

AUSTRALIA'S FORESTRY INDUSTRY IN 2040: THREE PLAUSIBLE SCENARIOS

NICOLE ALLEN

1. Abstract

Over the next 30 years the Australian forestry industry will face the impacts of climate change and increasing demand. Currently an inquiry into the Australian forestry industry is gathering evidence of environmental, social and economical impacts, production opportunities and land use as key issues for the Australian Parliament to consider (Australian Government, 2011). This report will outline the impacts of climate change and demand, with reference to its affects on the sectors of the economy, environment and society of Australia. Three plausible future scenarios of Australia's forestry industry's future scenarios in 2040 will be explained; titled as the 'dizzy', 'low and slow' and 'most likely' scenarios. Additionally adaptations and strategies which can be used to avoid or encourage the most desirable possible future for Australia's forestry industry will be discussed.

Key Words: climate change, cultural, demand, economic, society

Officer Cadet Nicole Allen drafted a previous version of this submission as a second year Bachelor of Science student studying the Geography at the University of New South Wales at the Australian Defence Force Academy. The views expressed here are those of the author.

2.0 Introduction

Already work has begun to build a sustainable source of trees for the forestry industry's use in the future, but is it enough? Current projections show an increase of 2 million cubic centimetres of plantation area between 2010 and 2040 (Parsons et al. 2007). However, with the effects of climate change increasing the rate of extreme weather, with the Australian Bureau of Meteorology stating "2009 will be remembered for extreme bushfires, dust-storms, lingering rainfall deficiencies, areas of flooding and record-breaking heatwaves"; how will the forestry industry be able to supply future demands whilst battling the effects of climate change? This report will compare the effects of varying demand and climate change on the Australian forestry industry up to 2040, focusing on plantations (which supplies two-thirds of Australia's timber, rather than native forestry) (Parsons et al. 2007). The effects of climate change and demand on the forestry industry in terms of the social, economic and environmental impacts will be discussed in three different future scenarios of Australia in 2040; This along with the vital actions needed to be taken now to prevent the worse and encourage the best scenario will be proposed.

3.0 Factors Affecting the Forestry Industry's Stability

3.1 Climate Change

The global climate naturally deviates from periods of hot climates to ice ages; however, anthropogenic climate change is accelerating this natural process from the emission of greenhouse gases including carbon dioxide and nitrous oxides (Science Teachers' Association of New South Wales 2008). It has been recorded from 1950 to present, that Australia's temperature has only risen 0.9°C, yet as the projections in Figure 1 shows; the temperature of Australia is expected to increase between 1 and 1.5°C in the next 20 years (CSIRO and BOM, 2010). Figure 2 shows the annual man surface temperature of the world from 1850 to 2009 and the increasing red line trend from the 1980's onwards provides evidence between increased greenhouse gas emissions and global temperature increases. Climate change will not only affect the temperature, it will also affect rainfall patterns, the frequency of extreme weather and sea level indirectly.

