

# Drivers of Land Use Change

## A behaviour change model for policy and program developers

**Policy and programs that help farming families satisfy long-term motivations are likely to be welcomed by farmers. Those that don't risk being controversial or ignored.**

### The Drivers of Land Use Change Project

The Drivers of Land Use Change (DLUC) project set out to research the drivers of land use change that influence the maintenance of biodiversity. Its aim was to produce innovative policy ideas to encourage the maintenance of native biodiversity on farmland within agricultural landscapes.

The DLUC project was supported as part of the Ecologically Sustainable Agriculture Initiative (ESAI). The ESAI was established to research opportunities to protect the environment while maintaining economic viability in the farming of the future.

The final report discusses findings about drivers, land use changes, and associated impacts on biodiversity that can potentially help in development of policies and programs. The findings here are drawn from the published and unpublished reports produced over the course of the project.

The key findings are outlined on the final page of this paper.

### The Drivers Model

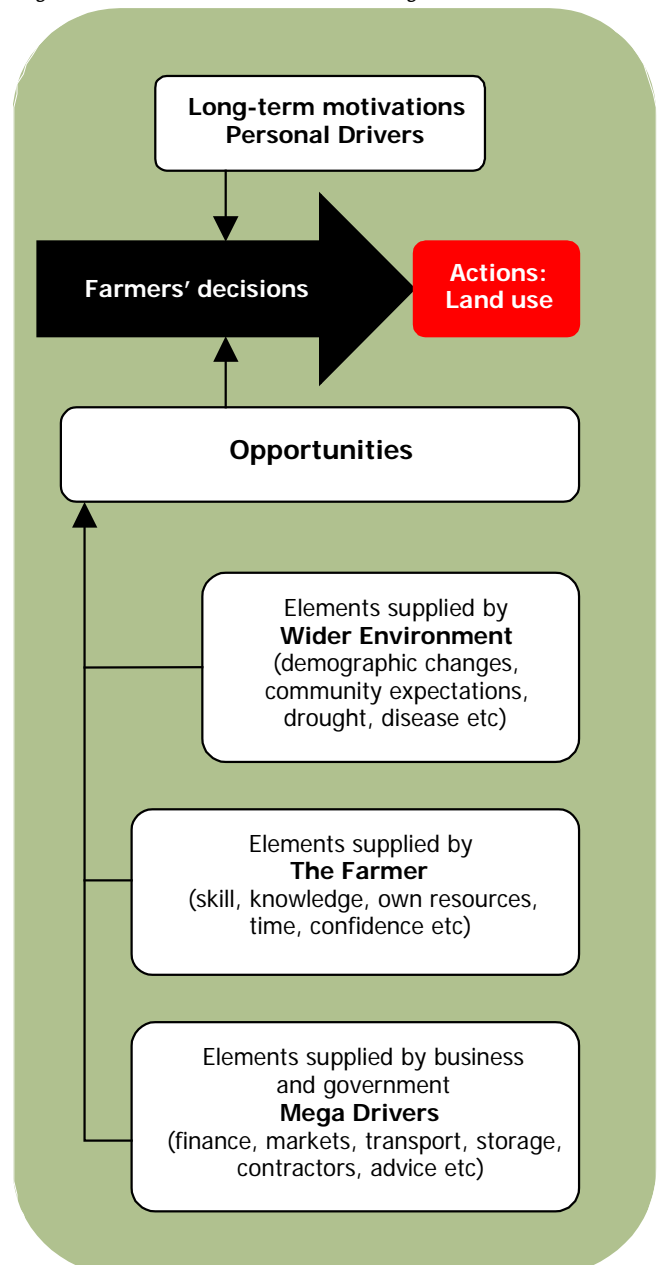
In order to generate ideas relevant to developing policy and programs, the project sought to understand two key relationships. They are: (1) the relationship between land use changes on private land and the consequences for native biodiversity, and (2) the relationship between land use change and drivers that encourage people to make these changes. The Drivers Model was created to aid in this.

