Preamble

I have prepared this submission in response to FIAC seeking the views of interested stakeholders in determining a vision and objectives for Australia's forest products sector for the coming decades. In a strategic issues paper FIAC[1] invited submissions on a number of questions and any other factors considered relevant to the development of a discussion paper on an Australian national wood and fibre plan.

My submission entitled "***A Permanent Public Native Forest Production Estate for Australia***" is strategic and visionary and mainly concerns "***Issue 3: Forest resources***", especially question 11: "*What is required to ensure the native forest estate is able to meet future demand for forest products?*" and question 12: "*What opportunities are there to increase wood supply from farm forestry, private native forestry and Indigenous owned and managed lands?*"

A PERMANENT PUBLIC NATIVE FOREST PRODUCTION ESTATE FOR AUSTRALIA

Background

Australia has 123 million hectares of native forest on six main categories of land tenure: nature conservation reserve; multiple-use public forest; private land (including Indigenous owned land); leasehold forest; other Crown land and unresolved tenure. The area of native forest available for commercial wood production is a key determinant of the capacity of forest-based industries to meet domestic and export demands for native timbers and wood products. *Australia's State of the Forests Report 2013* introduced for the first time the concept of "native forest commerciality" which categorizes native forest that is available and suitable for wood harvesting additionally by its commercial suitability based on forest productivity and merchantability.[2] In 2011, only 7.5 million hectares (19%) of the total of 39.8 million hectares of public native forest (i.e., native forest on the tenures multiple-use public forest, nature conservation reserve and other Crown land) was available and suitable for commercial wood production.[3] A further 29.1 million hectares of leasehold and private tenure forests was also potentially available and suitable for commercial wood production, subject to landholder intent, availability of markets and environmental constraints. A large part of this private and leasehold tenure contributes minimally to wood supply now because the predominant land use is grazing, there are fewer marketable species in commercial quantities, many of the localities are isolated from markets, and harvesting is not operationally feasible because of terrain and other factors.[4] These latter forests likely will continue to contribute minimally in the foreseeable future unless the potentially more productive ones are better managed. The area of commercial leasehold, private and multiple-use public forests was some 1.0 million hectares less in 2011 than it was in 2006—07 (Table 1,

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1 Commonwealth of Australia 2015, *Meeting future market demand: Australia's forest products and forest industry*, *Forest Industry Advisory Council*, *Department of Agriculture*, *Canberra.*

2 Davey S and Dunn G (2014) *Australian native forest commerciality*, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, available at data.daff.gov.au/data/warehouse/9aaf/9aafe/AustNatForCommerce/AustNatForCommerce20141106_v1.0.0.pdf (pdf 3.44mb).

3 Montreal Process Implementation Group for Australia and National Forest Inventory Steering Committee, 2013, Australia's State of the Forests Report 2013, ABARES, Canberra, December, available at data.daff.gov.au/data/warehouse/9aaf/sofr/2013/sofr2013_Full__v1.0.0.pdf (pdf 30.9mb).

4 (See [2, 3])

Map 1) as a result of increases in reservation for conservation and changes in the reported area of Australia's forests.[5]

Table 1: Area of leasehold, private and multiple-use native forest, by level of wood commerciality, 2006 and 2011

Year	Tenure	Non-commercial forest and forest legally restricted from harvesting[a]	Commercial forest (forest available and suitable for harvesting)						Total forest in tenure[c]	Comm-erciality[d]
			Level of wood commerciality							
			Very low	Low	Moderate	High	Very high	Total[b]		
			Area ('000 hectares)							%
2006	Leasehold forest	51,155	4	12,790	845	308	30	13,977	65,132	21
	Multiple-use public forest	2,194	84	2,203	2,496	1,784	649	7,216	9,410	77
	Private land	21,652	42	12,567	2,428	1,013	396	16,447	38,099	43
	Total	**75,001**	**130**	**27,561**	**5,769**	**3,105**	**1,075**	**37,640**	**112,641**	**33**
2011	Leasehold forest	35,737	0	11,753	702	317	24	12,796	48,533	26
	Multiple-use public forest	2,637	86	2,732	2,486	1,615	603	7,522	10,159	74
	Private land	17,099	54	12,156	2,551	1,119	415	16,295	33,394	49
	Total	**55,473**	**140**	**26,641**	**5,739**	**3,051**	**1,042**	**36,613**	**92,086**	**36**