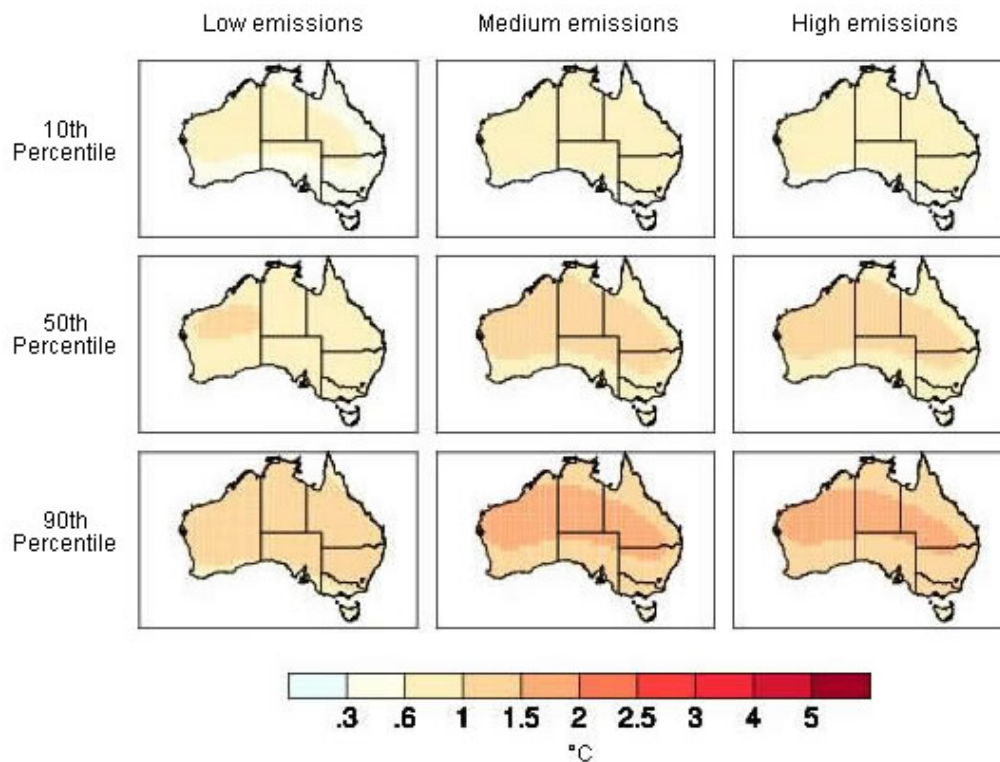


Figure 1. Nine different scenarios of Australia's future temperature in 2030. The percentile column indicates the probability of the scenario occurring, with the 10th percentile being a conservative scenario, 50th percentile being the most likely and 90th the most negative (CSIRO and BOM 2010).

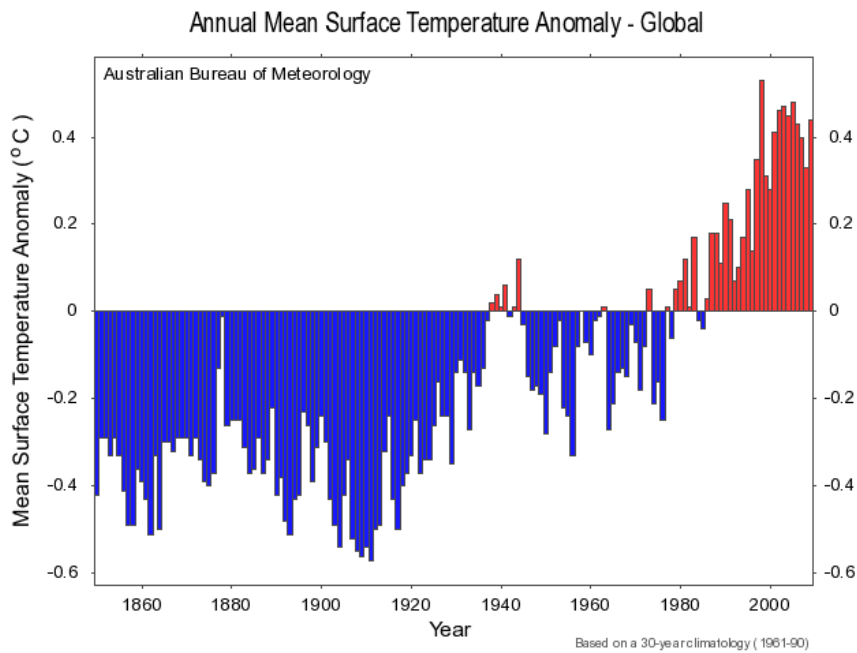


Figure 2. Graph of mean global surface temperature against time (Bureau of Meteorology 2010a).

Climate change is a slow process and in the small timeframe of 30 years being researched, it is unlikely that climate change will result in major changes in the methods used by the forestry industry. Initially the increased temperature will encourage tree growth; however, extended periods of heat may result in heat stress if precipitation also decreases (Low and Mahendrarajah 2010). The most likely impact of climate change on the economy in relation to forestry is the destruction of plantations due to extreme weather. Figure 3 shows the number of tropical cyclones in Australia’s region over a 20 year period. The map on the left illustrates the number of cyclones between 1987 and 2006, which greatly outnumbers the amount of cyclones between 1907 and 1926 just 80 years prior. Destruction of large plantations will result in an increase in price of timber regionally for at least the 15 years it takes for a newly planted tree to mature. This will cause the company who owns the plantation to lose a great deal of money; however, it would benefit other forestry companies which were not affected by the extreme weather as they can sell the same product for more.

