Research programs have concentrated on species selection, silviculture and improved productivity.

Management of significant areas of forest has been devolved to commercially-orientated state owned forestry enterprises and to local communities. However, a lack of regulations and guidelines puts the community-managed forests at risk as there is a temptation to convert the forests to other land uses. To offset this risk, the Vietnamese Government has introduced a Payment for Environment Service Fee on large corporate users such as hydro companies. Provided the fees are paid when due, the community forest managers will receive some funds for local management efforts.

Viet Nam is a significant exporter of wood furniture, but currently relies on raw material imports for about 80% of the raw material. Changed requirements in the European Union and the USA mean that the manufacturers must obtain certification of the wood source and verify the chain of custody. As local growers increase their supply to the export market, new means of certification are being developed. The WWF, in conjunction with the FSC, has introduced small-grower-group certification and has been able to obtain a 25% premium for future sales for the first small group.

While the national policy is to increase forest tree cover to 47% by 2020, the reality is that this may be aspirational only. Pressure from other land uses, agricultural encroachment, construction of hydro dams and mining threaten further forest expansion and that expansion, while directed at degraded grasslands, also threatens food production capacity—so compromises will be made.

In general, Viet Nam is well placed as a wood exporter to supply wood and woodchip to neighbouring countries—such as China, Japan and Korea—and to Europe and the USA, through improvements in tree breeding, silviculture and value adding. However the forest resource area is threatened by encroachment for agriculture, conversion to other commercial, non-timber tree-based crops, development of hydro dams, urbanisation and climate change.

It is not all negative: trees represent a significant cultural symbol in many of the religions and belief systems in Viet Nam, so the population is accepting of reforestation in general. A different perspective may become evident, however, if reforestation impacts them directly or they see an opportunity to use forests for other purposes. At the same time, trees are still very common in and around villages, towns and cities.

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The challenges of achieving sustainable forestry in PNG

Rob de Fégely

Email: ifa@forestry.org.au

Developing a fully value-added forestry company in Papua New Guinea (PNG) that is socially, environmentally and financially sustainable has many challenges.

Forestry in PNG is difficult. A lack of skills, education and health facilities affects the quality of the potential workforce. Combined with poor infrastructure, high inflation and difficult weather conditions, and a background of government instability, rumours of corruption and illegal and/or unsustainable forest harvesting, this makes operating in our near neighbour very challenging.

Cloudy Bay Sustainable Forestry Ltd (Cloudy Bay) signed a 35-year forest management agreement in 2006 over 150 000 ha in eastern Central Province, around 270 km south-east of Port Moresby. The annual sustainable harvest was initially assessed at 60 000 m³ per annum (m³/a), but Cloudy Bay has re-assessed this at 48 000 m³/a. The company is required to process all logs domestically.

Within the forest management area, managing traditional landowners who do not recognize the commercial requirements of a modern forest products business requires patience, dedication and consistency.

Cloudy Bay manages a long supply chain from forest planning, roading and harvesting, to processing and value-adding into furniture, structural timber and prefabricated buildings.

Cloudy Bay employs about 400 staff, of which only 8 are expatriates. Training staff is a major challenge; many candidates have little or no schooling and come from a village lifestyle that does not easily equate to the requirements of a commercial work ethic. Even if staff are technically qualified, most need management training.

In spite of these hurdles, Cloudy Bay is proving that a sustainable value-adding forestry model in PNG can work.

Introduction

It was with some trepidation in June 2009 that I accepted an appointment as Chairman of Cloudy Bay Sustainable Forestry Ltd in Papua New Guinea (PNG).

Becoming chairman of a company that would sustainably harvest tropical rainforest in a country that has a troubled forestry reputation, a booming economy thanks to mining, and a government struggling to provide basic necessities of health, education and infrastructure would be a challenge.

Cloudy Bay Sustainable Forestry Ltd was formed from an existing company in 2006 when it signed a forest management agreement (otherwise known as an FMA) for about 150 000 ha of natural forest in the east of Central Province, around 270 km south-east of Port Moresby. The annual sustainable sawlog harvest was assessed by the PNG National Forest Service prior to the signing of the agreement at 60 000 m³ per annum.

The Cloudy Bay FMA area is relatively small by PNG standards and is unique in requiring all the logs harvested to be processed locally.

Forests and forest products are an important asset to PNG. According to the PNG Forest Authority, Papua New Guinea (<http://www.forestry.gov.pg/>) has about 29.4 million ha of forest within a total land area of 46.3 million ha. There are over 2000 tree species, of which 400 are known to be harvested commercially. It is also estimated that 95% of the forests and land in general in PNG is owned by customary landowners; much of it is not surveyed. The remaining 5% is owned by the government and/or various church and mission groups.

Gathering reliable statistics on forestry operations and markets in PNG is not easy. However, according to verbal advice from the PNG Forest Industries Association (<http://www.fiapng.com/>), the annual harvest in 2011 was about 3.8 million m³. Of this amount around 3.5 million m³ was exported as logs primarily to China.

The modernisation of Cloudy Bay commenced when PNG Sustainable Development Program Ltd made an initial investment in Cloudy Bay in 2007 and ultimately become the sole owner in 2010. The investor provided significant funds to totally re-structure the company and build a new modern hardwood sawmill and drymill.

The then chairman of PNG Sustainable Development Program Ltd, Professor Ross Garnaut, and another well-known Australian, Tricia Caswell, a board member, both wanted to demonstrate that a 100% value-adding forestry business was not only possible but economically viable in PNG. The model is based on creating local employment, taking care of the natural environment and ensuring a sustainable future for the forest.

Species and products

The company processes its high-value species PNG rosewood (*Pterocarpus indicus* Willd.), taun (*Pometia pinnata* Forst.), kwila (*Instia bjuja* (Colebr.) Kuntze) and PNG walnut (*Dracontamelon sp.*) into furniture, flooring and joinery, and its lower-value species are pressure treated for sale as either structural timber and cladding or supplied to the company's prefabricated building plant. Offcuts of sawn timber are used to construct pallets or sent to the laminating plant and used in the joinery division for school desks or everyday utility products such as beds and bookcases.

Employees

About 6000 people, comprising 92 clans and 6 tribes, live in the Cloudy Bay FMA area. While many local villagers want jobs with Cloudy Bay, few have any employable skills and most of them have not been exposed to a conventional work ethic.

The concept of going to work each day is quite foreign to many of the local village people in Cloudy Bay and their families. Growing up in a village in PNG does not provide people with the technical, motor or spatial awareness skills needed to work in a modern sawmill or wood processing facility. Good training will be critical for success.

Cloudy Bay employs about 400 staff, mostly PNG nationals but supported by 8 expatriates including Managing Director Mike Janssen. Cloudy Bay has a policy of developing local staff and is confronting the challenges of providing employees (many of whom have never been employed before) with the skills required in a modern forest products business. Since commissioning the new sawmill the fraction of employees from the local area has grown from 40% in 2009 to over 70% of the total staff today.

Cloudy Bay aims for standards equivalent to those in developed countries; for example all employees wear high-visibility clothing and protective boots, which is not typical in the forest industry in PNG.

At Cloudy Bay we continue to address many challenges

Log suppliers

Developing relations with our landowners has been slow and sometimes frustrating. Under the FMA the landowners have an agreement with the government which, in turn, established an agreement with Cloudy Bay. This is commonly referred to as a 'lease, lease back' agreement. When the current staff

arrived at Cloudy Bay in late 2008, landowner disputes were rife. Most were caused by problems in boundary identification and the structure of landowner groups and not aimed at the company. Gradually we have resolved most of these disputes. Some have required government resolution, and this is never fast. Maintaining good landowner relations is a key to success in PNG, and it requires skill, patience, consistency and diplomacy. While many criticise this aspect of working in PNG, it is actually a process of developing a social licence. There are relevant lessons in this for the Australian forest industry, where grave difficulties exist between the timber industry and some rural and urban communities.

Education

The lack of skills among the PNG nationals is a serious problem and many of the younger staff are barely literate. They are capable of learning new skills, but the lack of schools, teachers and training facilities has been a handicap. The FMA agreement requires Cloudy Bay to build a range of community facilities including schools, teachers' houses, community halls and roads. To date, nine school complexes including classrooms and teachers houses have been constructed within the FMA. When Cloudy Bay opened a new technical school next to its sawmill in 2010, enrolments were 56. The school now has 210 students, including some who walk 20 km each day to attend.

Variation between species

The wide range of commercial tree species creates processing difficulties. PNG has around 400 commercial tree species; within the Cloudy Bay FMA some 60 different species are harvested. The high-value species mentioned earlier represent less than 10 per cent of the harvest. The remaining 90 per cent are grouped into high, medium and low-density species to enable some efficiency in processing.

Economics and management

Operating in PNG is expensive. While many applaud the boom in extracting mineral resources in PNG, it has created significant difficulties for smaller businesses within the economy. Tony Walker, the *Australian Financial Review* foreign correspondent, in his article 'PNG on the Fly' in February 2012, described PNG as being resource rich and dirt poor, and likened it to a rough-house, anything goes, 'Klondike of the Pacific' It is disappointing to witness companies, some of them international, and expatriates, lowering their standards 'because they can' rather than showing leadership to assist a developing country!

Cloudy Bay has suffered from poor decisions by earlier management, in particular the assessment of the sustainable harvest level and the sawmill design. These have taken time and considerable expense to resolve, as developing this project is relatively unique in PNG and there are no similar examples to follow.

Project-led inflation has seen prices of things like basic hotel accommodation soar to levels seen only in five-star hotels in the Sydney CBD. Delivery of machine and sawmill spare parts can take months, and cost more than it would cost a person to fly to Australia to buy the part and bring it back.

Not only are many everyday costs high in PNG, but the contractor capacity is very under-developed. Cloudy Bay has a very long supply chain by both Australian and global industry standards. Cloudy Bay management must succeed with nine separate operations to ensure the company functions efficiently. The supply chain is divided as follows:

1. Forest planning
2. Harvesting and log haulage
3. Green sawmilling
4. Barging of green sawn slab material from Cloudy Bay to Port Moresby
5. Drying
6. Drymill processing
7. Timber treatment (not all species can be successfully pressure treated)

8. Final value-adding, yielding products ranging from structural timber to prefabricated housing and joinery
9. Marketing and sales.