[a] 'Non-commercial forest and forest legally restricted from harvesting' includes forest of limited, possible or no commerciality; sandalwood; forest of unknown floristics and structure; and conservation reserves where harvesting is excluded by covenant or regulation. Forests on formal nature conservation reserves, other Crown land and land of unresolved tenure are not included on this Table.

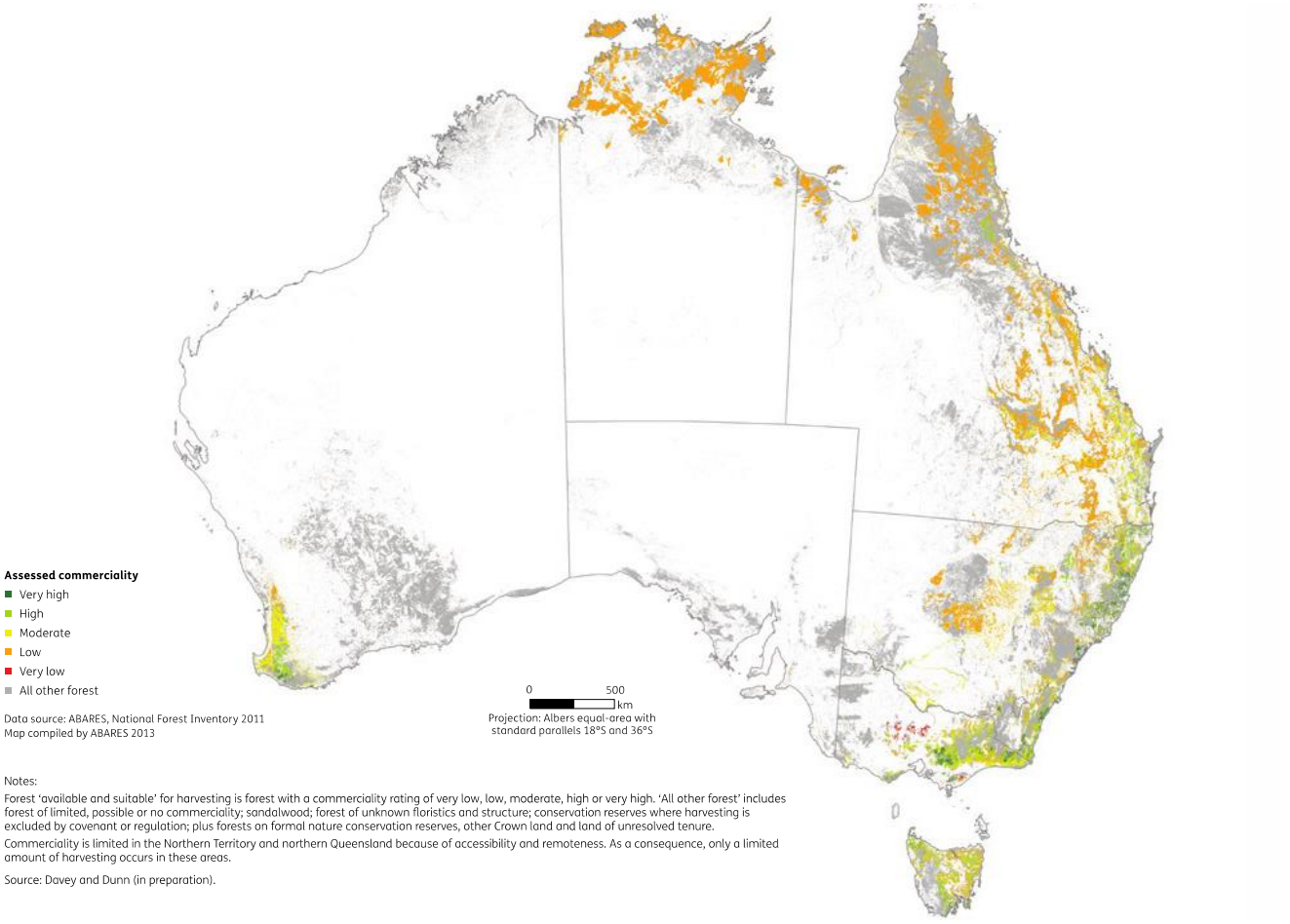
[b] 'Total' column is the sum of the areas of forest of very low, low, moderate, high and very high commerciality.