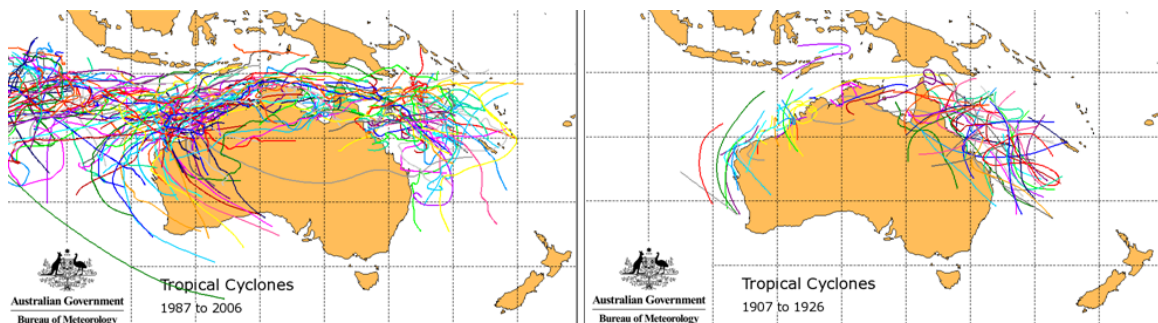


Figure 3. Maps comparing the number of tropical cyclones from 1987-2006 and 1907-26 (Bureau of Meteorology 2010b).

In terms of the cultural effect of climate change in reference to forestry on society, there will be little to none if plantations are damaged by extreme weather; however, it will be detrimental to the towns which rely on the plantations for employment. It is the

destruction of natural forests open to the public for recreational use as national forests, which will have a negative impact on the public's leisure practices.

3.2 Demand

Demand and supply interact with each other and in economics it is this balance which must be met in order to ensure the economic sustainability of a resource. This balance is important in the forestry industry as it maintains national and international trade for Australia's paper and timber industry and the livelihoods of all who are employed in jobs relating to the forestry industry. As such long term planning of plantations in terms of number of trees planted and the size of the plantation occur continuously. Current predictions for log supply are expected to increase, as shown in Figure 4. From 2007 to 2008, the greatest usage of timber was for the construction of house frames and floorboards (NSW Department of Primary Industries, 2008); As such for the predicted supply in Figure 4 to meet future demands, the government must instigate limits upon the rate of development of infrastructure to supply the growing population of Australia with enough timber to build infrastructure.

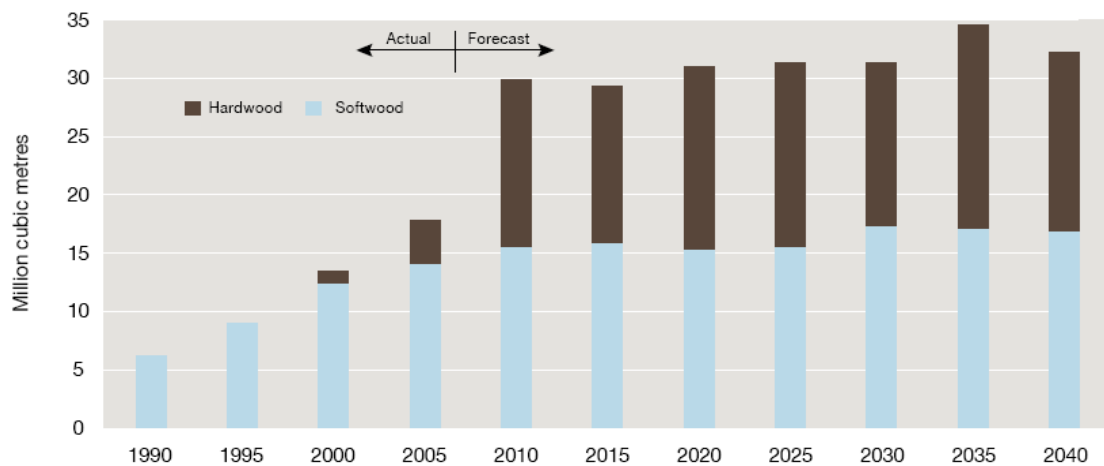


Figure 4. Graph of the volume of timber needed to supply Australia up to 2040 (Parsons et al. 2007, p. 5).

The implications of a need for an increased supply of logs affects Australia's society and environment as more land must be devoted to producing timber, which in turn creates more jobs. Environmentally an increase supply requires an increase of plantation area in order to maintain sustainable logging, or an increase in logging on the same amount of land, which will cause detrimental effects to the plantation trees and native species which reside in it due to over logging. Socially an increase in the forestry industry would result in increased employment in rural areas which harbour companies related to the forestry industry.

4.0 Future Scenarios

By comparing the effects of demand and climate change on the future of the forestry industry, four major possible scenarios can be attained from looking at the extremes of the spectrum (Figure 5). For the purpose of this report, the 'low and slow' scenario

(represented by the green cross on Figure 5) and ‘dizzy’ scenario (red cross) will be discussed; along with a ‘most likely’ scenario (yellow cross) and the perspective from a NSW forestry manager.