The *Drivers Model* links farmer motivation to available opportunities to change (Figure 1). It can be used to identify what government agencies might change to encourage farmers to manage their properties in environmentally sustainable ways.

This Information Sheet summarizes the final report of the Drivers of Land Use Change project (DLUC), *Matching opportunities to motivations*.

Find it, and other project reports, at:  
[www.dse.vic.gov.au](http://www.dse.vic.gov.au) >Conservation and Environment

Figure 1: Model of farmer decision making



# Drivers of Land Use Change

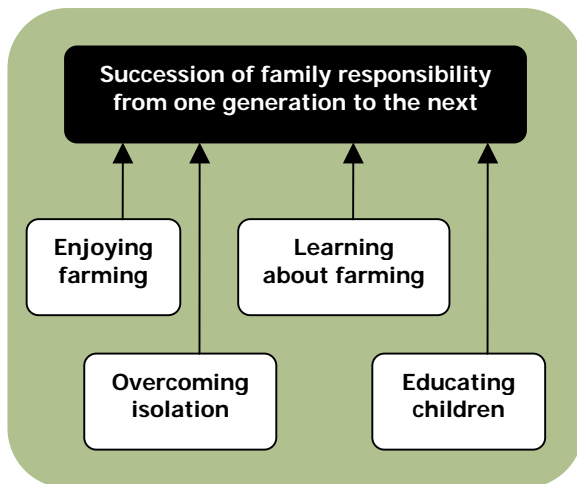
## Project summary

### Long-term motivations

The *Drivers Model* suggests that people take up opportunities that they believe will satisfy their long-term motivations.

Maintaining native biodiversity requires a long-term commitment, so involves long-term motivations. To identify these motivations, farmers on commercial family-run properties were interviewed about how they satisfied their fundamental human needs. From this, a set of five hierarchical 'stories', which are referred to as 'personal-drivers', was developed to explain farmers' long-term motivations (Figure 2).

Figure 2: Personal drivers: the five stories that represent the long-term motivations of farming families.



Farmers' actions for maintaining native biodiversity stem from their decisions about land use. By applying a systems-thinking approach, the project found that three decision systems were important. The *family decision system* was the overarching system which controlled both the *farm business decision system* and the *land ownership decision system*. Farming and land ownership support the family, not the other way around.

The five personal drivers influence each of these decision systems. The family may play tennis to overcome isolation, but this might also be one reason why the farmer joins a productivity discussion group. Decisions about purchasing more land are likely to reflect judgments about the effect of extra management responsibilities on enjoyment and isolation as well as financial considerations.

Farmers look for different **opportunities** in each decision system. For example, in the *farm business decision system*, farmers look for opportunities to grow and sell products. In the *land ownership decision system* they look for real estate opportunities.

### Changing opportunities to change farmers' actions

Figure 1 suggests that farmer decisions are influenced by the opportunities available. One example of an opportunity is the ability to lease more land.

This opportunity is shaped by three separate elements, as are all opportunities related to land use. These elements are:

- the **farmers** (e.g. their knowledge, skills, the resources they already have and their confidence).
- external organisations such as business and government agencies. What they supply are called **mega-drivers** (e.g. markets, finance, schools, contracts, laws, infrastructure, management advice, scientific research etc). Mega-drivers are outside farmers' control, but are essential in creating opportunities.
- environmental conditions including nature (e.g. good seasons, droughts, diseases and floods), demographic change, socio-economic trends and community expectations.

In the land-leasing example, the key mega-drivers would be land price, land available for lease, markets for the products the land can produce, and finance.

By changing a mega-driver government agencies (or business) can change the appeal of specific opportunities and so change what action farmers are able or want to take.

It is not enough to make an opportunity *available*. It also must also be *suitable*. In the leasing land example, the land might need to be large enough to generate the extra income required to support the needs of a growing family.