Infrastructure in PNG is also very poor! Cloudy Bay has had to repair roads and bridges at its own cost just to keep the main highway to its FMA open. While this has been an added expense, it does help to build our social licence with local communities and the authorities. Cloudy Bay, as a requirement of its FMA agreement, does construct roads and bridges and to date has extended the Magi Highway, the main road from Port Moresby to the Cloudy Bay FMA, by 30 km.

As part of its FMA agreement the company has also built a police station at the sawmill. A small health clinic, designed for our employees, services the local area, as there is no alternative! Last year the Cloudy Bay nurse, Sister Miriam, attended to 7838 patients and has delivered over 70 babies since 2007!

Cloudy Bay is well named. The weather is more often wet than dry. Weather dry enough to permit harvesting according to the PNG Codes of Practice occurs on less than 50% of the available work days.

Pluses

Despite the challenges there are many opportunities for forestry in PNG.

House construction in PNG is traditionally wood. The population and the economy are growing, which will increase demand for timber products. Cloudy Bay has developed a pre-fabricated housing model based on 1.2-m panels that weigh no more than 80 kg and are designed for ease of construction by unskilled labour.

PNG also has significant areas of grassland, and as the Papua New Guineans are natural gardeners adding longer-term timber plantations as an extra crop would not entail a massive cultural change.

Developing forest operations and local processing will assist with regional development and create employment in remote regions. Wood waste can combine with other biomass to generate electricity.

There is also an opportunity to gradually switch from exporting logs to domestic processing. However, this requires the development of skills, investment in sustainable forest management, processing facilities and the development of both domestic and export markets. Unless these developments take place, banning the export of logs will fail to promote the domestic economy.

Conclusion

Cloudy Bay is proving that sustainable value-adding forestry in PNG can work. Having overcome the earlier problems with resource assessment, Cloudy Bay is working through the final stages of Forest Stewardship Council (FSC) certification for sustainable forest management, having achieved FSC Control Wood certification in 2011. Productivity is also improving, with a 60% increase in harvesting productivity over the 12 months from 2011 to 2012. Sawmill production increased by 35% over the same period. The new school complexes have revived education in the FMA. The extension of the Magi highway has allowed other industries to develop, including the re-activation of a moribund rubber plantation. Local villages now have vehicle access from the centre of the FMA to Port Moresby; previous transport included canoe trips. However, more effort is needed in skills training, management mentoring, infrastructure development and governance before Cloudy Bay will be sustainable financially, environmentally and socially. Finally, the staff of Cloudy Bay acknowledges the support, investment and confidence the Board of PNG Sustainable Development Program Ltd and its CEO David Sode and his executive team have provided. Their continued support will make Cloudy Bay the success we now know it can be.



Forest management and certification: an overview of the requirements for forest certification in Australia and implications for forest management

Ross Garsden

NCS International Pty Ltd, 12 Sheridan Drive, Goonellabah, NSW 2480
Email: ross.garsden@ncsi.com.au

Background

While it is clear that global demand for wood and wood products is increasing, there is little information regarding trends in global demand for certified forest products. However, manufacturers are increasingly identifying their products with information relating to sustainable forest management and consumers are becoming more aware of the issues associated with the production systems that deliver the wood and wood products they are purchasing. In response to changes in community perception, many forestry agencies and companies seek certification of their forest management practices under a recognised standard such as the Australian Forestry Standard (AFS) (2007) or the Forest Stewardship Council (FSC). The AFS is recognized under the Program for Endorsement of Forest Certification (PEFC).

Certification confers recognition that forest products have been produced in a manner consistent with the principles of sustainable forest management. In addition, downstream processors have established certification to various *chain of custody* schemes that aim to confirm the status of wood and wood products through to the consumer. The aim of certification is to demonstrate sustainable forest management and seek recognition through the implementation of an internationally recognised, transparent and independently verified management system.

This presentation will focus on the requirements of the Australian Forestry Standard, particularly with respect to management of native forests. It is from the perspective of one who has been involved in auditing forest management systems for a number of years. The aim is to provide a brief overview of the requirements for forest certification, explore the implications for forest management and identify some of the key issues associated with compliance.

Setting the scene

In Australia today, most businesses and agencies in the forest industry have established certified management systems. The scope of these systems is varied and some enterprises have certification to multiple standards. For example, some enterprises may be certified to the Australian Forestry Standard (AS4708:2007), Environmental Management Systems (AS/NZS ISO 14001:2004) and Safety Management Systems (AS/NZS 4801:2001). Others have established, or are seeking, certification with FSC and many, particularly plantation growers, are certified to both schemes. While certification is becoming a requirement for entry into certain markets, my experience is that buyers are yet to pay a premium for certified product. This is consistent with the FAO 2009 report, *State of the World's Forests*, which notes:

Certification provides access to markets where consumers prefer green products, but no price premium to cover the costs of certification. For many producers, access to the green market is insufficient incentive for seeking certification, especially when there is demand for comparable uncertified products produced at a lower cost.

In the late 90s when forestry businesses and state agencies first adopted certified management systems (prior to the development of the Australian Forestry Standard), many went down the path of ISO 14001 EMS. This provided a framework for a management system with a focus on environmental management and introduced the role of *stakeholders* as a factor that required active engagement and consideration.

Requirements for stakeholder engagement are considerably stronger in both AFS and FSC. The early adopters of ISO 14001 rapidly became aware of the need for such engagement.

It is clear that many organisations initially felt the requirements for certification were an additional encumbrance on business. A new *management system* was often accommodated simply as a mechanism for gaining or maintaining certification. There was often a failure to connect the management system that was on show for the auditor with the day-to-day activities associated with running the business. Organisations tended to focus on doing what they thought was necessary for gaining and maintaining certification, rather than integrating the processes into the business. It is not uncommon to find organisations with extensive but often superfluous documentation.

Organisations may seek certification for a variety of reasons. Some government agencies are required to be certified due to mandated requirements of government. Some forestry companies obtain certification as a means of gaining or maintaining access to certain markets, while others may seek certification in response to board requirements. Regardless of the reasons for certification, all organisations face the same dilemma: that is, understanding what is required in order to obtain and maintain certification and then developing a management system that meets those requirements.

Irrespective of whether the organisation seeks certification with the AFS or the FSC, all certified management systems will be subject to periodic audit by an independent, third-party auditor. Auditors are engaged by accredited *certification bodies*; that is organisations that have been assessed and determined by the certification scheme as capable of auditing against the requirements of the relevant standard.

The role of the auditor is to examine the management system and the manner in which it is being implemented to determine whether it meets the requirements of the respective standard. The audit will invariably involve an examination of the documentation that supports the management system, as well as an assessment of the effectiveness of the implementation of the management system. The auditor seeks objective evidence that the requirements of the standard are being met so the management systems designed to meet those requirements fall within the scope of the audit. The duration of the audit is determined by the requirements of the certification scheme, with more time required for larger or more complex organisations. The minimum requirements for audit duration for the AFS are described in JASANZ (2008) Procedure 26.

In instances where the auditor determines that the organisation is failing to meet the requirements of the standard, or that it is failing to follow the procedures that it has established, the auditor will record a *non-conformance* and require an *action plan* to address and rectify the deficiency. A significant failure to meet the requirements of the standard may lead to the suspension or withdrawal of the organisation's certification.

There is considerable similarity between the requirements of the AFS and FSC standards. This paper will focus on the requirements of the AFS, but in most cases the requirements of the FSC will be very similar. It is noted that the AFS is currently under review, and a revised standard is likely to be released later this year. This paper will focus on the current standard and flag some issues that are being addressed in the revised standard.

An overview of the requirements for forest certification

There are two initial requirements for certification of an enterprise: namely, a definition of the *scope* of the management system, and a description of the land and forests to which certification applies, that is the *defined forest area* or DFA.

The former is usually determined by the certification body, in consultation with the enterprise seeking certification. The scope is usually a brief statement providing a general description of the nature of the activities that are controlled and managed within the management system. For example, the scope for an enterprise may be 'Activities associated with the management of softwood plantations for production of pulp wood and saw logs.' The scope or *capability statement* is what appears on the certificate of the enterprise and provides a reference as to what the organisation does.

Certification schemes require the establishment of a *policy* statement that spells out the corporate commitment to (amongst other things) a systematic approach to forest management; compliance with applicable legislation; prevention of environmental harm; and continual improvement in management performance and forest management outcomes.

The management system that is developed to deliver this policy commitment is intended to guide and control the operation of the business and provide a framework for identifying and managing the associated risks.

A systematic approach to forest management

1. The forest management plan

For certification, organisations are required to develop a *forest management plan*. This is a strategic plan that provides a description of the forest estate (or DFA) and the values to be managed as well as the scope and objectives of management. The plan will provide a description and rationale for the silvicultural regimes that will be applied to the forests as well as a rationale for the annual harvesting rates. It will also describe or make reference to the relevant operating conditions and controls for specified activities. The forest management plan will also identify applicable legal and other requirements relevant to the operation of the business and identify and assess the significance of specific aspects and impacts of activities relevant to the requirements of the standard. These complementary processes help the organisation determine risks and establish relevant management objectives and targets for managing those risks and drive continual improvement in business performance.

The forest management plan will also establish processes for monitoring the impact of activities relevant to the forest management requirements of the standard.

Organisations seeking certification are required to facilitate and encourage meaningful engagement of stakeholders in the development of the plan. In addition, they are required to make the plan (or at least a summary of the plan) and reports on its implementation publicly available, together with summaries of independent surveillance and certification audit reports.

2. Implementing the plan

In addition to the strategic forest management plan, the organisation seeking certification is required to develop *operational plans* and *procedures* that aim to ensure that forest management activities comply with the various controls, guidelines and codes of practice relevant to the full range of forest management activities.

The organisation is also required to define the roles and responsibilities of staff and contractors and to ensure that there is capacity to implement the management system. In doing so, the organisation needs to ensure that staff and contractors have the necessary skills and competencies to carry out the various functions and assist the organisation in the achievement of its objectives and targets.

Logically, the organisation will need to establish procedures for communication and documentation and demonstrate that these procedures are being followed. Documentation requirements necessarily include provisions for the production and control of various records.