[c] Figures for total forest in each tenure category are from Indicator 1.1a for 2011, and SOFR 2008 for 2006; these area coverages were used to overlay the relevant commercial forest layer.

[d] 'Commerciality' is the proportion of the total area of forest in a tenure category that is classified as very low, low, moderate, high or very high commerciality.

Source: Montreal Process Implementation Group for Australia and National Forest Inventory Steering Committee, 2013, Australia's State of the Forests Report 2013, ABARES, Canberra, December.

[5] (See [2])



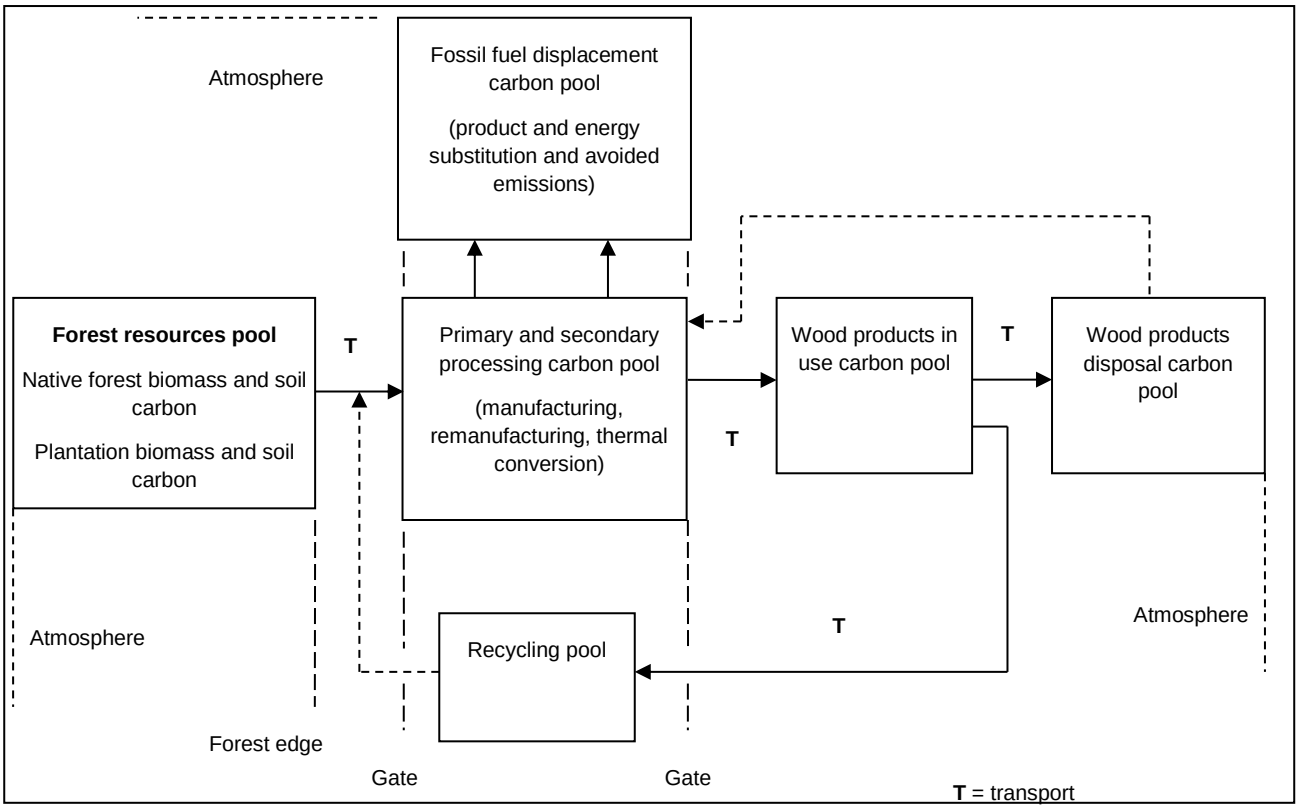
Map 1: Commerciality of Australia's native forest assessed across leasehold, private and public multiple-use forest tenures