### Choosing which mega-drivers to change

In order to meet biodiversity objectives, it is necessary to work out which actions (i.e. land uses) need to be changed or encouraged. This means:

- deciding what opportunities for farmers would create these actions (or land uses)
- determining how to make these opportunities suitable and available to farmers by changing mega-drivers
- finding out which mega-drivers farmers see as being crucial for them to take up these particular opportunities.

# Drivers of Land Use Change

## Project summary

### Determining the gaps between biodiversity objectives and what biodiversity remains

The strategic scientific questions for native biodiversity management (see Figure 3) are:

- what on-farm native biodiversity ought to be present to enable the farm to contribute to the maintenance of regional and statewide native biodiversity targets?
- what native biodiversity is actually being maintained on the farm, and is likely to be in the future?
- where are the gaps between this reality and the ideal suggested by the biodiversity objectives?
- what actions would close these gaps?

These actions can then be evaluated, and decisions can be taken on closing the gaps. See Figure 3.

### Information needed to develop policy

The project identified the following information needs:

- the biophysical processes by which agricultural technologies and practices, both current and emerging, have an impact on ecosystems, and the nature of these impacts in the long term;
- how native biodiversity information and objectives should be best prepared and distributed for stakeholders in supply chains (farmers, agricultural researchers, bank lenders etc.);
- changes in mega-drivers that will have most leverage for achieving NRM/biodiversity objectives, and the responsiveness of stakeholders in the supply chains, including farmers, to changes in 'crucial mega-drivers'.

### Project reports

One of the very first activities was to organise a successful conference on Land Use Change. Refereed papers are available on the project web site.

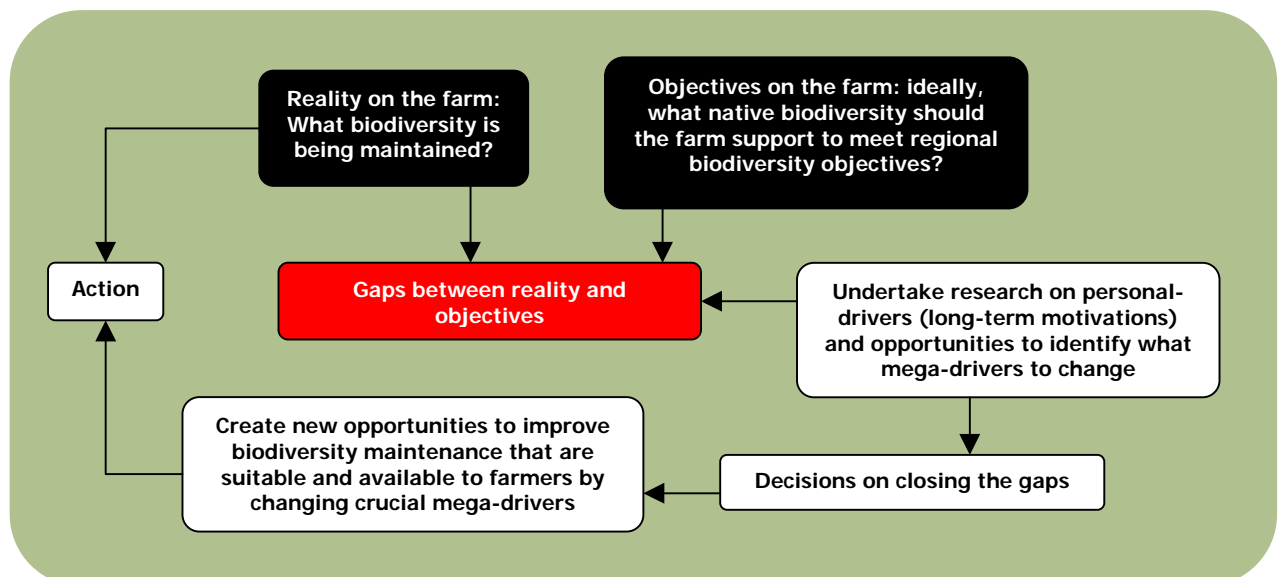
Understanding the relationship between land use change and biodiversity was a focus for the project. One report identified different types of land use changes in the Honeysuckle Creek area, and discussed their relationship to biodiversity. A second report outlined the use of the Land Use Impact Model to spatially represent the risk to biodiversity in the context of different land use scenarios.