Communication processes in large organisations can be quite complex and well-run organisations maximise the efficiency of meetings and reporting processes, with well-defined purposes, schedules, agendas and templates for recording minutes (including actions, responsibilities and timeframes).

Documentation procedures should aim to ensure that relevant system documents are clearly identified, secure and accessible. While the standard does not prescribe requirements for periodic review of system procedures, many organisations allow a review at any time to ensure that any documented procedure accurately reflects current practice and that it clearly describes how things are being done. Flow charts can also be an effective way of describing and communicating procedures. Where a procedure leads to the development of a record, the procedure should make it clear who needs to see that record and where it will end up.

Finally, the organisation will need to identify and assess a range of potential emergency situations and develop contingency plans to respond to and manage accidents and emergency situations should they occur. The standard requires that these plans are periodically tested.

3. *Monitoring performance*

Consistent with any good business management practice, the standard establishes a hierarchy of monitoring processes. At an operational level, the organisation is required to establish procedures for:

- checking that management plans comply with legislation, codes of practice and any other relevant controls
- monitoring and auditing forest operations to ensure that performance requirements are being met.

These requirements are usually achieved through the development of detailed planning templates with reference to relevant controls, and the development of checklists to assist with a rapid assessment of operational performance requirements. Such routine monitoring is usually undertaken by operational staff and supervisors, and is done on a regular basis to identify any deficiencies in performance and ensure that they are addressed in a timely manner.

In recent years, new tools and technologies have been developed to facilitate a range of monitoring processes. In particular, GPS and GIS technology, supported by applications on handheld devices, enables accurate and efficient data capture and transfer.

There are also requirements for routine monitoring and evaluation of the outcomes of forest management that aim to detect deficiencies in forest management performance and to ensure timely remedial actions. In practice, this means having a sufficiently robust system to detect deficiencies when they occur, determine the reason for the deficiency, apply any measures necessary to rectify the situation in the short term, and implement changes to the management system itself to prevent that situation from recurring.

The skill here is having a management system with the capacity to identify and detect weaknesses in management performance and apply the appropriate safeguards. As many of the requirements of the standard relate directly to legal compliance, it is essential that the organisation is fully aware of what the compliance requirements are and has an understanding that any failure to meet such requirements is likely to have a bearing on the credibility of its certification and the public perception of the organisation.

Finally, there is also a requirement that the forest management system is periodically audited with respect to compliance with *planned arrangements*. While the standard may not specify that such an audit should be carried out internally, my experience is that internal audits are more effective where the audits are undertaken by staff with an intimate knowledge of the processes being audited. The term, *planned arrangements*, refers not only to the requirements of the standard but also the requirements of the procedures or processes described within the forest management system itself. It is therefore quite critical that the organisation has procedures that accurately describe current practice.

Innovation and improvement are concepts fundamental to the corporate commitment to continual improvement established at the policy level. Organisations should aim to sponsor and stimulate innovation. The management system needs to be responsive to detecting such improvements in the organisation when and where they occur, assess their value and relevance and embed them into the management system as part of the 'business-as-usual' model.

4. *Periodic review*

The standard requires periodic review of the forest management system to ensure its continuing effectiveness and to drive continual improvement in forest management. In practice most organisations have established an annual review framework that is supported by a range of processes that monitor and report upon progress towards the achievement of corporate objectives at different levels within the organisation. This frequently involves monthly or quarterly meetings which communicate such progress.

The aim of the review is to ensure:

1. the continuing suitability, adequacy and effectiveness of the management system
2. continual improvement in management performance.

The review considers information derived from the results of auditing and monitoring activities, as well as changes to the system that have been developed in response to any deficiencies that have been identified. Specifically, the review provides a framework for assessing corporate performance with respect to the achievement of its objectives and targets and determining any necessary changes to its objectives.

Experience has shown that the more effective management systems are those that have:

1. an effective approach to identifying and rectifying any nonconformance
2. a robust and effective internal audit framework
3. effective management review processes.

In summary

In simple terms, the development and implementation of a management system means building a systematic approach to identifying risks; establishing objectives and targets to drive improvement; planning what is to be done; describing the processes involved; getting on with the job; monitoring performance and periodically reviewing the whole show to make sure that things are going according to plan.

The management system is underpinned by the policy commitment to *continual improvement* and provides mechanisms for making changes where necessary to drive such improvement.

The key message is that the management system should establish a framework for identifying the risks associated with the business and managing those risks.

Considerations and discussion

I have identified a number of issues that I believe warrant discussion. Before I discuss these, I have deliberately avoided an elaboration of all the requirements of the standard as most requirements deal with matters that are adequately addressed through compliance with various codes of practice. These codes aim to deliver a range of legal requirements with respect to forest management. For example, the standards clearly articulate requirements for protection and maintenance of biodiversity values, soil and water, forest health and vitality, and management of pests and weeds etc.

The issues I have identified are raised for the purpose of furthering understanding of specific requirements. They include:

- stakeholder engagement
- high conservation value forests
- carbon and greenhouse gases
- illegal activities
- mining
- safety
- sustainable forest management.

1. Stakeholder engagement

The standard requires engagement with stakeholders at a number of levels. At the highest level, the organisation needs to consider and respect the views of stakeholders in the development of the forest management plan. The standard specifically requires consideration of indigenous input.

At the operational level, the organisation also needs to consider the interactions between forest operations and the wider community, including neighbours who might be affected by those operations.

Clearly these two levels of stakeholder engagement are quite different.

The standard also requires the organisation to employ appropriate mechanisms to resolve disputes and grievances. The auditor is likely to look for evidence of the kinds of complaints that are being raised,

the type of response that the organisation gives and the effectiveness of that process in addressing the complaints.

Organisations are required to demonstrate how they encourage and facilitate meaningful engagement. It is clear that there are diverse views amongst members of the community, particularly with respect to management of native forests. In some instances, key stakeholder organisations have publicly expressed their opposition to any utilisation of native forests for timber production and have actively supported campaigns to end wood production from these forests. The challenge for any organisation is in working out the extent to which it takes such views into account, and how those views are considered in the development of the forest management plan.

A notable difference between AFS and FSC is that the former requires stakeholder engagement in forest management whereas the latter seems more interested in the certification process.

2. *High-conservation-value forests*

The concept of high-conservation-value (HCV) forests is not defined in the Australian Forestry Standard, but the protection and maintenance of significant biodiversity values is clearly integrated throughout the standard. HCV is dealt with quite differently under the FSC. In either case, the presence of HCV forest is not intended to preclude sustainable management of the forest: quite the contrary. In PNG, for example, there are significant forest reserves where the whole estate is assessed under FSC as HCV forest. Timber production is carried out in a way that does not diminish the values of the forest.

In Australia, though, we seem to have developed a community understanding that any utilisation of native forests for timber production is not compatible with HCV forests. It is probably fair to say that the community at large believes that harvesting trees from native forests is detrimental to the maintenance of conservation values. This is largely because the concept of sustainable forest management is poorly understood. It is not difficult to find folk who believe that all native forests should be quarantined from timber production and that we, as a community, somehow benefit when native forests are formally dedicated as reserves.

In an address to the Tasmanian Legislative Council last year, Mr Graham Wilkinson, Chief Forest Practices Officer for the Tasmanian Forest Practices Authority, provided a frank and accurate assessment of the perverse outcome that is being achieved by our political leaders in their attempts to placate community concern regarding the management of Tasmania's native forests (LCC 2012). The full transcript is readily available, but some key points are restated here:

- all forest has conservation value, so this notion of identifying forests as high conservation value is a nonsense; they all have value
- the issue is how we manage them at a reasonable cost to society, what the benefits are that we can extract from those forests and how we can minimise any detrimental impact on those values.

From the point of view of an auditor examining the forest management practices of an organisation, what is needed is science-based justification of the silvicultural practices that are being applied.

This too, is well-covered in Mr Wilkinson's address.

I believe that this is an issue that warrants greater public awareness and understanding. We need to get quite removed from the emotive media coverage and alarming footage of apparent forest destruction that is associated with some management practices and build a greater understanding of just how our society and its support systems work.

3. *Carbon and greenhouse gases*

The requirements of the current standard with respect to carbon and greenhouse gas emissions are relatively simple. The standard simply requires that the forest manager acknowledge the forests' capacity to act as a net carbon sink and demonstrates a commitment to minimising greenhouse gas emissions.

It is understood that the next version of the Australian Standard for Sustainable Forest Management is likely to include a quantification of the carbon accumulation within the forest estate. This may be quite problematic for some forest managers. While a range of tools may be available, the reliability of these tools to provide an accurate estimate of carbon at the forest level has been questioned. Moroni (2012) provides a succinct appraisal of aspects of forest carbon management in Australia.

Landscape C storage must be properly and accurately estimated, in so doing the full range of forest productivity on the landscape, natural disturbances and anthropogenic changes to forest landscapes must be properly represented and their effects on landscape C storage accounted for.

4. *Illegal activities*

The standard requires the forest manager to take appropriate action to constrain unauthorized or illegal activities. Illegal activities range from recreational vehicle use and illegal dumping of rubbish through to illegal harvesting or theft of forest products. While many organisations clearly do the best they can to constrain illegal activities, the effectiveness of their efforts is often hampered by the nature of the forest landscape and government-imposed requirements to provide almost unfettered public access to that landscape.

It is clear that responsibility for control of unauthorized or illegal use of the forests depends on effective strategic alliances with relevant government agencies and regulatory authorities.

5. *Mining*

There are a number of situations in Australia where mining operations are being undertaken within a forest landscape. These range from small-scale activities such as the winning of road base and gravel from small quarries, through to large, landscape-changing activities such as bauxite mining in Western Australia. The 'new kid on the block' is the coal-seam gas industry that is rapidly getting underway in Queensland and New South Wales.

The standard requires the forest manager to 'allow exercise of existing legal or traditional uses of the forests to continue.'

The issue is that the standard relates to the sustainable management of forests within the defined forest area. The decision to allow mining in the forest estate is invariably outside the control of the agency responsible for managing the forest for wood production.

In terms of sustainable forest management, the long-term impact of mining activities on the productive capacity of the forest (and any implications for certification) is yet to be assessed.

6. *Safety*

The standard requires the forest manager to foster a safe working environment and comply with relevant occupational health and safety legislation. From an auditing perspective, the auditor is confronted with a vast array of safety-related considerations that need to be incorporated into the audit plan, but this requirement of the standard presents the organisation with nothing more exacting than meeting its existing regulatory requirements.