Source: Montreal Process Implementation Group for Australia and National Forest Inventory Steering Committee, 2013, Australia's State of the Forests Report 2013, ABARES, Canberra, December.

Life Cycle Assessment

Figure 1 shows the Life Cycle of Carbon in Wood partitioned into six pools: i) forest resources (natural and planted), ii) primary and secondary processing, iii) wood products in use, iv) wood products for disposal, v) wood for recycling, and, vi) fossil fuel and non-wood products substitution. These carbon pools comprise both carbon stores (the native forests, plantations and wood products) as well as carbon "offsets" (displaced fossil fuel carbon emissions by burning woody biomass instead for energy and displaced fossil carbon emissions as a result of substituting wood products instead of fossil fuel intensive products such as aluminium, steel and plastics). Carbon can remain in this wood life cycle for decades in the in-use and disposal pools. If the recycling and disposal pools are taken into account the life cycle may extend to a century or more. Even a product like paper normally considered a short-lived wood product could have a life of many decades through repeated recycling and/or eventual very slow decay over decades in landfill. The fossil fuel displacement carbon pool (product- and energy-substitution and avoided fossil carbon emissions) is an important part of the life cycle, as fossil fuel not burnt is a permanent and incremental contribution to mitigating the rise of carbon dioxide in the atmosphere. These positive life cycle effects are maximised over a long time period of decades to centuries requiring "permanency" of the forest estate and perpetual new wood production from that estate continually entering and flowing through the life cycle like material on a conveyor belt.

Figure 1: Life cycle of carbon in wood and wood products, showing six carbon 'pools'



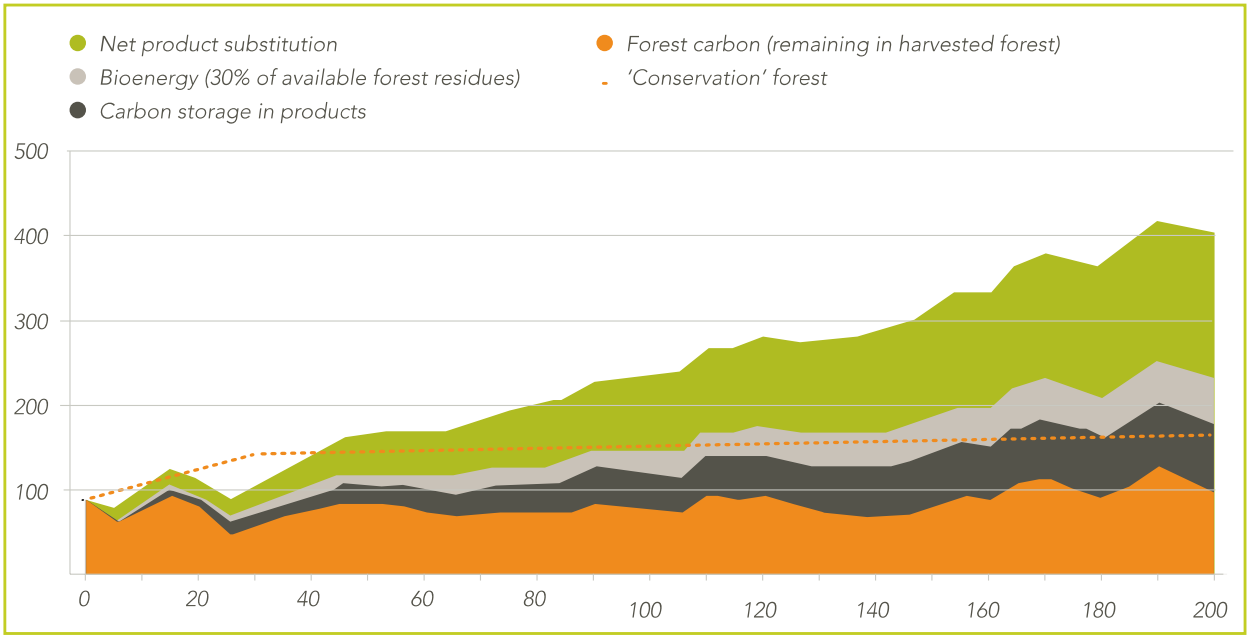
Source: Davidson J, 2008 Life Cycle Assessment of Carbon in Wood. Presented at the Asia Pacific Forest Industries Climate Change Conference, Sydney, 18 – 20 August 2008.

