Benefits from the Forest

Original text for 2007 edition by Gary Q. Bull, Associate Professor, and Steven Northway, Research Scientist, Faculty of Forestry, University of British Columbia, Vancouver, Canada

Data updated and revision of text on Fuelwood and Employment by Jim Ball, Chair, Commonwealth Forestry Association

This chapter describes the many tangible and intangible benefits that are derived from forests. It considers industrial products, such as sawn timber, panels and paper and then looks at fuelwood, a product that is often over-looked by policymakers and planners but is of (literally) vital importance to millions of people in developing countries as the source of domestic energy – and is becoming more important as a source of renewable energy in developed economies. Next, the chapter reviews non-wood products – also often ignored in national accounts, but often of major importance to the livelihoods of rural people in developing countries and, again like fuelwood, of increasing importance in developed countries. Finally, the chapter considers the intangible benefits – the environmental services that forests provide such as watershed control, the protection of farmland and livestock from the effects of the weather or the sequestration of carbon, and the social and cultural benefits that accrue from the production of these goods and services.

BELOW
Fuelwood is of vital importance to millions of people in developing countries such as Tanzania.

Industrial products

Figures for the production and consumption of industrial roundwood in Commonwealth countries are summarised in *Table 3.1*, extracted from *Annex 4.1*.

Industrial roundwood production in the Commonwealth in 2006 was 21% of the global total, the same as in 2004. The largest producer is Canada, by a long way; other significant producers include Australia, Malaysia, South Africa, India and New Zealand, but none of them have more than 15% of Canada's production.

The principle Commonwealth roundwood importing countries (more than 100,000 m^3/year) are Canada, followed by India, UK, Bangladesh, Pakistan and Malaysia, while the principle Commonwealth roundwood exporting countries (more than 1 M m^3/year) are New Zealand, Malaysia, Canada, Papua New Guinea, Australia and Solomon Islands. The Caribbean SIDS are roundwood importers, but the Pacific island SIDS are often exporters.

Roundwood consumption does not necessarily mean that the production figure net of imports and exports is necessarily all used domestically; it may be processed and exported, or imports may be re-exported.

Figures for the production of processed wood products by some Commonwealth countries are summarised in *Table 3.2*; they include sawnwood, wood-based panels (plywood, particleboard, fibreboard etc.), pulp and paper and paperboard.

Canada is by far the largest producer in all four categories of processed wood products. Other important producers of sawnwood include India, Malaysia, New Zealand, Australia, the United Kingdom, South Africa and Nigeria. After Canada, the main producers of wood-based panels are Malaysia, the United Kingdom,

India, New Zealand, Australia and South Africa, and the main producers of pulp for paper, after Canada, are India, South Africa, New Zealand and Australia. Finally, the main producers of paper and paperboard, after Canada, are the United Kingdom, India, Australia and South Africa.

Commonwealth Industrial Roundwood Production and Consumption, 2006 and 2004 (1,000 m³) TABLE 3.1

Region	*Production*		*Consumption*		*Consumption /head*
	2006	*2004*	*2006*	*2004*	*2006*
Africa	41,717	44,361	41,348	43,826	0.10
Caribbean	366	355	453	442	0.09
North & Central America	185,832	198,120	186,830	200,048	5.56
South Asia	27,038	22,801	31,664	25,255	0.02
South-east Asia & Pacific	72,976	71,281	57,357	56,659	0.90
Europe	8,105	8,049	7,876	8,065	0.13
Total Commonwealth	336,034	344,967	325,528	334,295	0.16
World	1,635,069	1,644,318	1,635,857	1,646,667	0.25

Source: *State of the World's Forests 2009*, FAO, Rome.

Issues

From a business point of view, "mainstream" forest products industries are grappling with a number of related issues. They include competition from other industries, subsidies to other industries by certain countries, lack of innovation in product development, changing consumer tastes and new trade complexities.

The industrial forest products industry is undergoing a period of rapid change. On the one hand it is facing significant competition from other materials such as plastics, steel and aluminium in various applications; on the other hand, it is facing competition from other industrial sectors such as energy, where cogeneration processes are competing for wood for use in pellet plant installations.

The industrial challenges that have emerged with these two changes are further compounded by the eagerness of governments to assist – some refer to this support as subsidies. This distorts product pricing, raw material flow, land use economics and even market acceptance.