While not every state has subscribed to the national harmonisation of safety laws, the fundamental safety requirements are now more consistent Australia-wide.

7. *Sustainable forest management*

While forest management systems aim to achieve *sustainable forest management* and *continual improvement in management outcomes*, there is frequently little objective information available to provide an accurate evaluation of the long-term impacts of forest management on the forest landscape and on those communities and industries that live and work within the forests or are otherwise dependent on the forests for their livelihood.

The concept of *sustainability* is often considered primarily in terms of environmental or ecological impacts and outcomes. The economic and social aspects of sustainability are frequently less-well

understood despite the fact that the standards have criteria aimed at demonstrating support for regional communities and industry as well as frequent references to social and economic considerations.

At the strategic planning level, the organisation is required to develop a forest management plan that, amongst other things, describes its anticipated yield and the rationale for its harvesting regime. Any estimate of sustained yield is likely to be developed through a process that considers, amongst other things, the nature, extent and condition of the forest estate, its productive capacity and its anticipated markets.

Some concern has been raised by stakeholders that forestry organisations, particularly those managing large public native forests, have at times been harvesting the forest at a rate that exceeds the sustainable yield. Clearly, forestry organisations need to have the flexibility to respond to changes in market conditions and other events such as fire or cyclone damage. This issue was addressed very effectively by Emeritus Professor Ian Ferguson AM in his 2012 report regarding the operations of Forestry Tasmania with respect to sustainable yield. He states:

In Australian forestry, sustainability is normally measured and expressed in terms of the ‘sustainable yield’. The term ‘sustainable’ probably in part owes its origins to an earlier inquiry (Ferguson 1985) in which I drew a distinction between the then widely used term ‘sustained yield’ and ‘sustainable yield’. The former implied a rigid target to be achieved. The latter implied a potential level, not necessarily a value that had to be attained, but one that should not be exceeded over the long term. The point being that sustainability is not prescribed by a single immutable value in the case of wood production, or indeed other uses (Ferguson 1996).

The full report is worthwhile reading by anyone requiring a clearer understanding of this issue, particularly the consideration of social and economic factors when developing models for assessing sustainability.

One thing is for certain: the agencies across Australia commissioned to manage our native forests for timber production have undertaken extensive research and continue to develop refinements to the silvicultural practices appropriate to the management of our native forests. The potential impacts of climate change are being investigated and, while the models herald significant change, the implications of these changes have yet to be factored in to the long-term productive capacity of our forest landscapes.

Conclusion

Enterprises seeking to establish or maintain certification should focus on the development of a *business as usual* model, where the requirements of the standard are seamlessly embedded into a business management system. The system needs to deliver continual improvement of forest management practices and outcomes, based upon objective evidence derived from long-term monitoring of the impacts of forest management on the forest estate.

A certified forest management system will go some way to demonstrating that the activities of the organisation are being conducted in a manner consistent with the principles of sustainable forest management.

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Forest management certification: achievements, challenges and future prospects

Richard Stanton¹

Australian Forestry Standard Ltd
<http://www.forestrystandard.org.au/home>

The concept of forest management certification emerged in the 1990s and has been a reality in Australia for more than ten years. The Australian Forestry Certification System provides an objective, transparent and consistent system for assessing forest management and tracing wood-based products from certified forests along the supply chain. What have been the costs and benefits of this development? Has certification achieved the original objectives set for it, and will it have an ongoing role in forest management and the marketing of wood and other forest products and services?

The Australian forestry profession and its supporters make frequent and extravagant assertions about the quality of forest management in Australia. Does certification provide a mechanism for substantiating these claims and will these claims continue to be justified in the context of continued declining investment in forest management capacity, education and training, and forest-related research?

The following is a selection from the slides used in the discussion:

<p>1. Certification and labelling</p> <p>More than 20 years of history and experience</p> <p>Simple concept—a mechanism that allows consumers to reward responsible practices</p> <p>Voluntary—a market-driven incentive as an alternative to a regulatory approach</p> <p>Many different views, often confused by the complexity of the detail</p> <p>Future implications for forest management and professional foresters?</p>	<p>2. Certification drivers</p> <p>Interest in and take up of AFS/PEFC chain of custody certification is continuing because of:</p> <ul style="list-style-type: none"> Green Building Council (GBCA) acceptance Illegal logging legislation Planet Ark (FWPA) promotion Corporate procurement policies Certified company promotion (e.g. Reflex) and availability of AFS/PEFC certified wood/products FSC promotion and dual certification
<p>3. Australian Forest Certification Scheme</p> <p>Operated by AFS Ltd—a not-for-profit public company, since 2003</p> <p>ABSDO-accredited Standards Development Organisation, manages two Australian Standards.</p> <p>AS4708—Forest Management</p> <p>AS4707—Chain of Custody (traceability)</p> <p>25 current forest management certificates (10 million hectares, major wood producers)</p> <p>200+ current chain of custody certificates (diverse range of wood and paper product businesses)</p> <p>AFCs is one of 32 national schemes assessed and endorsed by PEFC</p>	<p>Challenges and opportunities include:</p> <p>Declining or lack of investment in education and training, monitoring and research, fire management, conservation reserve management ...</p> <p>Complex ownership and management structures—public and private</p> <p>The Australian Standard should provide a benchmark to support discussions with shareholders, government and the community</p>

¹ The selection from the slides was made by the editors



The Forest Stewardship Council's certification system for Australian forests

Natalie Reynolds

Forest Stewardship Council Australia

<http://au.fsc.org/>

nreynolds@fscaustralia.org

FSC has been recognised as an international organisation that provides a system for different stakeholders interested in forest issues to work towards responsible forest management. In providing this system, FSC promotes environmentally appropriate, socially beneficial, and economically viable management of the world's forests. IFA is a member of FSC Australia.

Environmentally appropriate forest management ensures that the harvest of timber and non-timber products maintains the forest's biodiversity, productivity and ecological processes. Socially beneficial forest management helps both local people and society at large to enjoy long term benefits and also provides strong incentives to local people to sustain the forest resources and adhere to long-term management plans. Economically viable forest management mean that forest operations are structured and managed so as to be sufficiently profitable, without generating financial profit at the expense of the forest resources, the ecosystem or affected communities. The tension between the need to generate adequate financial returns and the principles of responsible forest operations can be reduced through efforts to market forest products for their best value.

Through the FSC system, forest owners, managers, forest product manufacturers, local communities, non-governmental organisations and other interest groups are given equal access, voice and vote to a mechanism that is democratic, inclusive and transparent.

More details about the history and operation of the FSC are available on the council's website, and many links are provided to other relevant information.

Members of the council, with feedback from stakeholders and experts, create the standards through which the FSC system operates. Standards are international and globally consistent, and can be adapted to reflect regional variation in circumstances.

The council is fostering the use of 'international generic indicators' (IGIs) in the evolution of national forest stewardship standards to bring global consistency and credibility to the FSC system. In Australia this process entailed an initial meeting on IGIs in July 2012 and a number of subsequent meetings were scheduled before concluding in December 2014; details of the plan are at <http://www.fscaustralia.org/policies-and-standards/forest-management> . At the end of the process the current interim standards now in place will cease to operate.

The notes on this page have been prepared by the editors



Forest policy and management: where should they head and why?

Vic Jurskis

6 Cocks Lane Eden NSW 2551
Email: vic.jurskis@gmail.com

Abstract

The Vision of the 1992 National Forest Policy Statement (NFPS) has not been realised. Natural and socio-economic environments have deteriorated as human economy has been excluded from forests. Increased reserves and regulation have promoted megafires, chronic decline in forest health, loss of biodiversity and contraction of regional economies whilst regional communities have been disenfranchised and management costs have increased. The recent spate of bushfire inquiries and the New South Wales (NSW) inquiry into land management reflect widespread community concerns.

The IFA should identify deficiencies of policy and management and propose better options. North American management agencies promote benefits of human intervention, while in Australia it has been left to individuals and historians, such as Stephen Pyne and Bill Gammage, to campaign for improvements. Minor changes to policy and major changes in implementation can improve environmental and socio-economic outcomes. Human intervention such as burning, thinning or grazing is essential to conservation.

Background

Santayana said those who ignore history are condemned to repeat it. Australian foresters are a prime example. They ignored the ecological history of the 19th century. By the middle of the 20th century this history was repeated in disastrous megafires and widespread chronic decline of eucalypts. Foresters implemented broadscale burning including aerial ignition, and allowed graziers, firewood collectors, beekeepers and others to assist in managing forests. Forest health, biodiversity, fire safety and local economies benefited.

As standards of living improved, wages increased and technology was substituted for rural labour. Population centralised in cities and the voting power of municipalities equalled that of regions. Governments focussed on city-dwellers, and indirect benefits of investment in rural employment and infrastructure were forgotten. Direct returns were expected on investments in forestry.

City-dwellers have little economic or cultural stake in native forests. Their interest is mostly concerned with preserving 'nature' and recreation that contributes little to rural economies. A bushwalking architect from Sydney promoted the wilderness myth in 1933. The Colong Foundation took up the cudgel in 1967. The Wilderness Society, established in 1976, now has about 2500 members and an annual income of 13 million dollars. Thus from small, elite groups of bushwalkers and 'naturists' has grown an army of 'feelgooders' with hugely disproportionate political power compared to stakeholdings, and powerful representation within the bureaucracy. Governments spend large amounts 'compensating' socio-economic destruction and supporting inefficient management (high cost : benefit) of reserves for political advantage.

'Feelgooders' conveniently dismiss ecological history; consequently mistakes are repeated. Academia has reinforced the power of pseudostakeholders. Technical forestry training was abandoned in favour of sociology and theoretical ecology at ANU, and senior academics participated in political bureaucracies such as the COAG bushfire inquiry and the NSW river red gum 'assessment'. Megafires, chronic forest decline and loss of biodiversity have increased along with reservations and

regulation as a consequence of implementing the 1992 NFPS. I examine the history and consider how the policy and its implementation might be changed to achieve the vision.

Considerations and discussion

Mitchell (1848) observed loss of biodiversity with infrequent burning: ‘The omission of the annual periodical burning by natives, of the grass and young saplings has already produced in the open forest lands nearest to Sydney, thick forests of young trees, where, formerly, a man might gallop for whole miles without impediment, and see whole miles before him. Kangaroos are no longer to be seen there; the grass is choked by underwood’.