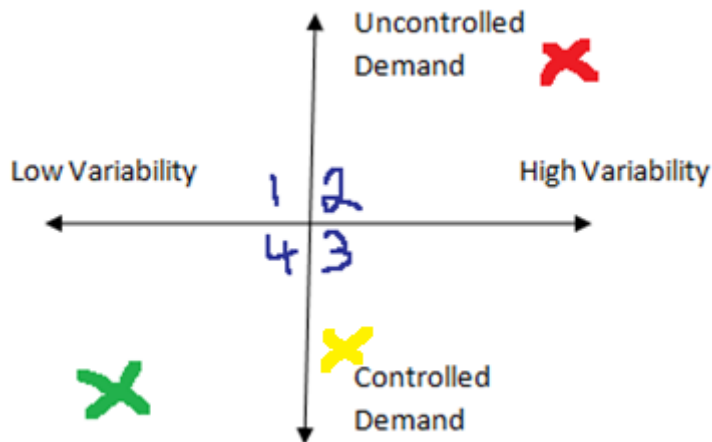


Figure 5. Graph of the spectrum of plausible forestry futures in 2040. Variability describes the effects of varying impact of climate change and demand describes the extent to which government regulates demand of timber.

4.1 Low and Slow Scenario

In this scenario the demand is controlled and climate change has been managed in such a way that it has not impacted plantations. Heavy investment in new technologies to reduce carbon emissions has resulted in minimised extreme weather and as such plantations have remained undamaged. Plantation area has increased and demand for timber in Australia has remained stable. Controlled demand and subsequent logging of plantations will ensure the plantation remains healthy as over logging does not occur and the ecological impact on native fauna and flora is minimised. From the perspective of forestry companies, increased plantation area will increase employment opportunities, which will also benefit regional areas including Wirrabara, Ingham, Grafton, Gippsland and Albany where most plantations are located (Parsons et al. 2007). The forestry industry will remain sustainable, along with construction companies as a balance between supply and demand maintains economic status of both industries. This future is the most favourable as housing construction, plantation development and the forestry industry are all maintained at a sustainable level.

4.2 Dizzy Scenario

For scenario four, the government management of climate change and demand has not occurred; both variables have been allowed to develop unchecked. In this future the forestry industry will have initial financial benefits from the increased demand of timber products for infrastructure as the population of Australia grows. In the long term forestry companies will no longer be financially stable as climate change may result in extreme weather which can damage or affect the growth of plantations. The environment and plantations are damaged by the progression of climate change and towns which rely on the forestry industry to survive struggle to maintain a stable economy as their main source of income is unstable. As supply of timber products is unstable, the balance between supply and demand will be skewed and result in

economic stress on forestry dependant companies. This future is the least favourable as the environment, primary industry and local communities suffer from the effects of uncontrolled climate change and demand on the forestry industry.

4.3 Most Likely Scenario

In this scenario the Australia government has controlled demand for timber products and implemented small changes to reverse climate change. In 2040 plantation expansion is likely to be much lower than the recent increase in expansion between 2003 and 2006 (sees Figure 6). This is due to the limited amount of land which is suitable for plantations; at the moment 70 per cent of all Australian forest is privately owned and leasehold land (see blue sections of Figure 7) which could be expanded into has to have permits approved by the State and National Government for logging (Low and Mahendrarajah 2010). In addition to this, the forestry industry is in competition for this land with National Parks and Aboriginals under the *Native Title Act* (1993) (Roche and Denlow 2010). The reduction in plantation expansion will result in reduced produce and as such the demand of timber products will lessen as other construction products such as metal will supplement the infrastructure industry. The management of the plantations will continue and the reduced affects of climate change from reductions in carbon footprints will ensure continued environment health. In this scenario, communities which depend on the forestry industry will remain economically stable due to controlled demand and lessened effects of climate change in comparison to the ‘dizzy’ scenario.