It is also generally agreed that the industry is not being particularly innovative; its investment in research and development is relatively low compared to other industries and there is a distinct lack of new product development. The blame for this is largely laid at the feet of the financial indicator "return on capital employed", which has been relatively low for a long period of time.

The industrial forest products industry is also facing a new type of final consumer, one whose tastes are changing, at least in many cases, to a non-rational use of wood or related products. The consumer is demand-

Production of Processed Wood Products by Some Commonwealth Countries, 2006 and 2004 TABLE 3.2

Country	*Sawnwood (000 m³)*	*Wood-based panels (000 m³)*	*Pulp for paper (000 tonnes)*	*Paper and paperboard (000 tonnes)*
Canada	58,709 (60,952)	18,189 (16,617)	23,481 (26,222)	18,189 (20,599)
India	14,789 (17,500)	2,554 (2,341)	4,048 (3,425)	4,183 (4,129)
Malaysia	5,129 (5,598)	7,767 (6,963)	124 (124)	941 (981)
Australia	4,784 (4,038)	1,989 (2,083)	1,153 (1,107)	3,221 (3,097)
New Zealand	4,269 (4,369)	2,223 (2,219)	1,562 (1,596)	944 (920)
UK	2,902 (2,783)	3,498 (3,533)	287 (344)	5,813 (6,442)
South Africa	2,091 (2,171)	726 (1,022)	2,915 (1,709)	1,793 (3,774)
Nigeria	2,000 (2,000)	95 (95)	23 (23)	19 (19)

Source: *State of the World's Forests 2009*, FAO, Rome.

ing greener products too, and as a result the industry as a whole has had to adopt standards, such as certification, that aim to demonstrate that the wood product is coming from a sustainably managed forest.

Forest products trade is being hampered by the coupling of forest as a raw material sources to the profitability of the manufacturing sector. This means in many countries barriers are erected to the free flow of logs. In addition, there has been a rise in non-tariff trade barriers such as certification and phyto-sanitary standards which may discourage trade.

Trends

The broad industrial trends indicate an increase in consumption in most industrial wood product categories, an increase in global trade in forest products despite the constraints on growth mentioned earlier, an increase in the use of engineered wood products, and an increase in material substitution.

The economics of wood supply, a very important component of forest management, have been turbulent, especially in those countries dominated by natural forests. There are the normal business cycle trends (such as in the housing markets), there is a marked increase in natural disturbances of the forest, such as wind, fire, insect and disease which affect both long-term and short-term supply, and there are competing uses of the forest leading to stronger log prices which can expand the economic zone.

At the macro level, there has been industrial restructuring in four ways: 1. the industry is further amalgamating creating larger companies on the global stage where the head offices are not in Commonwealth countries; 2. they are downsizing their manufacturing in some regions due to ageing plants, inefficient facilities or inappropriate product lines; 3. they are finding new business partners such as the energy sector or agribusiness; or 4. they are shifting their investments to locations with low input costs (e.g. labour), new emerging markets (e.g. India) or to areas where land management is not as complex (e.g. private industrial timberland).

At a more specific level the manufacturing sector has seen a marked decline in some specific industries such as newsprint, but a growth in industries such as Oriented Strand Board (OSB) and Medium Density Fibreboard (MDF) panels. There has also been a shift in production between countries.

In many Commonwealth countries, where property rights are unclear, there has been an increase in conflict over land use. The challenge is both to create industrial processing capabilities that are both viable and can incorporate the high costs of the "transition period".

Fuelwood

"Fuelwood" refers to wood consumed for energy production purposes, whether for industrial, commercial or domestic use. It includes wood converted to charcoal. *Table 3.3* shows fuelwood consumption in the regions of the Commonwealth, while *Annex 4.2* shows consumption by country.

Worldwide, fuelwood consumption increased between 2004 and 2006 by 6% and in Commonwealth countries by 4%. The consumption in Commonwealth countries represented 33% of total world consumption in 2006. Some country data are missing, however, and even where there are figures they are indicative only and in absolute terms may be unreliable.

Wood as fuel is most important as a source of energy in Commonwealth developing countries, and is especially important in African Commonwealth countries, where consumption is estimated as 0.59m^3/head.