Also required is a change in attitude in how woody residues from native forest harvesting and processing are considered for their potential contribution to the fossil fuel displacement carbon pool. The intention would be for only a proportion of the woody biomass residues left following harvesting to be removed for bioenergy. (For example, only 30% of available forest residues are taken into account in Figure 2.) Some coarse and fine woody debris would be left on site for habitat and soil protection and replenishment of soil organic matter and nutrients. Where harvest residues are particularly heavy, removing the excess would contribute to a reduction in surface fuel load, potentially contributing to a reduction in the intensity and severity of any bushfires that are likely to occur.

Greenhouse gas implications of "conservation" and "production" scenarios

Application of full life cycle assessment to Australia's production native forests shows the advantage over conservation native forests of keeping the forest in managed production over the long term, i.e. several decades to centuries, in tonnes of carbon per hectare sequestered, stored or substituted for fossil carbon (Figure 2). Also, log availability from native forests is not projected to decline as much through to 2050 because of climate change compared the projected decline from plantations.[6] Allowing previously harvested forest with its regeneration and regrowth stands to be subsumed into national parks and other kinds of conservation reserves after one or a few harvest cycles is having unintended consequences for the long term mitigation of global warming, as well as reducing future domestic wood supplies. Preventing further changes in native forest tenure from production to conservation reinforces the need to create "permanency" of the native forest production estate.

Figure 2: Greenhouse gas implications of "conservation" and "production" scenarios (tonnes of carbon per hectare sequestered, stored or substituted for fossil carbon) for north coast NSW forests modelled over a 200-year period



Source: Ximenes et al (2012), Forests 2012, 3:653-683

[6] ABARES 2012, *Australia's forests at a glance 2012*, Canberra, August (see figure on page 29)

Proposal

The reduction in area available for commercial native forest production is likely to continue unless measures are taken to formally gazette the remaining areas of commercial multiple-use public native forests — at least in the categories of "moderate", "high" and "very high" levels of commerciality (totaling 4.7 million hectares, see Table 1 and Map 1) — to create a permanent public native forest production estate for Australia, in the same way that a permanent public native forest conservation reserve estate has been gazetted. This will allow planning in the long term — meaning more than 100 years — to allow the Australia's public multiple-use forest landscapes to reach their true potential in mitigating global warming, ensuring future wood and fibre supplies to forest industries, and providing wood products sustainably for society. Renewing existing RFAs for another fixed term of 25 years or providing them with a rolling 25-year window would fall short of the desired result. While the existing RFAs encompass much of the public multiple-use forest with "high" and "very high" commerciality, many significant areas have never been included in the RFA system, particularly in east and southeast Queensland. The gazetted area would be managed in perpetuity at least to existing certification protocols, codes of forest practice and proven silviculture. This proposal is not meant to create a new forest tenure category wherein un-controlled harvesting can take place. The impending renewal of Australia's RFAs could provide the opportunity to start to create a permanent public native forest production estate for Australia.