Curr (1883) saw that ‘the comparative unproductiveness of our soils, the character of our vegetation and its scantiness, the retention within bounds of insect life’ was a consequence of Aboriginal burning. After it was disrupted, he observed: ‘an increase in the productiveness of our soil...crops now grow where formerly they would not...grass is much more plentiful...one begins of late to miss on our clayey plains the calcined and barren appearance of thirty years ago’. He also ‘noticed that considerable tracts of eucalyptus forest in Victoria have succumbed to the attacks of parasitical insects’.

Howitt (1891) noted the consequences in Gippsland, including the first megafire in 1851, ‘very numerous trees which are probably not older than 30 to 40 years’, ‘dense scrub of gum saplings, *Pomaderris apetala*, *Aster argophylla*, and other arborescent shrubs’ and ‘the increase of the leaf-eating insects which seem in places to threaten the very existence of the Red-gum’.

Early foresters mostly admired thick stands on rich soils. They overlooked the history of megafires, chronic decline, pestilence and loss of biodiversity and attempted broad-scale fire suppression in the early 20th century. By the mid-20th century the resurgence of megafires and pestilence induced them to employ broadscale prescribed burning, and fire safety and forest health temporarily improved (e.g. Mount 1969; Jurskis *et al.* 2003). Now there are ridiculous proposals for carbon storage through fire suppression by the Fenner School at ANU (e.g. Moroni 2012).

With the ascendancy of the wilderness myth since the 1980s, forest policy and management have sought to ‘win over’ inner city electorates. They have been overly concerned with tenure as evidenced by the high priority given by the NFPS to establishment of a Comprehensive Adequate and Representative Reserve (CARR) System. Management of reserves has received little attention. This is partly a consequence of the NFPS which mandates research, long-term monitoring, adaptive management and protection of ecological processes *outside* the CARR reserves but not within (NFPS p. 10–11).

Thus the NFPS ignores a history of about forty thousand years of intensive human management (Gammage 2011; Jurskis 2011) and assumes that lack of human intervention is good for biodiversity. However, the wilderness myth has been exposed and a human role in shaping natural ecosystems and maintaining biodiversity is now widely recognised (Denevan 2011; Gammage 2011; Jurskis 2011).

For example, pestilence and loss of biodiversity occurred through Europe when long-established human activities such as chestnut tending, grazing, mowing, litter raking and/or timber harvesting were stopped (Prietzl and Kaiser 2005; Gustavsson *et al.* 2007; von Oheimb and Brunet 2007; Spitzer *et al.* 2008; Szabo 2010; Obrist *et al.* 2011). Diverse alpine meadows in China, shaped by 2000 years of traditional grazing and burning, were similarly affected when burning was prohibited (Sherman *et al.* 2008). The ‘fortress model’ of locking up forests in unmanaged reserves is losing favour globally as the biodiversity benefits of human economy gain recognition. For example, Maya in Central America have several swidden systems that contribute to the value of the Mesoamerican Biological Corridor (Diemont *et al.* 2011) and benefits of socio-ecological management have been demonstrated by the Kandozi in Peru (Sarkar and Montoya 2011)

In Australia, a greatly expanded reserve system is mostly mismanaged and the problem is compounded by increasing regulation of other lands to minimise ‘disturbance’. Since 1992 there have been at least fourteen megafires in southern Australia (Adams and Attiwill 2011, p. 16–18) and chronic decline of eucalypt forests has expanded affecting most endangered ecological communities

(e.g. Jurskis 2005; Jurskis and Walmsley 2012). Several rare species have suffered local extinctions as a consequence of ‘protection’, including eastern brown treecreeper (*Climacteris picumnus victoriae*), Hastings River mouse (*Pseudomys oralis*) (Jurskis 2011), broad headed snake (*Hoplocephalus bungaroides*) (Pringle *et al.* 2009) and plains wanderer (*Pedionomus torquatus*) (Gannon 2012). The common grasstree *Xanthorrhoea resinosa* is less common and has suffered local extinction as a result of ‘protection’ (Tozer and Keith 2012).

By contrast, ecologists opposed to timber production from Australian native forests have not been able to show that it has caused serious environmental problems and have consequently resorted to convoluted explanations of why it is difficult to find negative impacts (e.g. Lindenmayer and Laurance 2012).

Limited surveillance of native forest health occurs in eastern Australia in reaction to ‘pest outbreaks’ (Carnegie 2008), consequently the underlying causes, extent and progress of chronic eucalypt decline are largely unrecognised (Jurskis 2005). In Western Australia, closer surveillance revealed that prescribed burning limited outbreaks of gum leaf skeletoniser (*Uraba lugens*) in jarrah forests (Farr *et al.* 2004). Research in NSW (Turner *et al.* 2008), Tasmania and Western Australia (Close *et al.* 2011, Table 1) has elucidated the connection between prescribed burning, nutrient cycling and forest health (Mount 1969). Chronic eucalypt decline in the absence of burning is one facet of a global loss of biodiversity consequent to nitrogen accumulation (Bobbink *et al.* 2010; Jurskis *et al.* 2011).

Having witnessed dramatic scrub development in eastern Tasmania since the mid-1970s, I have no doubt (and no direct evidence) that the cancer epidemic currently threatening devils (*Sarcophilus harrisii*) is connected with this deterioration in their habitat. Disease epidemics are generally caused by increased stress in the host population (Wikipedia).

The priority of the National Forest Policy Statement on expanding reserves has been misused by politicians and conservation bureaucrats to justify reservations that are at odds with the Policy. Reservation of post-European forests of river red gum and white cypress does not contribute to a representative system. The red gum decisions provide an excellent case study of the ascendancy of non-stakeholders and poor implementation of the NFPS.

Historical records, remaining pre-European stands, and the form of ancient trees show that river red gum forests were lines or narrow strips of trees along rivers, creeks and runners (ephemeral effluent creeks) and around billabongs and lakes, or patches in river bends, whereas low floodplains carried reedbeds and slightly higher floodplains carried open woodlands of red gum. Aborigines managed these areas intensively, burnt fallen timber in broadcast fires, and in camping and cooking, celebratory and hostility fires, and used it in construction (e.g. Jurskis 2009, 2011).

The current extensive, dense forests could not be reasonably construed as a necessary component of a representative reserve system. City-based greens wanted to ‘save’ these forests. Melbourne Greens were successful and Sydney Greens were encouraged. The dysfunctional NSW Government gave them an opportunity to impose their will on regional communities. According to Fraser (2010), Environment Minister, Frank Sartor, said at Gulpa sawmill in Deniliquin: ‘Let me give you a lesson in politics. The Greens hold 15 per cent of the vote. And if we are to stay in power, we must hold their preferences to maintain city seats. They want a significant national park in red gum.’ Both Sartor in NSW and Victorian Environment Assessment Council acknowledged that local communities would suffer significant socio-economic dislocation for the ‘benefit’ of city dwellers (Joss 2012).

Environmental bureaucracies paved the way for political decisions by misrepresenting the history and ecology of red gum forests (e.g. Natural Resources Commission (NRC) 2009). They were assisted by academia including the Professor of Forestry at ANU who chaired the NSW ‘Technical Review Panel’. The Commissioner referred to ‘the most extensive red gum stand in the world’. The report stated that ‘ringbarking was carried out to open up pastures’ and ‘a thick understorey of natural regeneration developed in newly cleared areas’ after the 1870s floods (NRC 2009, p. 24).

In fact, the first grazier in the area stated that ‘this country possessed from the first, over a great portion of its area, the inestimable advantage of being ready for immediate use without the outlay of a sixpence.’ Curr (1883), who introduced the concept of Aboriginal fire-stick farming, considered that

‘it may perhaps be doubted whether any section of the human race has exercised a greater influence on the physical condition of any large portion of the globe than the wandering savages of Australia’. This and other first-hand evidence from Oxley, Sturt and Mitchell as well as other early settlers and foresters (see Jurskis 2009, 2011) was ignored by the NRC (2009) which stated ‘it is difficult to draw conclusions about the linkages between the use of fire and forest structure at the time of European settlement.’

Thus the scene was set for reservations and the decision was ‘justified’ on the basis that river regulation prevents forest ‘regeneration’. The report advocated active management whilst paving the way for more passive management. Both reports perpetuated the pseudoscience that high levels of fallen timber supported pre-European biodiversity. Estimates of natural loads of fallen timber in river red gum ignore the historical records and derive from a single measurement taken in a post-European stand on a site that had no trees under Aboriginal management (Curr 1883; Jurskis 2011). Furthermore there is no evidence of a positive correlation between biodiversity and fallen timber in eucalypt woodlands (Jurskis 2011). Both decisions ignored forest health problems consequent to reduced burning and grazing (e.g. Jurskis 2005, 2008) and sought to reduce grazing.

After paying ‘compensation’ to local industries that were thinning dense forests, both states are now ‘trailing’ thinning to waste for ‘ecological’ reasons. This provides negligible employment, interferes with recreational values and creates a fire hazard. The trial plan states that ‘The duration and frequency of floods would have acted to limit widespread recruitment of high density stands. In concert with altered flood regimes, management for commercial timber extraction has altered these natural processes, resulting in widespread establishment of high stem density stands and a paucity of large trees in the landscape.’ (NSW office of Environment and Heritage and Parks Victoria 2012).

Thus the conservation bureaucracies alleged that reduced flooding prevents ‘regeneration’ **and** produces dense stands of red gum! Most of the extensive red gum forests actually established in the 19th century consequent to disruption of Aboriginal burning, and additional areas established as a result of reduced flooding after construction of Torumbarry Weir in 1922 and Hume Dam in 1936 (Hearn and Durrant 1990; Jurskis 2009, 2011). ‘Management for commercial timber extraction’ commenced with thinning of dense stands of saplings in the 19th century (Jurskis 2009).

The vision of the NFPS vs reality

- *The unique character of the Australian forested landscape and the integrity and biological diversity of its associated environment is retained.*

The character of the landscape continues to change from open forest and woodland to scrub, and biodiversity is being lost. The prevalence of megafires and chronic eucalypt decline, and ongoing local extinctions indicate loss of environmental integrity.