India consumes the most wood fuel in the world (followed by China and Brazil). Within the Commonwealth India is followed by Nigeria, Uganda, Bangladesh, Pakistan, Kenya and Tanzania (*see Annex 4.2*). Wood energy consumption also increased in many developed

Summary of Commonwealth Fuelwood Consumption, 2006 TABLE 3.3

Region	*000 m³*	*m³/head* (2004)*
Africa	236,783	0.59 (0.59)
Caribbean	598	0.11 (0.12)
North & Central America	3,855	0.11 (0.12)
South Asia	365,624	0.25 (0.28)
South-east Asia & Pacific	15,876	0.25 (0.20)
Europe	179	0.00 (0.00)
Total Commonwealth	622,915	0.30 (0.33)
World	1,871,450	0.28 (0.28)

Source: *State of the World's Forests 2009*, FAO, Rome.
* population data from Annex 1.1

economies, by 3.5% yearly between 2005 and 2007, with Australia and Canada both using significant quantities of woodfuel (UNECE/FAO 2009). A survey in the UK in 2009 showed that 1% of respondents said that they used wood as a fuel in their home, either on its own, or with other fuels. Of these, just over half said they were occasional users, and 12% used it as the main fuel for domestic heating (see www.forestry.gov.uk/statistics).

There have been two other recent developments in the use of wood as a fuel, both more "high-tech" than solid fuelwood. The first is the use of wood pellets, where sawdust, shavings and other residues are used; Canadian exports of wood pellets are expected to reach 10 M tonnes/year by 2010, with British Columbia contributing over 30% of that amount – mainly derived from the conversion of pine which has died as a result of mountain pine beetle attack (Roberts, 2008).

The second development is the growth in the use of ethanol as a form of renewable energy derived from sugar cane, grains such as maize or vegetable oil such as palm oil, driven by increasing prices for crude oil. The conversion of cellulose into ethanol is also being studied; while the feedstocks such as waste wood, recycled newsprint or short-rotation plantations or even grasses are (or could be) more abundant than the other sources, the processing cost is currently higher than for ethanol derived from other sources – although this is also set to decline with further research and economies of scale. Roberts *op. cit*. gives a useful resumé of the situation, but more recently issues have been raised

The Importance of Fuelwood for Rural Domestic Energy in India BOX 3.1

A survey in 2004-5 showed that firewood and wood chips were used by 75% of rural households in India, followed by liquefied petroleum gas (LPG) which was used by 9% and dung (9%). Only 1% of rural households had moved to other fuels from firewood and chips since the previous survey in 1999-2000 and even since previous surveys in 1983 (79%), 1987-88 (78%) and 1993-94 (78%), possibly due to slow economic development and/or the unavailability of alternative energy sources. The use of firewood in rural areas seemed to be unrelated to household income, suggesting that few people buy fuel, mostly collecting it themselves.

In urban areas, on the other hand, 57% of the households used LPG, 22% firewood and chips, 10% kerosene and the balance other fuels. The use of LPG had increased by 13% since the 1999-2000 survey, seemingly largely at the expense of kerosene which decreased by 12%. Since the last survey the use of firewood had decreased only slightly, but by a great deal from 46% of households recorded in 1983 – an annual fall of 1% yearly, probably due to increasing urban prosperity.

It is projected that by 2020 the effect of increasing population, growing urbanisation and greater wealth the proportion of rural households using firewood will fall to about 65% – but the increase in population will still lead to an overall increase in fuelwood consumption of about 10%. If there are no interventions by the government then about half of that new demand will be met from state forests and the balance from trees outside forests; since demand for fuelwood already exceeds supply, then forest degradation will increase still further.

Source: Singh, 2008.

ABOVE
Recent developments in the use of wood as a fuel include pellets made from sawdust, shavings and other residues.

concerning the impact of biofuels on food production – and natural forests.

Issues

Fuelwood use in the Commonwealth is still growing, since biomass energy is seen to be a relatively clean and renewable energy and it is currently viewed as a "growth" industry. In developed economies many governments or utilities are now offering significant incentives (also known as subsidies) for investment in biomass energy. In developing economies the non-industrial consumption of wood is continuing to rise and is on the whole desirable in being from renewable sources. The challenge is finding the sustainable combination of land use practices that still produces fuelwood while at the same time providing food crops and other environmental services.

Trends

All statistics indicate that fuelwood consumption in developing countries is continuing to rise. The challenge with the growing population will be determining the sustainability of the "green revolution". That is, is there really a clever way that the inputs in fuelwood production can be manipulated, for example through the use of fertilisers or irrigation or through improved growth rates by genetic engineering? In developed countries recent figures indicate that new technologies can increase the use of fuelwood for wood pellets, ethanol and bio-refining and cogeneration in industrial facilities.