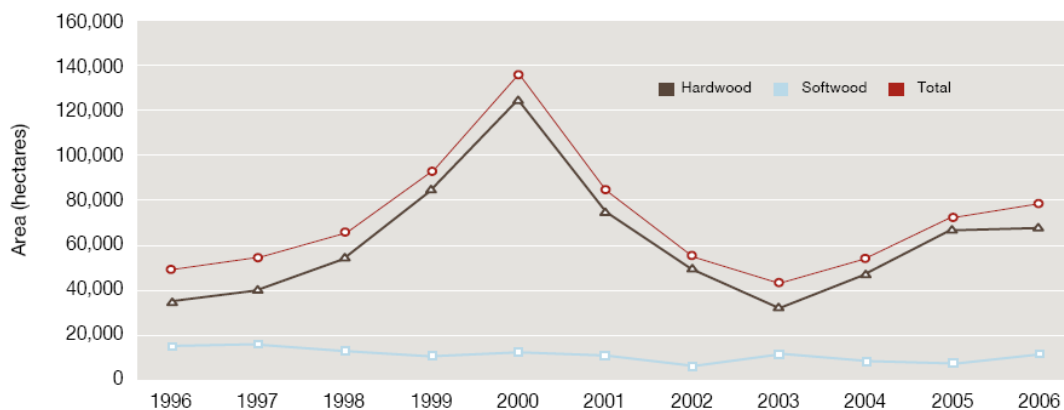
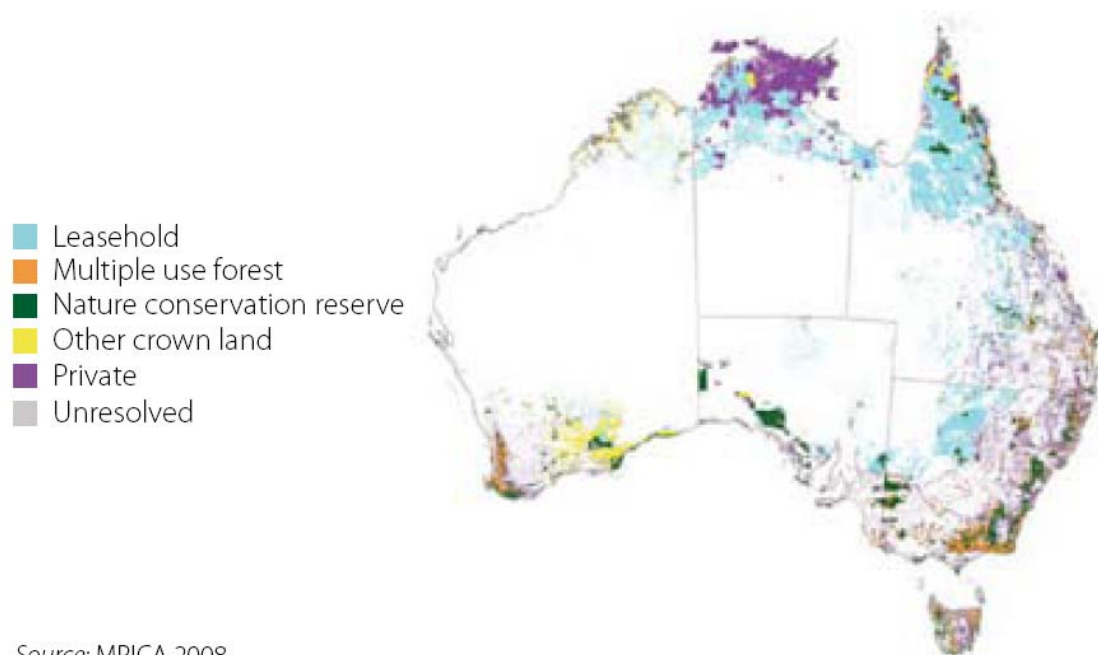


Figure 6. Development of new plantations from 1996 to 2006 (Parsons et al. 2007, p. 5).



Source: MPICA 2008.

Figure 7. *Ownership of forest land in Australia 2008 (Low and Mahendrarajah 2010, p. 5).*

4.4 Local Management Perspective

To add a local perspective a co-owner of a plantation, logging and transport forestry company in the North Coast of NSW was interviewed. He has worked in his company since 1977 and currently has both plantation and native forestry property. In the past the industry was capable of supplying demand and climate change had not affected plantations. Instead the main hurdle was the removal of native forestry property from the respective companies by the Australian government and ownership was handed over to the National Parks and Wildlife Service (NPWS). Despite the government's removal of forestry property, the timber quota remained the same and has resulted in over logging of most plantations.

For people like him the worse scenario for his company is that the government will give all of his native forestry property to the NPWS and due to the current negative public opinion of logging companies, the industry will be shut down. The best scenario would be increased plantation land and less wasteful practices. Currently Australian loggers use only the trunk of a tree, leaving the roots and branches, which could be used to supply the developing residue (also known as pulp) market. In this scenario the timber market has expanded to supplying the residue, infrastructure and Bioenergy market. The person interviewed for a local perspective saw the most likely scenario would be state ownership of all native plantation property and little change in current logging practices.

5.0 Environmental Stewardship

This section looks at the steps which need to be taken now in order to reach the best scenario for the Australia forestry industry in 2040.

