Australian Government
Department of Climate Change and Energy Efficiency

DRIVERS OF LAND CLEARING IN AUSTRALIA

Australian National Greenhouse Accounts

Land sector reporting

Land clearing *is defined as the direct human-induced removal of vegetation cover from forested areas, in order to allow the land to be used for other purposes such as agriculture. This includes first-time clearing of undisturbed forest as well as the clearing of forest regrowth on previously cleared land. It does not include timber harvest in forests that will remain in commercial timber production.*

Land clearing is an important contributor to Australia's total net greenhouse gas emissions. Carbon dioxide and other greenhouse gases are released when vegetation is burned or left to decay, and as soil carbon declines over time following a clearing event. In 2009, land clearing accounted for around 7% of Australia's net emissions of 564.5 million tonnes of carbon dioxide equivalent reported under the Kyoto Protocol. The land sector, like all sectors, has a significant contribution to make to Australia's net emission reduction goals. The first step to reducing emissions from land clearing is to understand where these are occurring and why.

Australia uses satellite imagery and geographic information systems (GIS) to detect and analyse changes in forest cover across the continent from year to year. When an area of forest clearing is detected from changes in satellite images from one year to the next, the cause is determined from fine-scale images and cross-referencing national data sources on land use. This provides a spatially explicit picture of how much human-induced land clearing occurs each year, and where it happens. The locations of land clearing events detected between 1990 and 2009 are displayed in Figure 1. During this period land clearing occurred predominantly in Queensland and New South Wales.

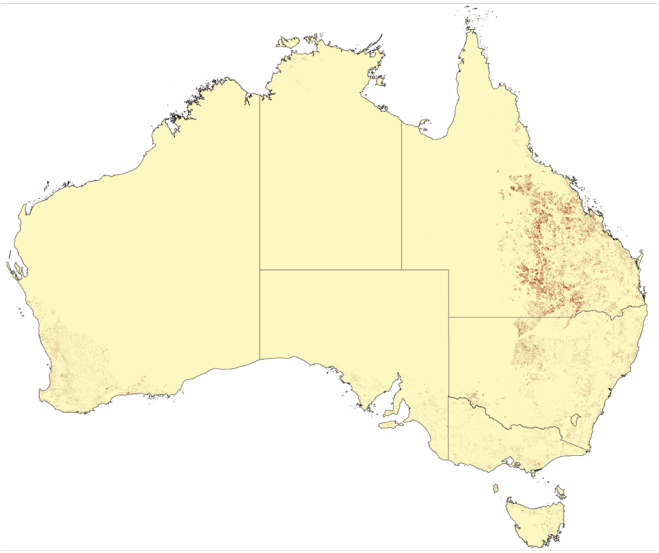


Figure 1

Location (in red) of land clearing events detected between 1990 and 2009, which are included in the Kyoto deforestation account.

Source: *National Inventory Report 2009*, vol. 3, p. 62.

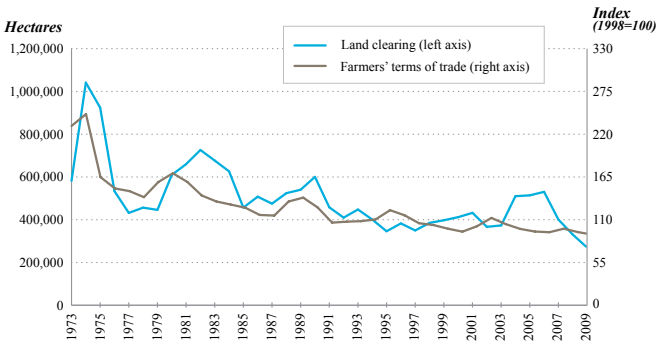
Economic indicators

Today, most land cleared in Australia is used for cattle grazing. In the past, large areas were also cleared for crop production. For farmers and other landowners, economic considerations are an important driver of land clearing. When the prices of agricultural products, for example beef, are high, landowners have a strong incentive to clear land and expand production.