In both developed and developing economies the property rights assigned to fuelwood are often very poor, the product of fuel is not seen as economically significant and there are no clear targets for production that are linked to sustainability. These present major challenges to the users of fuelwood irrespective of the status of the economy.

Non-wood forest products

Non-wood forest products (NWFP) have been defined as "goods of biological origin other than wood, derived from forests, other wooded land and trees outside forests[1]". There is a vast range of non-wood forest products, from plant products used for food and fodder, the raw material for medicines, dyes and local tools and utensils, through exudates such as gums to animal products such as honey, bushmeat and even living animals. Non-wood forest products are increasing in importance in developed commonwealth economies and have been important for some time in developing economies.

In developing countries NWFP can make an essential contribution to livelihoods where many are of great importance the daily needs and employment of the poorest rural people. Most are traded locally and a few are traded internationally but although the recent Global Forest Resources Assessment (FAO, 2006)

1 This is the working definition adopted by FAO in 1999. The evolution of the definition is described in "Towards a harmonised definition of non-wood forest products", *Unasylva*, No. 198 Vol. 50, pp. 63-64.

attempted to quantify the removals and value of NWFP there is in fact reliable information on production or value of very few (Vantomme, 2003). A study of the marketing of NWFP in the humid forest zone of Cameroon, however, estimated that the value of the trade was the equivalent of millions of US dollars and that it offered income opportunities not only for large specialised traders but also for many small traders, most of whom were women (Ruiz Pérez *et al*., 1999)

In most tropical countries fodder is locally important in the dry zones while palm leaves, which are extensively used for thatching, are in even more demand where the tourist trade is important to provide the roofing for "authentic" huts. Wood is used for carvings and raffia and other fibres are used to make crafts for the tourist trade.

Considering the Commonwealth countries of Africa, honey and beeswax are important exports from Tanzania and Zambia, with some 10,000 beekeepers obtaining employment in Zambia (Non-Wood News, 2007). Some species such as the leaves of *Gnetum* spp. and the fruits of *Irvingia gabonensis* are provide food in the "hungry season" in West Africa, while the nuts of *Cola acuminata* are traded locally and nationally. Bushmeat is of great importance in rural diets in many East and West African countries, where it provides a low-cost and high-return supplement to farming; the poor may benefit in particular but less from their own consumption and more from market sales (Brown and Williams, 2003). Shea Butter (derived from the savannah tree *Vitellaria paradoxa*) is used both internally and exported from West African countries such as Ghana and Nigeria.

Cinnamomum camphora is grown in plantations in India and Sri Lanka, and essential oils e.g. *Citronella* sp. and gums such as Gum Tragacanth (*Sterculia* sp.) are harvested in India. Sandalwood (*Santalum album* and other *Santalum* species) is a root parasite from which a valuable essential oil is distilled; it grows in India (as well as Australia, Fiji, Kenya, Tanzania and Vanuatu) but its high price in recent years has caused over-exploitation and supplies are threatened so Australia has established

Rattan

BOX 3.2

An important non-wood forest product in international trade is rattan, used mainly for furniture but with a wide range of other uses from carpet beaters, walking sticks, umbrella handles, sporting goods, ropes, birdcages, matting and baskets. The market for rattan furniture in Europe, North America, Japan and other industrialised nations has grown steadily, and the trade in rattan furniture probably represents less than 4% of world trade of all furniture.

Rattan is a spiny climbing or trailing plant with around 600 species, found in tropical Asia and the Pacific where ten of the 13 known genera are found, and equatorial Africa. The main genera for commercial production is *Calamus*, but *Daemonorops*, *Korthalsia* and *Plectocomia* are also important. The largest producer country is Indonesia, but Malaysia, one of the centres of greatest species diversity, is another important producer that has made great strides in developing the industry in recent years. Other producers include Sri Lanka and Bangladesh.

Source: Kumar and Sastry, 1999.