- *The total area of forest is increased.*

The total area of forest can increase or decrease according to how it is defined and assessed, and there is considerable public opposition to new plantations.

- *There is a 'holistic' approach to managing forests for all their values and uses so as to optimise benefits to the community.*

Ongoing socio-economic disruption and environmental degradation shows that this is not happening.

- *Private forests are managed in an ecologically sustainable manner and in close cooperation with public forest managers, to complement the conservation and commercial objectives of public forests.*

Ditto. Regulations intended to promote sustainable management are delivering perverse outcomes on public and private lands.

- *A range of sustainable forest-based industries, founded on excellence and innovation, will be expanding to contribute further to regional and national economic and employment growth.*

Ditto. Industries based on native forests are contracting throughout Australia.

- *Forests and their resources are used in an efficient, environmentally sensitive and sustainable manner.*

Ditto.

- *Forest management is effective and responsive to the community.*

Ditto. Community concerns are evident in the recent spate of bushfire enquiries, the formation of the Australian Environment Foundation in 2005 and the current NSW parliamentary inquiry into management of public land.

- *The Australian community will have a sound understanding of the values of forests and sustainable forest management, and will participate in decision-making processes relating to forest use and management.*

Ditto. The red-gum reports and decisions show that the greater Australian community has been excluded from decision-making processes by politically powerful minorities whilst the conservation bureaucracies have contributed to a general misunderstanding of sustainable forest management.

The NFPS unreasonably includes protection of wilderness as part of its objective of a CARR System. The definition of wilderness—‘not substantially modified by and remote from the influences of European settlement’—excludes virtually the whole of Australia as a result of post-European impacts on fire regimes and consequent changes in vegetation (e.g. Howitt 1891; Gammage 2011; Jurskis 2011). In NSW, the Wilderness Act 1987 provides that areas not be identified as wilderness unless they have not been substantially modified by humans or can be returned to such a state. Obviously we can’t resurrect the megafauna and their environment.

A major failing is that the NFPS mandates research, long-term monitoring and adaptive management only in forests *outside* the reserve system. As a result, reserve managers have not been brought to account and required to improve their management. Furthermore, conservation bureaucracies have sought to impose similarly inappropriate management on other lands, resulting in perverse outcomes and an inability of other land managers to implement adaptive management. Hastings River mouse provides a good example. Monitoring showed that it was absent from national parks that were protected from grazing and burning, and were overrun by shrubbery, antechinus and bush rats (*Rattus fuscipes*) (Jurskis 2005), but the environmental bureaucrats ordained that apparently suitable habitat on state forests must be ‘protected’ from grazing and burning.

Protection of ecological processes is mandated under the NFPS only for production forests with regard to regulating wood supply. Thus megafires and chronic eucalypt decline are partly symptomatic of a policy failure. The NFPS recognises that governments have a role to play in minimising adverse socio-economic impacts on regional communities of reduced wood supply, so the red gum and cypress debacles are not so much a failing of policy as a failing of implementation. The NFPS stated that those affected by policy should have input into its development, and provided for an advisory body whose effectiveness was to be reviewed by the end of 1995. I know nothing more of this but it is clear that the intent was not realised.

The NFPS also stated that grazing in native forests can have a significant impact and severe implications. This prejudicial statement contrasts strongly with the reference to the ‘potentially harmful’ effects of wildfire and, in my view, reflects a longstanding campaign of pseudoscience by ecologists with a wilderness mentality. For example, Lunt *et al.* (2007) assumed that native plant species in river red gum forest had been depleted by grazing and predicted that exclusion of grazing would not promote ‘recovery’ because of the ‘high degree of initial degradation’ and the low site productivity. However the studies they cited to show degradation did not indicate loss of plant species as a result of grazing. Lunt *et al.* (2007) found no difference in species richness after exclusion of grazing for 12 years and differences in composition between grazed and ungrazed did not increase over time. Species richness was naturally low in regularly flooded areas such as their study site and increased where flooding was reduced (Stokes *et al.* 2010). Lunt’s *et al.* (2007) study provided no support for their assumption of ‘initial degradation’.

Another study showed no difference in species richness between areas that were heavily grazed and areas that had been ungrazed for more than half a century (Robertson and Rowling 2000). Red gum saplings, other vegetation and litter (fuel) were much more prevalent and there was less bare ground in ungrazed areas whilst species richness was lower where tree canopies were denser (Robertson and Rowling 2000). This indicates that grazing can substitute for the natural fire regime and maintain biodiversity and fire safety. It is clear that exclusion of grazing can have negative consequences for

fire management, forest health, biodiversity (e.g. Jurskis 2005, 2008, 2009, 2011) and water yields (e.g. Anon. 1969). However the NFPS takes a 'guilty unless proven innocent' attitude to the issue.

The future

The failings of the NFPS could be corrected. References to wilderness would be irrelevant if the definition was strictly applied. Requirements for research, monitoring, adaptive management and maintenance of ecological processes could be extended to cover reserves by restructuring the document to remove the artificial segregation of planning and management requirements between reserves and multiple-use forests. This would effectively remove the implicit assumption that land tenure can have inherent conservation value, and encourage zoning of management style within individual tenures.

Prejudicial statements about grazing impacts could be replaced by a universal requirement for assessment of grazing against alternative options such as burning or slashing before making any changes in the status quo. Recent decisions to allow grazing in national parks to restore habitat for the plains wanderer (e.g. Gannon 2012) give some small optimism that a more rational approach can prevail.

Forest management requires a major shakeup. This was recognized a decade ago in North America (e.g. Allen *et al.* 2002, Hessburg *et al.* 2005) where thinning and burning are being applied in many adaptive management programs dealing with similar problems of megafires, chronic forest decline and loss of biodiversity (St Clair and Jurskis 2010). In Australia, a sustainable model of conservation requires a major change in culture within the environmental bureaucracies and academia, both of which are dominated by a wilderness mentality. The red-gum decisions, and the 'landscape trap' and carbon storage myths propounded by the Fenner School at ANU (e.g. Ferguson and Cheney 2011; Lindenmeyer *et al.* 2011; Moroni 2012) provide examples. Also, 125 'scientists' opposed to a grazing trial in the Alps wrote to the Victorian Environment Minister that 'the negative ecological impact of cattle on Australian native ecosystems is well documented' (Concerned Scientists 2011) providing further evidence of this culture.

The environmental and socio-economic damage of the NSW red gum decision could be partly remedied by such a change of culture. Section 30E (2) (f) of the NSW *National Parks and Wildlife Act (1974)* provides for sustainable use of modified natural areas having regard to the conservation of the park's natural and cultural values. Modified natural area means an area of land where the native vegetation cover has been substantially modified or removed by human activity and that is identified in a plan of management as not being appropriate for or capable of restoration. Rather than conducting a token thinning trial in less than 0.3% of the new reserves, a responsible parks bureaucracy could resurrect the commercial thinning industry before its corpse decomposes. The environmental and socio-economic benefits of this industry have already been demonstrated and could continue to be monitored at no net cost to the taxpayer.

Attiwill and Adams (2008) wrote that 'scientists must enter the foray (sic), using the fighting words of politics rather than maintaining the protective mantle of neutrality'. I think it is more complicated than that because corruption of science and politics have run parallel. An ecocracy has developed whereby like-minded academics and bureaucrats provide political spin in the guise of independent scientific advice. Foresters in bureaucracies have been understandably reluctant to speak out. Bill Gammage has done an outstanding job of exposing the wilderness myth and has gained some political 'traction' with prestigious literary awards. Understandably, Bill's treatment of ecology is not as strong as his history, and it will be up to foresters to demonstrate that burning, thinning and/or grazing can be used to restore ecosystem function in native forests. We should begin by better documenting current dysfunction and clearly explaining the causes.

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The need for the Institute of Foresters of Australia to provide more leadership

Robert L. (Bob) Newman OAM*

BSc (For.) (Melb.) Registered Professional Forester FIFA, FCFA, N.W. Jolly Medallist

PhD student, Southern Cross University

Email: rln@dmnewman.com.au

‘Those who fail to learn from history are doomed to repeat it.’—Sir W.S. Churchill

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*Currently Vice-President and former Chairman of the Governing Council of the Commonwealth Forestry Association.

Foundation Member and former President of the Association of Consulting Foresters of Australia.

Sometime Hon. National Secretary of the Australian Forest Growers Inc.

Foundation Board Member of the National Association of Forest Industries.

Some time President of Canberra and Hobart forest industry clubs

Life member, Timber Communities Australia

Introduction

The purpose of this paper is to draw to the attention of foresters that the future success of sound sustainable forestry in Australia depends to a large extent on a strong pro-active Institute of Foresters of Australia, responsive to national affairs affecting forestry.

Indeed the word 'Foresters' was preferred over 'Forestry' for the Institute title by those foresters who created the IFA to emphasise that the Institute's members themselves should be aware that their ability can drive forestry forward in the interests of Australia and to support policies that allowed them to give personally their unrestricted best to their work. Since the training of foresters in Australia started a little over 100 years ago, enormous challenges have occurred in a profession of practical scientists working mainly away from populations with long-term plans to do the best for the forests—native and man made.

Foresters, at this time, are seen to be on the back foot in their influence on forest policy. To regain society's support there is a need to heed history, as the Winston Churchill quote says, and recall that 130 years of very little forest management following European settlement were followed by a successful period from 1920 to 1980. Now foresters will again have to fight to maintain sound forest management, hopefully aided by an enlarged IFA administration as described in this paper.

Some history of forestry and the first phase of the use of forests

A search of literature on forest activities from the time of arrival of European settlers in Australia in 1788 to the end of the nineteenth century shows little to be proud of—there was very little forest management in Australia except in South Australia from 1875 (Lewis 1975).

In the late nineteenth century, after many years of pressure from the public and government departmental heads, foresters were invited from the Indian Forest Service (IFS) to report on the state of forests in Victoria. F.D'A. Vincent, of the IFS, reported in 1887, but his report was not published as it indicated a poor state of forest management. However, his inspection resulted in the appointment of G.S. Perrin as the first conservator of forests in Victoria. He had had experience in South Australia and then in Tasmania (Carron 1985).