In addition, private landholders should be encouraged to designate at least a significant part of their 4 million hectares of native forest in the "moderate" to "very high" commerciality categories (see Table 1) as "permanent" production forest. This would need to be aided by changes to states' native vegetation and private native forests acts and regulations, enabling private and Indigenous landholders to target and apply better management and silviculture to enhance wood yields, to reduce fire risk and to take advantage of carbon credits that also may accrue in the future as a result of better forest management.

Appendix: My qualifications and experience underpinning this submission

Education:

- 1972: PhD (Forest Ecology, Genetics, Tree Improvement and Breeding, Vegetative Propagation) (PhD Thesis: Variation, Association and Inheritance in *Eucalyptus*); Australian National University (ANU), Canberra, ACT, Australia.
- 1967: BSc (Forestry) (First Class Honours) (Schlich Memorial Gold Medal (equivalent to University Medal) (Forest Ecology, Silviculture, Forest Management, Forest Economics) (Honours Dissertation: *Spatial Variation in Soil Moisture Under Eucalypt and Pine Stands*); ANU.
- 1964: BSc (Ecology, Botany, Soil Science) (Special Botany Dissertation: *The Effect of Certain Eucalypt Species on the Redistribution of Nutrients in the Poorer Surface Soils of the Pilliga Region*); University of New England, Armidale, NSW, Australia.

Career and experience synopsis:

- Independent senior specialist in forestry, natural resources and environmental management (2001 — October 2005 and September 2009 to present)
- Research Scientist, Land and Forest Sciences Programme, Bureau of Rural Sciences, Department of Agriculture, Fisheries and Forestry, Canberra, Australia (October 2005 to August 2009). (During that time, the Bureau of Rural Sciences (BRS) was the scientific bureau within the Australian Government Department of Agriculture, Fisheries and Forestry. BRS provided nationally focused scientific advice to support evidence-based policy development and decision making by the Australian Government.)
- More than 70 international consultancies undertaken personally, including: 25 with FAO, 18 with national governments, 8 corporate and private, 7 Australian Agency for International Development (AusAID), 4 Australian Centre for International Agricultural Research (ACIAR), 3 International Union for Conservation of Nature (IUCN), 2 United Nations Operations Service (UNOPS) for the United Nations Development Programme (UNDP), 2 World Bank, others (all 1978 to present)
- Partner, Principal and Managing Director in two forestry and natural resource management and planning consultancy businesses based in Armidale NSW Australia (1985 – 2000)
- Senior Forestry Officer, Food and Agriculture Organization (FAO) of the United Nations (1982 – 1984)
- Pro Vice Chancellor, Papua New Guinea University of Technology, Lae (1979 – 1980)
- Foundation Chairman, Professor and Head of Department of Forestry (1975 – 1978), elected Dean Faculty of Natural Resources (1978), Papua New Guinea University of Technology
- Widely published and reported in areas of tree improvement and breeding, silviculture, ecology, vegetative propagation and cloning of eucalypts, land use planning, social forestry, watershed management and policies on forests and environment (including Co-author of the book “Eucalypt Domestication and Breeding” published by Clarendon Press Oxford, UK; author of the book “Conservation Planning in Indonesia – Case Studies from Kalimantan” published by World Conservation Union/United Nations Environment Programme, Gland, Switzerland)
- Author of commissioned review papers on a range of key forest issues including conservation of tropical forest ecosystems, demonstration of ecological guidelines on forest land use, methodology to tap forest genetic resources, ecological implications and impacts of bio-energy plantations in the tropics, economic use of tropical moist forests, ecological effects of Australian tree species planted as exotics
- Reviewer and editor of numerous papers for journals and of publications, especially for the “Australian Forestry” journal and including the books “The Future of Tropical Rain Forests in South East Asia”, “Recent Advances in Mass Clonal Multiplication of Forest Trees for Plantation Programmes”; reviewer and examiner of university theses submitted by candidates for forestry postgraduate degrees
- Extensive research and managerial experience in many countries in the tropics, sub-tropics, temperate and Himalayan foothill regions in both production forestry and protected area management
- Involvement in issues related to participation, poverty and forest use in less developed countries and provider of support and advice to government and non-government organizations in natural resource management particularly strategies based on empowerment of local occupiers and users (social forestry, community forestry)