Almost all rattan is collected from natural forests but in recent years uncontrolled harvesting and deforestation have seriously depleted the natural stocks in many countries. More than 31,000 ha have been planted in Malaysia with the large-diameter *Calamus manan* of which 7,000 ha are in rubber plantations. In addition, large plantations of mainly *Calamus caesius* and *Calamus trachycoleus* have been established on a total of 10,000 ha. Malaysia banned the export of unprocessed rattan in the 1990s and has since seen an increase of almost 200% in the export value of rattan products. A Small-Scale Entrepreneurs Development Unit (SSEDV) has been created, with financial support from the World Bank and the government, to provide technical and training support to the industry. An Agroforestry Unit established at FRIM has provided training and planting material for rattan planting in rubber plantations by smallholders. The results of all these efforts are increased foreign exchange earnings and employment opportunities in both the rural and urban sectors.

ABOVE
Maple syrup is the most valuable non-wood forest product. In this operation in Quebec, Canada, the pipes connect individual trees to a central vacuum pump which collects the sap through a suction system.

sandalwood plantations – with some Indian companies investing there (Non-Wood News, 2007). In both India and Bangladesh NWFP (including sandalwood oil) are used in Ayurvedic medicine, widely used by much of the population.

But in fact the most valuable non-wood forest product of all is from the temperate zone and a developed economy – maple syrup, from Canada. In 2004, 26.9 M litres of syrup were produced, with a gross value of C$151.9 million and 23.6 M litres were exported (Canadian Forest Service, 2006). In Scotland a survey found that for many people the collection of NWFP was important for personal satisfaction rather than commercial reasons; over 200 products re collected from 97 vascular plants and 76 fungi and non-vascular species, with edible uses the most popular (Emery and Dyke, 2006). In developed economies decorative foliage and Christmas trees have large markets.

Issues

The critical issues with NWFP are: finding the statistics to capture their importance, finding methods to estimate a sustainable harvest level, developing new markets for these products in developed countries, determining an appropriate property rights systems for resource allocation, determining a fair method of taxation and getting the appropriate technical support to those whose economic activity is dependent on the NWFP.

A great deal of the buying and selling of these products occurs in informal markets. Therefore it is difficult to describe to policy actors their significance to government revenues, their contribution to local livelihoods and their contribution to the increasing interest in "local" foods. A few non-Commonwealth countries have developed statistical systems to capture their social and economic importance but these are not widespread in the Commonwealth.

Although statistics are usually either unavailable or unreliable there is strong worldwide interest in NWFP and a great many networks and sources of information have developed. A partial list of networks is available in the 1999 issue of *Unasylva* devoted to non-wood forest products and income generation (No. 198 Vol. 50, p. 56) while *Non-Wood News* of FAO (www.fao.org/forestry/nwfp/nonwood.htm) provides a six-monthly digest of current developments in this field.

Trends

The trends indicate that NWFP are growing in importance economically, particularly in developed economies where recognition of their importance is relatively new. In developing economies, in many instances their social

and economic value is much higher than the timber value and the products produced frequently benefit those in the lower income brackets the most.

Employment

Issues

Employment, in the forest or in the processing of wood in the formal or informal economy, is often quoted as one of the important forestry contributions to sustainable rural livelihoods. But there are relatively few reliable figures to support this claim even for the formal economy, and even fewer for the informal economy. It has, however, been estimated (ILO, 2001) that for every job in the formal forestry sector there were one or even two jobs in the informal sector in developing countries in the late 1990s, mainly related to the production of fuelwood and non-wood forestry products.

Annex 4.3 gives figures for employment in the forest and in primary production in the forestry sector for some Commonwealth countries. The importance of the forestry sector in 2006 to total numbers employed in the developing economies of India, Malaysia and South Africa can be seen, and also to the developed economies of Canada and the United Kingdom. But only in Malaysia (2.3%), Canada (1.6%) and New Zealand (1.4%) does the forestry sector currently account for more than 1% of the total labour force.

Annex 4.3 also gives the 2006 breakdown of employment into categories: in the forest; in the primary manufacture of wood and wood products; and in the manufacture of paper and paper products. In the four developed economies of Australia, Canada, New Zealand and the United Kingdom, as well as in Malaysia, Ghana and Kenya, primary breakdown of wood is the main source of employment, whereas in the other developing economies it is employment in the forest – except for Bangladesh, where it is the manufacture of paper and paper products.

LEFT
Forest nursery workers in India – employment is often quoted as one of the important forestry contributions to sustainable rural livelihoods.