5.1 Local Management Perspective

The person interviewed for a local perspective believes the current global climate change is natural and will happen over such a large timescale that it will not affect the methods of practice of the forestry industry up until 2040. As such he believes no action should be taken to reverse these effects. In light of this, he is also a supporter of Bioenergy; Bioenergy is the production of electricity from the burning of plant products, rather than coal. Bioenergy would make the demand of timber products increase as timber use would be diverted from infrastructure to electricity production; however, he believes metal products will replace the need for timber construction sources. As of 2009 Bioenergy contributed to only 0.5 per cent of Australian energy production (Natural Resource Management and Primary Industries Ministerial Councils 2009); however, with increased Government awareness of reducing carbon dioxide emissions, technological developments and timber residue input, Bioenergy could become a viable energy source in 2040 (Goble and Jarvis 2007).

The person interviewed for a local perspective believes if the Australian forestry industry is to continue meeting demand both nationally and internationally the current management of plantation areas needs to be more closely monitored. He explains not all plantation areas are being logged at appropriate intervals or volume in order to encourage growth and the wrong species of trees are being planted in some areas. Along with this, the timber industry needs to expand the residue market. The residue market consists of the second grade timber which is sold as woodchips. He believes with less wasteful practices via the use branches and roots, the residue market would increase its production and profit greatly as Japan being the main buyer (Japan bought 82 per cent of Australia's exported woodchips between 2008 and 2009) has an increasing demand of woodchips (Department of Agriculture, Fisheries and Forestry 2010).

5.2 Comprehensive Strategy

In order for Australia's forestry industry to reach the best future scenario described, the Australian Government will have to look at the forestry industry as a holistic system which incorporates the economy, environment and society of Australia. Below are some steps which can be taken now to ensure the economic sustainability and growth of the forestry industry to 2040.

It is important to maintain the economic factor of the forestry industry in order to ensure its future survival and ability to support the rural towns its employment provides. Currently 13,200 people are employed in Australia's forestry and logging companies of which the timber industry provides 0.7 per cent of Australia's gross domestic product (Department of Agriculture, Fisheries and Forestry 2010). The employment and profit made by logging and sawmill companies' funds state governments and as a result funds state run services such as schools and hospitals (Roche and Denlow, 2010). Continued growth of forest plantations would result in higher rates of employment in these regional areas (for every 65 hectares of new plantations, one more job is created in the Riverina) (Roche and Denlow 2010), however, if new plantations encroach on traditional Aboriginal land, it would result in a great loss of cultural and spiritual heritage (Standards Australia 2007).

The forestry industry can possibly meet future demands by being less wasteful. Currently Australia has an export trade deficit of \$2.1 billion, half of which is due to Australia's importation of paper (Department of Agriculture, Fisheries and Forestry 2010). Collection of tree branches at logging sites and woodchips at sawmills would provide an increased supply of second grade timber for use in the residue market for the production of paper. Recycling of timber products from demolished buildings combined with government restrictions on increased construction developments are other methods of meeting demand without the cost of logging more trees.

The Australian government is currently making adaptations and mitigations towards climate change including the National Climate Change and Commercial Forestry Action Plan 2009 – 2012 and the carbon pollution reduction scheme (Department of Agriculture, Fisheries and Forestry, 2009). In terms of the economy, the Australian government must make a decision as to how much it is willing to spend in order to slow down the rate of climate change. The Garnaut Climate Change Review looked at the worth of spending money now in order to make a better future. Figure 8 depicts his calculations as to the benefits of spending none, some or a lot of money on climate change mitigations over time. Figure 8 shows the Australian Government should spend time and money on mitigating climate change in order to reach a beneficial future in terms of the survivability of the environment and Australia's lifestyle.

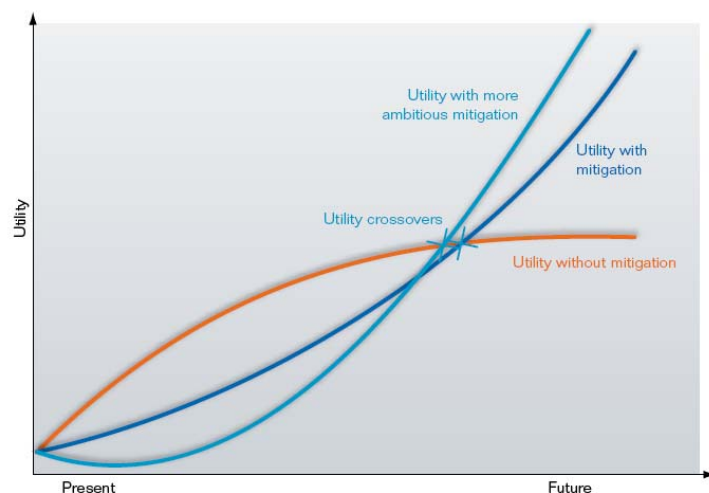


Figure 8. Garnaut's utility versus time graph. The orange line shows no money spent on mitigating climate change results in little benefits. The dark blue line shows the exponential growth in utility with money spent. The light blue line shows a lot more money spent will result in initial hardships with slightly more benefits in the long run as the dark blue line (Garnaut, 2008 p.18).