- Promoter of means to enhance natural resources policy, processes and institutions
- Invited Visitor and Participant, Environment and Policy Institute, East-West Centre, Hawaii, USA (assessing tropical forest lands; forest and watershed development and conservation in Asia and the Pacific) (three times 1978 – 1979)
- Invited Visiting Scientist, Commonwealth Scientific and Industrial Research Organization, Division of Forestry and Forest Products, Canberra, Australia (eucalypt tree improvement and breeding) (6 months, 1980)
- Foundation Chairman International Union of Forest Research Organizations' Working Parties on eucalypts and member of several other Working Parties (1975 – 1985)
- Invited Member Commissioner, Commission on Ecology of the (then) World Conservation Union (now International Union for the Conservation of Nature (IUCN)) and Chairman and Co-chairman of its Working Group on Tropical Moist Forests (1978 – 1985)
- Contributor to numerous conferences and seminars and speaker at meetings throughout the world
- Career in forestry spans more than 47 years, apart from Australia much of it in developing countries, including Papua New Guinea (more than 12 years), Bangladesh (nearly 5 years), Bhutan (nearly 2 years), as well as in Brazil^{-}, Cambodia^{-}, Cameroon^{-}, China^{-}, East Timor^{-}, Ethiopia^{+}, Fiji^{-}, India^{-}, Indonesia^{+}, Kenya^{-}, Laos^{-}, Malawi^{-}, Malaysia^{-} Myanmar^{+}, Nepal^{+}, Philippines^{+}, Sri Lanka^{+}, Tanzania^{-}, Thailand^{+}, Vietnam^{-}, Zambia^{-}, others (alphabetical order, $^{+}$ means > 3 months, $^{-}$ means < 3 months total) (all 1967 to present).

My involvement in Life Cycle Assessment and the Life Cycle of Carbon in Wood:

- From 2005 to 2009, as Research Scientist in the Bureau of Rural Sciences (now ABARES — Australian Bureau of Agricultural and Resource Economics) of the Australian Government Department of Agriculture, Fisheries and Forestry (now Department of Agriculture), I was actively engaged in helping to develop Australia's policy on carbon in forests and wood products and ways of reducing emissions from deforestation and degradation. I also examined existing evaluation tools and rating schemes for buildings and building products which at the time ignored the renewability of wood, its lower embodied energy, its lower emissions of air and water pollution, its ease of disposal, its recyclability and its carbon storage in long-life wood structures and landfill compared to alternate materials such as steel, concrete, aluminium and plastics.
- I completed short introductory and advanced courses in life cycle assessment conducted by RMIT in 2007 and 2008. During 2008-2009 I was a Member of the Australian Life Cycle Assessment Interim Steering Committee for the Australian Life Cycle Inventory (AusLCI) Database Initiative and served on two of its Sub-committees, AusLCI Data Collection Guidelines 2008-09, and industry sector Working Group on Wood Products. I was a member of the Australian Life Cycle Assessment Society (ALCAS) 2006 – 2010 and attended two (5th and 6th) of its Australian Life Cycle Assessment Conferences in Melbourne in 2006 and 2008.
- In 2008, I developed the Life Cycle of Carbon in Wood partitioned into the six pools shown in Figure 1, and presented it to the Asia Pacific Forest Industries Climate Change Conference in Sydney.

Recent projects:

- 2012: Writing (with co-authors from CSIRO and ABARES) "*The State of Australia's Forest Genetic Resources*", a report by the Australian Government to the FAO
- September 2012 to December 2013: Writing criterion summaries and case studies, and science editing of the whole of *Australia's State of the Forests Report 2013* (Case studies included material related to the life cycle of carbon in wood)
- December 2013 to January 2014: Writing Criterion and Thematic Summaries for *Victoria's State of the Forests Report 2013* (Pages 18 — 48 comprise my contribution to the *Report*).