The trends in total numbers employed in the forestry sector, as well as the percentage of the labour force employed in the sector, have been downwards since 1990 for most of the countries examined. For example, employment in the United Kingdom and Canadian forestry sectors fell by 37% and 14% respectively in that period, although it rose in Malaysia by 45%; some other developing economies also showed small increases, usually due to growth in primary processing. The loss of share in the total labour force was most marked in Canada (from 2.2% to 1.6%), South Africa (1.0% to 0.5%) and Papua New Guinea (0.9% to 0.4%). No country in fact increased its share of the total labour force since 1990; even in Malaysia it fell slightly from 2.4% to 2.3%.

Globally employment in the forestry sector fell by 1.1% yearly between 1990 and 2000, and by 0.5% yearly between 2000 and 2006, although in the first period tropical countries showed an increase of 1.6% yearly and in the second a decrease of 0.1% yearly. Globally, and on average over the last two decades, the numbers in the three employment categories are roughly the same, so that one job in the formal forestry activities supports 1.2 jobs in the wood industry and one job in the pulp and paper industry[2]. The sample of 17 Commonwealth countries is, however, too small and too heterogeneous to make meaningful comparisons with the global figures.

Trends

Total employment in the forest sector has been falling since 1990 in the developed economies of the Commonwealth. This has not been the rule in the developing economies, where the employment in the processing of wood products is increasing, possibly at the expense of the developed countries, and although this trend may be interrupted in the short term due to the global recession it will likely continue in the medium term. The proportion of the total labour force employed in the sector has, however, continued to fall, and despite possible "make work" schemes in the short term this is likely to continue to be the case.

Markets for environmental services

In addition to timber and non-wood forest products, forests provide many environmental services. Those values which are commonly described include biodiversity, water, carbon and aesthetics. Since many of these services are poorly defined it is a challenge for them to get the recognition they need and deserve, irrespective of the economy.

Issues

As with any product or service, an appropriate definition is critically important. Surprisingly perhaps, there is no clear agreement on what biodiversity or aesthetics is, and while water and carbon are more tangible values, nonetheless they bring their own complexity.

Once the environmental service is defined the next challenge is to find an appropriate level of removing the service or adding the services to a forested ecosystem: in other word, a sustainable level has to be defined.

The next issue, among the myriad of issues, is the transaction costs of measuring and monitoring the environmental services of interest. It is not possible to afford to manage something which does not cover these transaction costs. And once these obstacles have been overcome, the other issues are developing the markets and finding buyers for them, addressing issues of equity or fair distribution of the income generated, identifying appropriate levels of taxation, and developing an appropriate system of property rights.

2 FAO (2008), *Contribution of the forestry sector to national economies, 1990-2006*, Forest Finance Working Paper FSFM/ACC/08, FAO, Rome.

Trends

Despite what seems to be a long list of complex issues there is a growing interest in environmental services and products. The obvious question is: why? The relatively straightforward answer is that while for decades people have tried to find non-market or regulatory mechanisms to protect or enhance environmental services and products, the fact is that many of these efforts have not been successful.

So environmental services markets have become mainstream in parts of countries like Australia, and the trends in many Commonwealth countries will be for an increase in their use as a mechanism to manage for these services. There are a number of potential advantages: 1. the transaction costs should be lower; 2. new policy actors (e.g. industry, NGOs, foundations) can participate with traditional actors (levels of government and banks) in finding a more acceptable solution to an environmental challenge; 3. there is scope for market rigor in terms of accountability and transparency.

Forest industries are increasingly aware of these trends and are showing themselves to be adept at recognising opportunities that have both commercial and non-commercial values.

Socio-cultural benefits

Increasingly the forest industry has recognised that in many areas it needs a social licence to operate, particularly on public land and that culture, particularly indigenous cultures are an important part of finding a sustainable business solution. The challenge is to define the boundaries of this new business environment and many Commonwealth countries have made remarkable progress in the last decade.

Issues

The social-cultural issues facing the industry are formidable and complex. Perhaps the most significant group that industry is working with is the indigenous people whose rights are increasingly recognised by the courts, at least in some countries, and who are demanding a part of the action. Yet the first challenge is where to start to build meaningful relationship. Frequently there has been an history of mistrust and ignorance; there is a lack of a skilled workforce, there is lack of financial capital to participate in an economic activity, there are other political forces that would try to disrupt a business relationship developing and there are tremendous global competitive forces, that severely limit what an industrial partner is able to do.