The forestry industry is important in maintaining the health of the environment in terms of the composition of the atmosphere and other ecosystem goods and services. Currently the Australian Government is providing benefits to farmers to plant trees to absorb carbon dioxide emissions (Natural Resource Management and Primary Industries Ministerial Councils 2009). Controlled clearing of plantations is necessary as old trees contain a high content of stored carbon and unless they are logged, they will rot and most of the stored carbon will be released into the atmosphere as carbon dioxide. Studies show that by capping the amount of trees logged to a level similar to now, stored carbon stocks will rise from 1.4 Mt to 1.6 Mt in early 2040; but with

increased logging, stored carbon stocks are expected to rise from 1.4 Mt to 4 Mt by early 2040, as shown in Figure 9 (Kapambwe et al. 2008). By the expansion of the forestry industry thus the number of trees logged, the concentration of carbon dioxide levels will decrease (depending on the amount of carbon dioxide put into the atmosphere) and effects of climate change on Australia, as well as contribute to meeting future timber demand up to 2040.

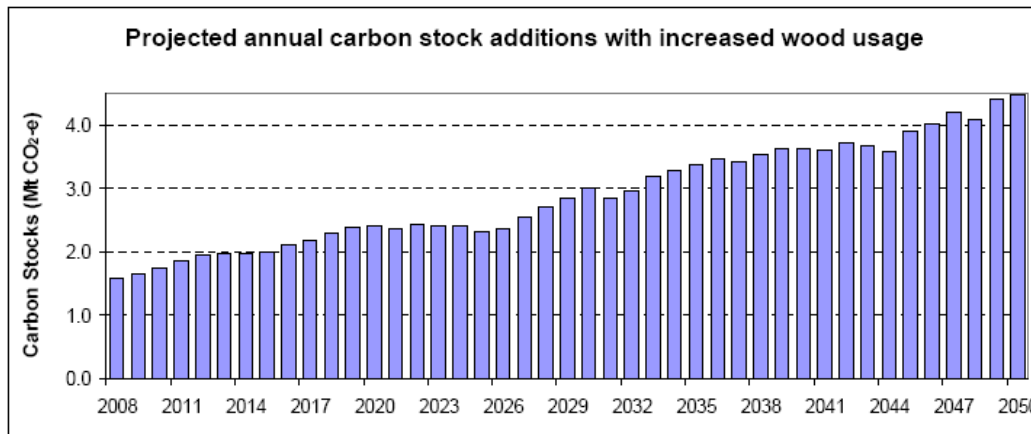


Figure 9. Projected stored carbon from the atmosphere from logged trees (Kapambwe et al. 2008).

6.0 Conclusion

Australia’s forestry industry is integral to the Australian economy in terms of exports, society in terms of sustaining rural communities and environment by the natural process of carbon fixation. Due to these focal points, management of this industry is of vital importance to Australia if it is to reach the ‘low and slow’, rather than ‘dizzy’ scenario for 2040. Of all of the steps which can be taken to counteract the effects of climate change and demand upon the forestry industry, increasing plantation areas is the most essential step. Increasing plantations areas increases job opportunities and exports, lessen carbon dioxide concentration, thus the effects of climate.

7.0 References

Australian Government 2011, ‘Growing Australian forestry; Inquiry into the Australian forestry industry’, House of Representatives Agriculture, Resources, Fisheries and Forestry Committee, Canberra, Available: <<http://www.aph.gov.au/house/committee/arff/forestry/media/media1.pdf>> (last accessed 23 June 2011).

Bureau of Meteorology (BOM) 2010a, ‘Global Climate Variability & Change - Time Series Graphs’, Available: <<http://www.bom.gov.au/cgi-bin/climate/change/global/timeseries.cgi>>, (last accessed 04 October 2010).

Bureau of Meteorology (BOM) 2010b, ‘Tropical Cyclone Information for the Australia Region’, Available: <<http://www.bom.gov.au/cgi->

bin/silo/cyclones.cgi?region=aus&year=1907&eyear=1926&loc=0>, (last accessed 04 October 2010).