The *farmers' terms of trade* are a key indicator of economic conditions in the agriculture sector. They are defined as the ratio of an index of prices received by farmers to an index of prices paid by farmers. Prices received include agricultural products such as beef, and prices paid include inputs such as fertiliser and diesel. The farmers' terms of trade increase if either the price of an agricultural product rises, or the price of an input falls.

Figure 2:

Land clearing and farmers' terms of trade, Australia, 1973–2009



Sources: Land clearing: DCCEE data used in the *National Inventory Report 2009*.
Farmers' terms of trade: ABARES, *Australian Commodity Statistics 2010*, table 17, p. 17.

Figure 2 shows the farmers' terms of trade in Australia and the annual area of cleared land between 1973 and 2009. The land clearing areas are the sum of first-time clearing and re-clearing of land where forest cover has regrown.

As illustrated in Figure 2, there is a clear relationship between the farmers' terms of trade and land clearing. The data also indicate a lag of approximately one year in the relationship. Typically, an increase (or decrease) in the farmers' terms of trade is followed by a corresponding increase (or decrease) in land clearing around one year later. A linear least squares regression using yearly percentage changes in the land clearing area and the farmers' terms of trade from 1974 to 2009, with a lag of one year, confirms that this relationship is statistically significant at the 1% significance level ($R^2 = 0.34$).

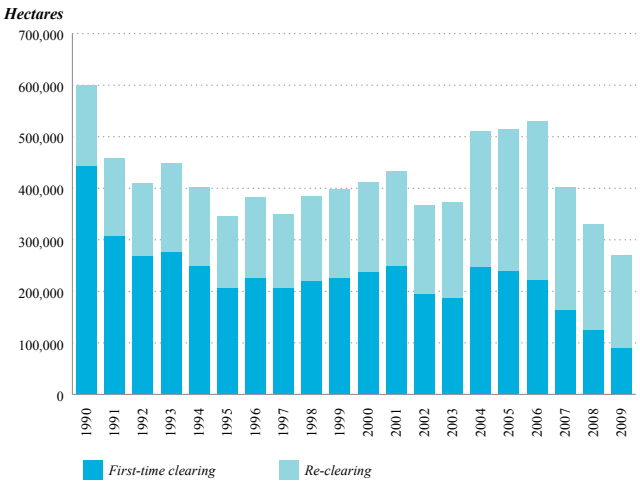
Government policies

Government policies are another important factor affecting the rate of land clearing. In recent decades, state governments have passed legislation to significantly restrict land clearing, especially in environmentally significant areas. First-time clearing of undisturbed forest is now prohibited in many areas.

Figure 3 illustrates the trend in land clearing in Australia between 1990 and 2009. The figure demonstrates a strong shift away from first-time clearing over this period towards re-clearing of forest that has re-grown on previously cleared land. In 1990, first-time clearing accounted for 74% of the total area cleared, while by 2009 the proportion had fallen to 33%. This reflects the progressive introduction of land clearing restrictions by state governments from the early 1990s onwards.

Figure 3:

Land clearing, Australia, 1990–2009



Source: DCCEE data used in the *National Inventory Report 2009*.

The national trends also demonstrate the effects of a major policy change implemented recently in Queensland. In 2004, the Queensland government passed amendments to land clearing legislation to substantially restrict clearing from 2007 onwards. Further restrictions were passed in 2009. The effects of this policy change can be seen in the sharp drop in land clearing, especially first-time clearing, from 2007 onwards (Figure 3). In addition, there was a temporary increase immediately prior to the drop, between 2004 and 2006. This may reflect landowners clearing extra land in anticipation of the new restrictions, as it occurred in the period between the passage of the new laws and before they came into force. Unlike most previous large shifts in the rate of land clearing, the recent shifts in 2004 and from 2007 onwards were not accompanied by significant changes in the farmers' terms of trade (Figure 2).

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