Trends

Once again, the forest industries have been one of the leading industrial sectors to address the socio-cultural issues. There have been efforts to create many joint venture companies, to develop skills training programmes, to provide new business opportunities and share resources. Other industrial sectors, such as mining, have been learning from forest industries and are employing many of the same techniques.

Conclusions

1 The consumption of fuelwood in Commonwealth countries, at over 600,000 m^3/year, is nearly double the consumption of roundwood – whereas the global figures for roundwood and fuelwood consumption are nearly the same. Another comparison of Commonwealth and global figures is that while the Commonwealth roundwood consumption is one-fifth of the global total, fuelwood consumption is one-third. Or again, the consumption per head of fuelwood in the Commonwealth is nearly twice that of roundwood, but the consumption of fuelwood per head in African Commonwealth countries is nearly five times.

The trends suggest that fuelwood use in Commonwealth developing countries will remain steady or

may even increase, while in developed Commonwealth countries it will grow, albeit from a much lower base.

The continuing importance of fuelwood shows clearly the need to develop sustainable supplies in Commonwealth countries, especially in dry areas where there are limited areas of natural forest. It also highlights the importance of policy interventions and technical developments to encourage sustainable fuelwood use. Such sustainable use not only gives zero carbon emissions but contributes to human health by thorough cooking of food and boiling of water.

2 Statistics. Given the important, but usually unquantified, contribution of fuelwood and non-wood forest products to the rural economy, especially but not only, in developing countries, governments must develop and maintain systems for the collection of reliable, current data.

3 Valuing and marketing the intangible benefits. If the contributions that forest goods and services make to the economy, to environmental and cultural values – especially to climate change amelioration – there is an urgent need to develop methods for valuing them if they are to be provided for in national policies and planning, and if markets for them are to grow.

4 All Commonwealth countries are important consumers of processed wood products; Canada dominates the production of roundwood and processed wood products, but some other Commonwealth countries are major producers also, and others, such as India and Malaysia, will become more important. Consumers of wood products are becoming aware of environmental issues and are increasingly demanding proof, through certification, that they are sourced from sustainably managed supplies (the growth of forest areas managed under various certification schemes is discussed in *Chapter 2*).

References

Brown, D. and Williams, A. (2003), "The case for bushmeat as a component of development policy: issues and challenges", *International Forestry Review*, Vol. 5 (2).

Canadian Forest Service (2006), *The State of Canada's Forests 2004-2005*, Canadian Forest Service, Natural Resources Canada.

Emery, M., Martin, S. and Dyke, A. (2006), *Wild harvests from Scottish woodlands*, Forestry Commission, Great Britain (available online at www.forestresearch.gov.uk).

ILO (2001), *Globalisation and sustainability: the forestry and wood industries on the move*, www.ilo.org/public/english/dialogue/sector/techmeet/tmfwi01/tmfwir.pdf.

Kumar, A. and Sastry, C.B. (1999), "The international network for bamboo and rattan", *Unasylva*, No. 198 Vol. 59.

Roberts, D.G. (2008), "Convergence of the fuel, food and fibre markets: a forest sector perspective", *International Forestry Review*, Vol. 10 (1), pp. 81-93.

Non-Wood News, No. 14, (2007), FOIP, FAO, Rome.

Ruiz Pérez, M., Ndoye, O. and Eyebe, A. (1999),"Marketing of non-wood forest products in the humid forest zone of Cameroon", *Unasylva*, No. 198 Vol. 59.

Singh, K. D. (2008), "Balancing fuelwood production and consumption in India," *International Forestry Review*, Vol. 10 (2), pp. 190-200.

UNECE/FAO (2009), Workshop on"Current and future woody biomass for energy – monitoring use and understanding technology", 15-16 September 2009, Riga, Latvia. FAO, Rome.

