Plantations2020
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Plantations and Carbon Facts

As the climate change issue reaches fever pitch, interest in the use of forests as a means of removing carbon dioxide (CO_2) from the atmosphere has accelerated. Carbon storage in new forests can provide a cost-effective form of net greenhouse gas abatement and a valuable source of transitional emissions reductions until new energy technologies are developed. Forest establishment can also contribute to other social and environmental outcomes.

Key messages

- Forests planted on cleared agricultural land can remove 5-30 tonnes of CO_2 per hectare from the atmosphere annually.
- Plantations can play an important role in removing the greenhouse gas CO_2 from the atmosphere .
- Factors that encourage plantation expansion will generate climate change benefits.
- The attractiveness of plantations as a carbon sink investment will be heavily influenced by trading and accounting rules which are still being developed.
- Plantations generate large volumes of wood residues which have potential to replace fossil fuels as an energy source, reducing greenhouse gas emissions.

How much carbon and carbon dioxide do forests store?

Carbon represents about half the dry weight of a tree.

Australian forests store 10.5 billion tonnes of carbon, mostly in native forests. On average, 4 tonnes of carbon per hectare is stored across the Australian forest estate.

The entire Australia forest estate is storing 38.5 billion tonnes of CO_2. In 2005, the Australian Greenhouse Office estimated Australia's total CO_2 equivalent emissions were 559 million tonnes, so Australian forests are storing 69 years worth of 2005 annual emissions.

Future carbon storage by plantations

New plantations and replanting will only occur if a positive investment environment exists.

The potential of Australian forests to store more carbon depends on the rate of new plantings or forest regeneration, harvesting and growth rates, and tree deaths by fire, pests and disease. New plantations are being established at a rate of 73,000 ha per year, and around 40,000 ha of harvested plantations are re-established annually to meet timber supply requirements of new investments in timber processing.

Accounting rules, plantation investment, carbon trading

In theory, under the Kyoto Protocol, only the carbon stored in forests planted post-1990 on cleared land is eligible for trading. Accounting rules exclude any carbon that might be stored through 'forest management' mechanisms (eg. native forest management, management of older plantations), in part because of the downside risks to the national account.

Fire is one risk to the national carbon accounts that can impact on Australia's net greenhouse gas emissions

Various trading schemes also have different rules about how many years the carbon must remain out of the atmosphere to count as a carbon credit.

Plantation investment for carbon

Several schemes are currently operating in Australia using forests to generate tradeable carbon credits and/or to offset greenhouse gas emissions. Rules for the inclusion of forests and wood products in a national Australian Emissions Trading Scheme (likely to commence in 2010) are still being developed.

A number of issues will determine the attractiveness of plantation investments for carbon storage.

The concepts of **additionality** (is a plantation additional to what would have been planted anyway) and **permanence** (how long do trees have to remain in the ground, is harvested timber regarded as a carbon emission) will be important.

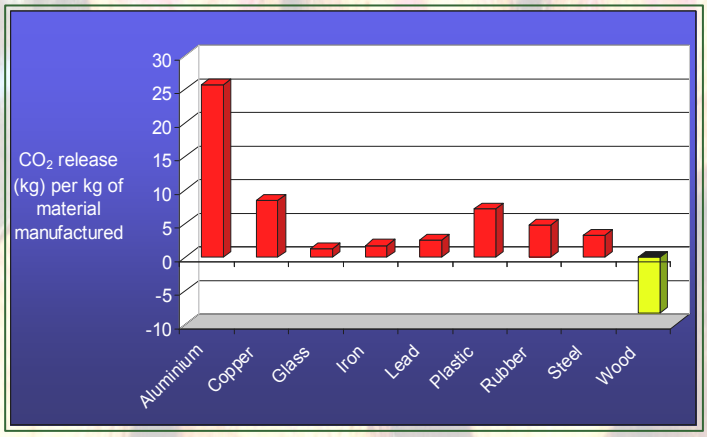
The treatment of carbon stored in harvested timber products will impact on the attractiveness of plantations as carbon sink investments

Research indicates that harvested timber products, even in landfills, retain the majority of their carbon for decades and that the most cost-effective way to remove carbon is to allow timber harvesting (Richardson 2005).

Wood compares favourably to competing materials

Timber from plantations performs well compared to competing materials (Fig 1). One study has indicated that timber can store up to 15 times the amount of carbon that is released during its manufacture.

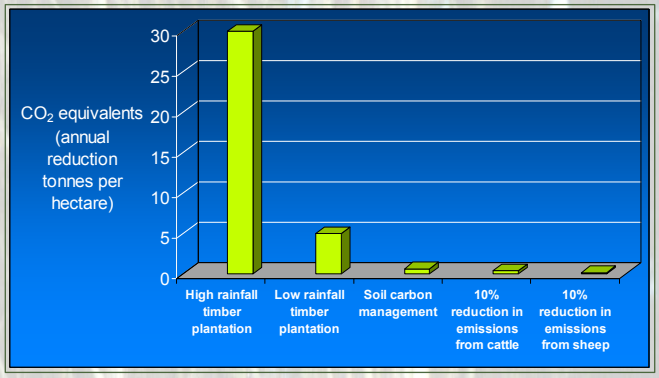
Figure 1. Greenhouse gas release in manufacture of construction materials



Source: Forests NSW (2005)

A positive environmental outcome of plantation expansion is the accelerated rate of greenhouse gas abatement from plantations relative to agricultural land uses. A number of mechanisms are being investigated to curb agricultural emissions. Current evidence suggests that plantations are ahead in their capacity to remove CO_2 from the atmosphere (Fig 2).

Figure 2. Approximate rates of greenhouse gas sequestration or abatement



Source: Australian Farm Journal (2007)

Bioenergy

Waste from wood processing is already being used for heat and energy and replacing some fossil fuels. Additional energy could be created using material from new plantations and residue materials, providing further greenhouse gas benefits.

Wood waste has potential to replace fossil fuels for energy, reducing greenhouse gas emissions

Polglase and Stein (2001) estimated that burning coal to produce electricity releases 8 times more CO_2 into the atmosphere than using wood residues from forests grown primarily for sawn timber in New South Wales. Studies overseas suggest that the net emissions of CO_2 may be up to 30 times higher from a coal-fired power station.

References.

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Forests NSW (2005), Forest, Timber and the Greenhouse Effect, available at http://www.forest.nsw.gov.au/publication/forest_facts/forests_timber_greenhouse_effect/default.asp

Australian Farm Journal (2007), Volume 17 No 07 pp16 Emissions trading: threat or opportunity?

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