Commonwealth Scientific and Industrial Research Organisation and Bureau of Meteorology (CSIRO and BOM) 2010, 'National Temperature Change 2030 Annual, Climate Change in Australia'. Available: <<http://www.climatechangeinaustralia.gov.au/nattemp5.php>>, (last accessed 04 October 2010).

Department of Agriculture, Fisheries and Forestry 2009, *National Climate Change and Commercial Forestry Action Plan 2009-2012*, Department of Agriculture, Fisheries and Forestry, Canberra, Available: <http://www.daff.gov.au/__data/assets/pdf_file/0008/1386431/climate-change-061109.pdf>, (last accessed 09 March 2011).

Department of Agriculture, Fisheries and Forestry 2010, 'Australia's Forest Industries', Department of Agriculture, Fisheries and Forestry, Commonwealth of Australia, Australian Government. Available: <<http://www.daff.gov.au/forestry/national/industries>>, (last accessed 04 October 2010).

Forests NSW Department of Primary Industries 2010, *Forests NSW Annual Report 2008-2009: Part 1 - Social, Environmental and Economic Performance*, report prepared by Morgan Roche and Ann Denlow, Forests NSW. Available: <http://www.dpi.nsw.gov.au/_data/assets/pdf_file/003/309783/forests-nsw-annual-report-2008-09.pdf>, (last accessed 15 November 2010).

Garnaut, R. 2008, *The Garnaut Climate Change Review: Final Report*, Cambridge University Press, Port Melbourne. Available: <http://www.garnautreview.org.au/pdf/Garnaut_prelims.pdf>, (last accessed 15 November 2010).

Goble, D and Jarvis C. 2007, Forest and Wood Products Australia Limited, *Opportunities for Using Sawmill Residues in Australia*, report prepared for Forest and Wood Products Australia, Manufacturing & Products Project Number PR08.2046. Available: <<http://www.fwpa.com.au/Resources/RD/Reports/PR08.2046%20Opportunities%for%20Using%20Sawmill%20Residues%20in%20Australia%20final%20web.pdf?c=2>>, (last accessed 15 November 2010).

Kapambwe, M., Ximenes, F., Vinden, P. and Keenan, R. 2008, *Dynamics of Carbon Stocks in Timber in Australian Residential Housing*, report prepared for Forest and Wood Products Australia. Available: <http://www.fwpa.com.au/Resources/RD/Reports/PN07.1058dynamics_carbon_stocks.pdf?pn=PNA016-0708>, (last accessed 15 November 2010).

Low, K. and Mahendrarajah, S. 2010, Future directions for the Australian forest industry, *Issues Insights (ABARE), 10.1*, Australian Bureau of Agricultural and Resource Economics (ABARE), Canberra, 23pp. Available: <http://www.abare.gov.au/outlook/_download/a1.pdf>, (last accessed 04 October 2010).

Natural Resource Management and Primary Industries Ministerial Councils 2009, *National Climate Change and Commercial forestry Action Plan 2009 -2012*, Available: http://www.daff.gov.au/_data/assets/pdf_file/0008/1386431/climate-change-061109.pdf, (last accessed 04 October 2010).

NSW Department of Primary Industries 2008, *Forests NSW Annual and Seeing (Sustainability) Reports*, Available: <www.dpi.nsw.gov.au/forests>, last accessed 09 March 2011.

Parsons, M., Frakes I. And Gavran M. 2007, *Australia's Plantation Log Supply: 2005 – 2049*, Australian Government Department of Agriculture, Fisheries and Forestry, Bureau of Rural Sciences, Canberra, 48 pp. Available: <http://www.plantations2020.com.au/assets/acrobat/log_supply_final_06-46.pdf>, (last accessed 04 October 2010).

Plantations 2020, *Plantations for Australia: The 2020 Vision, An Industry/government Initiative for Plantation Forestry in Australia*. Available: <<http://www.plantation2020.com.au/assets/acrpbat/2020vision.pdf>>, (last accessed 15 November 2010).

Science Teachers Association of New South Wales 2008, *Success One HSC Chemistry, Eighth Edition*, Aaron Butler Publishing, Bowral.

Standards Australia, 2007, *Forest Management-Economic, Social, Environmental and Cultural Criteria and Requirements for Wood Production (known as The Australian Forestry Standard)*, AS 4708-2007, Australia Forestry Standard Limited, Yarralumla. Available: <http://www.forestrystandard.org.au/files/Standards/4708.pdf>, (last accessed 15 November 2010).