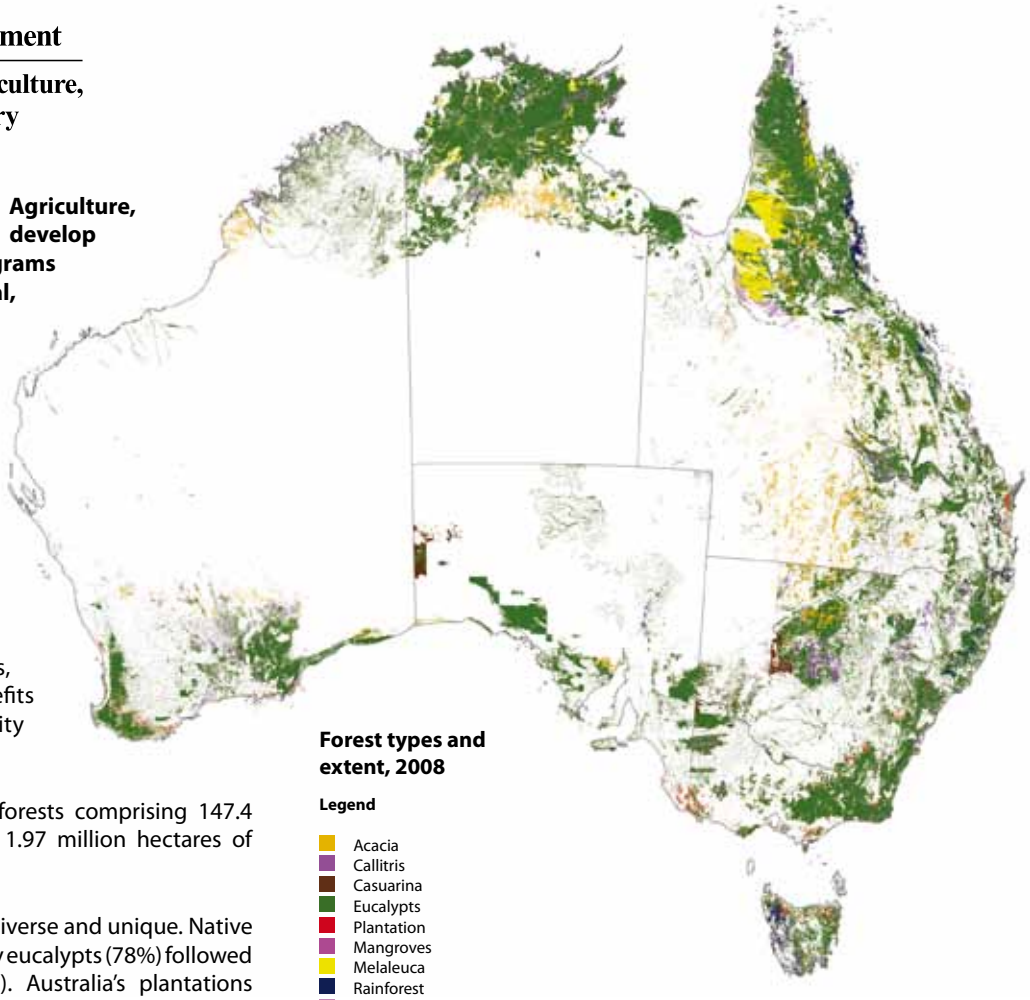
Vantomme, P. (2003), "Compiling statistics on non-wood forest products as policy and decision-making tools at the national level", *International Forestry Review*, Vol. 5 (2).

Australian Government

Department of Agriculture, Fisheries and Forestry

The Australian Department of Agriculture, Fisheries and Forestry's role is to develop and implement policies and programs that ensure Australia's agricultural, fisheries, food and forestry industries remain competitive, profitable and sustainable.

A goal of DAFF is to assist Australia's forestry industry to grow, improve and capitalise on new opportunities while protecting the environment and contributing to the prosperity and quality of life in rural and regional Australia. While forests will continue to provide sustainably produced wood products, they will increasingly provide other benefits such as carbon sequestration, salinity control and biodiversity conservation.



Forest types and extent, 2008

Legend

- Acacia
- Callitris
- Casuarina
- Eucalypts
- Plantation
- Mangroves
- Melaleuca
- Rainforest
- Other
- Non-forest / no data

Australia has 149 million hectares of forests comprising 147.4 million hectares of native forests and 1.97 million hectares of plantations.

Australia's native forests are extremely diverse and unique. Native forest types in Australia are dominated by eucalypts (78%) followed by acacias (7%) and melaleucas (5%). Australia's plantations are made up of about half exotic conifers (predominantly Pinus radiata), while the other half (48 per cent or 950,000 hectares) are hardwood (predominantly eucalypt) plantations.

About 23.0 million hectares of Australia's public native forest is held in nature conservation reserves, and 9.8 million hectares is available for timber harvesting.

In 2007-08, the value of turnover of Australia's forest products industries was estimated at A$23 billion. The number of people employed in forestry, logging and wood manufacturing in 2007-08 was 76,800.