In 1895 Inspector-General Ribbentrop of the IFS came, having worked in India with eminent German-trained foresters Brandis and Schlich. In his report, published by the government, he emphasised the extraordinarily backward state of forest management. This resulted in a Royal Commission in Victoria and, after a lot of political resistance, a Forest Act was passed in 1907.

At about the same time there were also concerns in other states at the lack of forest management—for instance in 1907 New South Wales had a Royal Commission concerning the state of forests, resulting in a Forest Act in 1916.

These concerns started to have overall national traction; professional forest education at the diploma level for forest management commenced in Victoria in 1910.

South Australia, because it was substantially devoid of commercial forests, started plantations as early as 1875; the stimulus to educate students at a university level in Adelaide probably came from those working in that state. Lord Robinson was the first Rhodes Scholar in 1904 from any discipline from Adelaide University; he was followed only a few years later by N.W. Jolly—both used their awards to study forestry under Schlich, who had become Professor of Forestry at Oxford University. Robinson went on to head the UK Forestry Commission and Jolly was an outstanding career forester in Australia.

Adelaide University made a forestry degree available in 1911 and Cyril Cole OBE, who retired as the Chief of ACT Forests in 1956, was its first graduate in 1914.

A mention too should be made of David Hutchins, an experienced British forester who came to Western Australia in 1914 for a conference on science. He was then invited by the Federal Government to report on the state of forests in each state, which he did, taking some four years to complete the request.

Commencement of forestry education

In 1926, with the blessing of the Federal Government, the Australian Forestry School (AFS), located in Canberra, was founded; arrangements were made with all state governments and Australian universities to provide a forestry degree based upon two years study in science at a university followed by two years study at the AFS, which operated with Federal Government funding. Lane Poole was appointed acting principal.

The commencement of forestry education in Australia was the most useful and significant event in the history of forest management in Australia, and signalled the end of neglect of public forest management.

A second phase

A second phase commenced in the 1920s, resulting in forest management being driven by much forest science, particularly in the silvicultural treatment of native forests in several states on a considerable scale; the successful kiln drying of hardwood timber; the development of a major pulp and paper industry; and the commencement of establishment of substantial plantations.

Research by Ian Boas and Louis R. Benjamin early in the 1920s at the Perth Technical College, and subsequently in Melbourne, successfully showed the potential of eucalypts for paper-making. Forest products research was seminal in the subsequent development of a large Australian manufacturing industry, as well as lifting the standard of living in country areas. The resources generated by this industry enabled fire protection and other forestry objectives to be pursued.

These developments encouraged people like Sir David Rivett, a leader of the Council for Scientific and Industrial Research (CSIR, to become the Commonwealth Scientific and Industrial Research Organisation, CSIRO, in 1949), to include forest products research in that organisation as a division in Melbourne in 1928. The division played a part between the First and Second World Wars in developing kiln drying of eucalypts. This resulted in more profitable sawmilling of ash-type eucalypts in Victoria and Tasmania, yielding a product suitable for flooring and shop-fitting rather than simply green structural material. Knowledge of the mechanical properties of Australian woods, gained in the 1930s, enabled publication in 1939 of a *Handbook of Structural Timber Design* which became a key reference work and led to development of national and international standards.

Max Jacobs, a young forestry graduate of the University of Adelaide later to become an iconic silviculturist, joined the Commonwealth Forestry Bureau in Canberra as a researcher in 1933.

These positive developments in the 1920s and 1930s led to recognition of a need for advocacy of the three current main influences: professional forest policy, standards of forest management, research and education. The university-trained foresters of those times considered a professional institute could form the vehicle to expand the overall role of forestry. A Western Australian forester, Stephen Kessell OBE, and other senior foresters on the 10 December 1935 formed the Institute of Foresters of Australia, with Kessell as chairman, Max Jacobs ISO as secretary and W.D. Muir (NSW), J. Incoll (Victoria), G.J. Rodger (South Australia) and C. Haley (Queensland) as committee members.

Lane Poole too encouraged the formation of the IFA, as he and Lord Robinson had been the drivers of the founding in 1921 of the world-wide Commonwealth Forestry Association.

The objectives of the IFA

To refresh or remind foresters, the core objectives of the IFA were and continue to be:

- to promote and encourage the study of the science and practice of forestry in all its branches
- to raise the status, advance the interests and improve the technical and general knowledge of persons engaged in or proposing to engage in forestry
- to collect and circulate statistics and other information relating to forestry in all its branches
- to originate and promote, in the interests of the Institute, improvements in the law.

These objectives have served members well and this review of the advantages of expanding the IFA role is now timely, with already a sound base. A future role for the Institute in line with its objectives will be examined in the second part of this paper.

The wave of commercial as well as environmental interest in forestry developed right through the Second World War, and interest in training of foresters expanded in 1945 when the University of Melbourne first offered a degree in forestry science that did not entail attendance at the Australian Forestry School. The second phase of what was the sound development of forestry continued up to the 1980s when, as access to forests increased, some environment lobbies became vociferous about the felling of trees and another political game returned—one more difficult to deal with than the *laissez faire* political attitude of the previous century. This third phase is where we are now.

The third phase

By examining the roles of people and policies with influence on forest management the IFA can combat negative views on forestry. The three main influences are:

The politicians—Politicians allocate funds for forestry-related activities and are responsible for forestry policy on Crown and some private land; their major fault in recent times has been to listen to a small but influential group espousing the locking-up of forests against forest management

The foresters—In the middle are the foresters, who have not been good communicators although having done much good work over many years on a combination of forest and environmental management including timber stand improvement and plantation development

The environmental lobby—The environmental lobby, by skillfully using the media has damaged much of the fabric of forest management foresters have built, and, in the process, caused governments to spend a lot of money on reports in order to satisfy political pressures to little good purpose.

Some examples of the negative bias on forestry matters could include the Australian Broadcasting Corporation which has, over a long time in most Australian states, apparently found it hard to produce balanced reporting on forest management. This is difficult to understand, bearing in mind the high quality of most of its programmes. Newspapers—for example the *Canberra Times* (which has no local competition) and the *Melbourne Age*—are not known in forestry circles for their balanced reporting on forestry matters either.

All those purveying negative views on forestry matters seem to have had little understanding of the real impact of persuading leading politicians, for instance in the Victorian and the New South Wales Governments at various times, on matters affecting the nation and forest management. They certainly have disappointed those working in forestry, who have sound intentions with scientific objectives.

Another example of negativity towards forestry occurred when a leading Federal Cabinet minister in the 1980s decided, after a short period, to disband the Forestry and Forests Products Industry Committee, which had representatives of all states and the Commonwealth, because the advice offered did not suit the minister, even though that committee was one of a number of industry advisory groups set up by that minister.

To make matters worse, some organisations mentioned above have been considered as directly or indirectly responsible for experienced and respected senior foresters resigning because either the implementation of a proposed policy would have led to poor practice, or the preferred use of opinion from multidisciplinary departmental heads having not enough knowledge was impractical, or did not make policy or financial sense.

As well, the volume of logs allowed to be removed from particular native forests and the price that industry paid for pulp and sawlogs may well have been influenced too much by a combination of local politics and representations to politicians by trade associations and industry itself.

It is hard to recall an accurate statement from the environmental lobby about forestry, or any policy supporting anything useful which has been achieved in forestry. And much has been achieved by the forestry profession for both Australia and other countries despite some problems justifying criticism.

The tragedy is that at the time of the rise of environmentalism support was needed for the forestry profession, but the reverse has occurred.

The fallout from misinformation about forest management

So what is the fallout to date from the third phase of forestry which has come from the activity of the environmental lobby in the last 25 years?

The outcome of the misinformation about and bias against forest management have been very hard to contain. Indeed, it might be concluded that this misinformation has put off students, often through their parents, from considering careers in forestry. Poor media reporting has contributed to a reduction of state and federal government priorities in funding forest management. This has resulted in state forest services being managed in large multiservice departments or, for instance in the case of Queensland, forestry being administered at one stage by four or five different departments to ensure little traction. Sales of some government plantations to redress shortfalls in state government finances have been at prices considered in forestry circles to be too modest.

These factors have resulted in several serious losses to forestry in recent times, one being the destruction of the state forestry organisations with a forester as a head. The lack of current investment in establishing either hardwood or softwood plantations for sawlog production is causing a shortfall of at least 15 000 ha of new plantation per annum to hold imports down and to service an increasing population. The expansion of national parks has brought with that decision some objectives that are to be regretted.

Another example of politicians using the politics of forestry to get votes is the recent rejection of forestry as a carbon credit source when the contribution forestry could make to carbon sequestration figures could be large.

The recent loss of research facilities managed by CSIRO for both forestry and forest products is an enormous blow to the best interests of Australia and of a number of other countries with which we interact.

The scope for training of professional foresters and the number of students is no longer adequate in at least one university that, in years past, has taught the majority of forestry undergraduates in Australia. For too long has this position been allowed to continue.

How to rebalance activity

What should foresters do to re-balance forest land-use management and to stop the return of foresters to a political battlefield experienced in most of the nineteenth century and again since the 1980s?

The solution lies in a strong, competent Institute of Foresters of Australia with the backing of the majority of the population.

The Institute of Foresters of Australia has a good reputation for the soundness of its policies, and one hears very little criticism of the performance of foresters themselves. It is pleasing to note that both the current Victorian and New South Wales Governments now have an IFA representative on their forestry advisory boards. One might question, however, the integrity of some in the environmental movement which seemingly acknowledges in conversation the competence of foresters but in fact ignores them.

A number of current factors in forestry need serious attention to get adequate forest management back on track. Some inadequacies are:

Public relations

Once the National Association of Forest Industries (NAFI) was formed in 1987 after years of often self-serving, differing views on policy for the forest industries it was hoped that the Association would be able to promote forestry and its products using consistently good information and TV. There were good intentions and one TV product showing a schoolteacher espousing forestry scientifically was a success, but after a time the public relations projects became too modest to have much impact. NAFI,

however, did well in representations to government over a long period, and has now amalgamated with another forest industry body as the Australian Forestry Products Association (AFPA).

Some kindred IFA organisations were briefly members of NAFI, but not the IFA itself. The forestry community as a whole needs to be pro-active and respond promptly to matters of political and public interest. A priority objective of an expanded IFA should be continual professional public relations, responses to negative media commentary and untrue or biased claims about forest operations and management, and the presentation of accurate forestry information. There need to be several functions a year involving the public, drawing attention to the role of forests and foresters in society on a year-by-year basis. The forest industry and governments need to communicate much more consistently to the public the advantages of multiple use of forests and the importance of wood generally.

Legislation

One means of stabilising forestry's role is to stop public and private forest land going from multiple to single use. Legislation in each state, supported by an Act of Federal Parliament, should define areas in each state for multiple-use forestry in native forests including harvesting and regeneration. Stephen Kessell suggested this to the NSW government as long ago as 1935, but at that time it was rejected.

A legislative approach could be that any change to forest areas above a nominated threshold should be decided by an Act of both a state and Federal Government at the same time, and permitted only at least 12 months before or after state or Federal elections.

This would prevent forests being used as political footballs to gain votes, and ensure the nation has a balanced policy on the amount of forest land for multiple use.

Education

Education standards and the specific breadth of syllabuses of tertiary undergraduate and masters class-work degrees need annual reviews by a professional committee of the IFA. Universities wishing to teach forestry should have IFA accreditation.

There is a need to encourage students to study forestry and to ensure their courses reflect the needs of the profession and of industry.

As a reminder of the scope of forestry training, at least 20 subjects are part of a foresters professional equipment, namely: introduction to botany, physics, geology, chemistry, silviculture and mensuration, forest operations and management, engineering, forest ecology, environmental principles including EISs, fire, surveying, entomology, soils, forest economics and policy, dendrology, statistics, leadership principles, forest products including wood technology, timber marketing, meteorology and OH&S.

Student selection

Most students wishing to enter forestry as a career should be interviewed and selected for either an IFA scholarship or a reintroduced government one, similar for instance to the process used in selecting potential military officers for training. A minimum intake of undergraduate students per year should be established. The reintroduction of Commonwealth Forestry Scholarships would be likely to solve the current shortage of forestry students.

There is no check at the moment either on whether a student is likely to make a good forester or not when they currently enter a university forestry course. Reliance on the level of marks gained in school year 12 exams is not a sufficient gauge of suitability.

Career path

A return of foresters to a career path would result in confidence that the native forest estate in Australia would be more efficiently managed by foresters, including national parks where large areas cost much more per hectare to manage than those managed by forest services.

A ministerial forestry department responsible for forestry should always be headed by a professional forester aided by a senior administrator able to steer graduates to gain experience and maintain interest in their forestry careers.

Policy

There is a need for the IFA to have a stronger relationship with other organisations involved with drawing up or commenting on forest policy for government submissions. Such cooperation should include, where appropriate, the Australian Forest Products Association (AFPA), Forest and Wood Products Australia (FWPA), the national parks associations, the Australian Forest Growers (AFG), forest industry state associations, Timber Communities Australia, and Forest Contractors Association.

As well, regular connections should be made and kept with ministers of the Crown and heads of government forest services.

Finance

There is a need to have a watching brief on the annual budgets for forest management and plantation expansion for each state, and an input from the IFA as to priorities and their levels. Recommendations for a larger administration team in order to allow the IFA to cope with addressing current forestry inadequacies would be helpful for employees' careers.

The objectives of formulating policy on public relations, legislation, education, student selection, career paths, policy and finance can be successfully pursued by the IFA by adjusting the structure of inputs to and outputs from the Institute, but entail a greater work load for the IFA administration.

Current IFA management structure

The IFA Board meets four times a year. Divisions of the Institute have their AGMs some two or three months before the IFA AGM in November each year. As occasion demands members of the Board and divisional committees may hold telephone conferences at other times.

The Board consists of the chairperson of each division, one for each state, plus the ACT (including Northern Territory and overseas members), and the chairman of the Association of Consulting Foresters of Australia.

Branch chairpersons are members of divisional committees, and branches have a chair, secretary and treasurer and at least one committee person. Branches exist when regional members wish to support such an arrangement.

The president is elected by all full members and does not have to be a divisional chairman but has to be a full member of the IFA. The CEO of the IFA is appointed by the board and does not have to be a forester. The CEO acts as the administrator, secretary and treasurer of the IFA, with statutory responsibilities as required for institutes of this nature.

Suggested amendments to current arrangements

Several amendments to the current arrangements would add to the efficiency with which responses considered to be required could be provided. These new arrangements would include a set of formal committees called subject committees, more detail of which is given below.

Appointment of a patron

A patron is desirable whose experience would have embraced forestry matters and who would be a personality well-known in the community.

Supporting deputy president

The president needs to have a deputy who would also be a board member and who would be a point of referral for the office and members to interpret the president's views when that person is unavailable, and who, when necessary, would represent the president at functions. The person would liaise with the CEO on activities of subject committees.

Supporting staff for CEO

An additional member of staff is required for larger IFA inputs (at the moment there is only one support position). A second person is required to ensure dissemination of pro-active IFA views, and prompt responses to policy and PR issues. That person should preferably be a professional forester who could be appointed for a fixed term on a rotation basis from different divisions.

Membership

An annual membership drive at the time of World Forestry Day, combined with year-round encouragement from divisional and branch committees should lift member numbers. There is also a need to examine and enhance the relationship of the ACFA and the category of Registered Professional Forester. As well, practitioners in forested national parks should be encouraged to join those working in the many other facets of forestry.

Meetings

Each divisional committee should meet four times a year in person and have a chairperson, secretary and treasurer and at least two committee members.

The IFA CEO would be responsible for the overall good operation of subject committees.

Publications

The Forester magazine should have a page regularly listing all IFA office bearers, that is board members, divisional, branch and subject committee members, with a very brief resume of each person and their emails and telephone access. Dates of meetings would be listed and summaries would appear in *The Forester*.

After the divisional AGMs occur a report of activities should appear in *The Forester*.

The excellent weekly newsletter would continue. Reports on committee decisions, with a brief explanation, should also appear in *The Forester*.

Reports arising from the wide range of work undertaken by foresters and their immediate colleagues should be made available to national and international audiences through the Institute's journal *Australian Forestry*.

Records

Each member should submit, when they join the IFA, a resume and a photo that then become an archive updated annually with career movements when paying annual fees. This would ensure members skills and experience are easily identified.

Subject committees

Each second year at the time of the biennial conference the board would nominate and declare subject committees, consisting of three persons, to deal with the following matters and to respond to queries by the CEO and the board. Where possible committees should use Fellows of IFA on the basis of their experience, level of interest and time available.

PR subject committee responsibilities

The IFA needs to respond promptly to matters of public interest, and to continually provide professional PR responses. The presentation of forestry information needs to be a top priority. As well there need to be at least three functions a year presented by the IFA in each state, attracting politicians and the media, and the involvement of associated organisations committed to multiple land use forestry,.

The activities in each state should include the celebration of World Forestry Day, a state award for forester of the year and parliamentary dinners, both Federal and state. Compilation and presentation of information of interest for potential foresters is also necessary.

Such activities would lift the profile of foresters and would inform policy-makers about forestry. It would ensure both the divisions and branches have a clear role in educating the public. One approach to the cost of PR would be for all forestry organisations to meet the costs of a person trained in PR and all contribute to the cost.

Policy subject committee responsibilities

Nearly twenty IFA policy statements have been approved by the IFA Board—possibly most members have not read all these, but they should. The statements are most useful; the number needs expanding and they should be used much more in the political and public arena. The statements are about:

- Wood for bioenergy (2002)
- Woodchips from Australia's forests (2002)
- Environmental services from forests and their valuation (2003)
- Use of chemicals in plantation forestry (2003)
- Clearing native forests for plantations (2003)
- Old-growth forests (draft) (2004)
- Conservation and management of rain forests (2005, revised 2010)
- Forest management planning (2005)
- Forest genetic resources (2007)
- Genetically modified organisms in forestry (2007)
- Maintaining forest health (2009)
- Future directions for Australian national forest policy (2009)
- Conservation of remnant native woodlands (2010)
- The role of forestry as a primary industry (2010)
- Environmental credentials of timber as a building material (2011)
- Social values in forest management (2011)

Fire subject committee responsibilities

All aspects of fire, including preparing reports for public enquiries

Awards subject committee responsibilities

Awards and representation for external awards including the Order of Australia should be handled. This could include scholarships.

Education subject committee responsibilities

Forestry education committee would be responsible for encouraging policy for education in Australia and maintaining standards and suitable syllabuses for training foresters. Some travel would be required to discuss courses at teaching institutions once policies have been established.

Ethics subject committee responsibilities

A code of ethics should be handled and is necessary for a variety of purposes, including RPF concerns with employment dealing with product disclosure statements and responsibilities.

Publications subject committee responsibilities

Responsible for the journal and where necessary support the CEO concerning *The Forester* and other publications. The IFA should particularly foster reprints and on-line publication of textbooks on forestry and forest products.

Finance subject committee responsibilities

Assist in expanding the cash flow to the IFA and encourage the further development of the scholarship fund. To undertake an expanded role there would be a requirement for an increase in fees and or other support. At the moment annual subscriptions are below those of similar organisations.

Conclusions

The IFA needs to position itself to be recognised for a strong role for the education of foresters, for setting of standards of education and for the profession of forestry.

The Institute's most important activity must be to provide the majority of the population with correct information about forest management in Australia. This will require a person with forestry training to deal with forest policy and dissemination of information about it.

The third need is the further development of the IFA *Forester* to include an annual supplement for limited distribution to schools and to the public. This would require industry financial support.

An appointment of a patron would make sense. A sympathetic high-profile person would add to the public's view that forestry is important and encourage participation in at the least World Forestry Day.

A deputy president would reduce the work load of the president, and the effectiveness of subject committees would be enhanced.

A review of finance to deal with a larger activity would be necessary.

The involvement of Fellows to be subject committee members, where suitable, makes sense.

The first subject committees to be appointed should be one on education to encourage more students, and one on PR.

The increased influence on forest matters would produce beneficial advantages to the nation, the forestry and forest products industry, and to the community in general. This anonymous quote might spur many more members to assist in the cause of forestry:

Those who turn up usually win!

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Notes

This paper draws on detailed knowledge obtained by the author from participation (1952–2012) in many committees (see footnote on first page) and personal conversations with senior forestry, forest industry and university leaders covering the issues described. The author believes he has reported events correctly but apologises if he has recalled any events incorrectly, or shown bias, because of the march of time.