Another report outlines the findings about long-term motivations that were derived from interviews with farmers in Honeysuckle Creek, North-East Victoria. The external forces shaping what farmers do, and how this relates to biodiversity, were examined. Reports, available on the project web site, cover:

- the 'mega-drivers' shaping agriculture, agribusinesses and regions;
- the operation of supply chains, both output-side and input-side;
- the role of Catchment Management Authorities and local government; and
- the particular situation of lifestyle farmers

Project reports can be found at [www.dse.vic.gov.au](http://www.dse.vic.gov.au) > conservation & environment.

Figure 3: The relationships between gap analysis and behaviour change research based on the Drivers Model.



# Drivers of Land Use Change

## Summary of key findings

### **The *DLUC Drivers Model* can provide powerful insights relevant for most NRM issues**

The *DLUC Drivers Model* is relevant to government agencies wanting voluntary change in the behaviour of farmers on commercial family-run properties in regard to all natural resource management issues on private land.

The Model provides information that is very relevant to the development and review of policy and programs. It does not provide an alternative process for developing them. It provides a useful check on the assumptions that are made about behaviour change.

Powerful insights for policy and programs directed at behaviour change can be gained by applying the Drivers Model separately for each of the three decision systems (the family, farm business, and land ownership decision systems), and by considering the five personal drivers (ensuring succession, overcoming isolation, enjoying farming, educating children, and learning about farming).

The Model could also be used to develop an understanding of decision making by lifestyle and corporate farmers, by guiding research into their motivations and opportunities.

### **The family decision system is very important for biodiversity maintenance**

Decisions by farmers to *protect* natural resources are normally justified in terms of caring and rights ethics, and so fall within the family decision system.

Creating more opportunities in the family decision system is likely to be effective in improving the maintenance of native biodiversity on farms, because decisions are likely to be long-lasting.

The availability of opportunities to farmers depends partly on what the farmer can bring to the opportunity from their own resources. This can depend on how successful they are in generating income through the farm business and land ownership decision systems.

### **Making “relevant opportunities” more suitable and available for farmers**

Voluntary behaviour changes are likely to occur when the farmer understands that taking up a specific opportunity will bring satisfaction to one or more of the farming family's long-term motivations (or personal drivers).

Voluntary behaviour changes could be encouraged by changing the mega-drivers that farmers believe to be crucial in making “relevant opportunities” more suitable and available.

“Relevant opportunities” are those farm-scale opportunities that will deliver the objectives of society at the regional and state scale. Defining “relevant opportunities” is likely to involve considerable investigation.

Creating suitable and available opportunities to satisfy the farmers' personal drivers and deliver the goals of society (“relevant opportunities”) is the key to getting voluntary and socially acceptable behaviour.

### **Putting resources into changing opportunities rather than farmers' motivations**

Personal drivers are the farming family's life-long motivations and so are very resistant to change. They show what farming families are interested in over the long-term and so provide a guide to the kinds of opportunities that are of most interest to farming families.

Changing mega-drivers to create opportunities that are in harmony with farmers' personal drivers is more likely to be successful than seeking to change farmers' long-term motivations.

### **Crucial mega-drivers can occur throughout the supply chain**

Some mega-drivers are created in parts of the agricultural supply chain that are quite removed from the farmer's decisions (e.g. agricultural R&D). So that actions on the farm deliver the objectives of society, this requires changing mega-drivers that are critical to farmer decisions at the most effective points, wherever these points occur in the supply chain.

### **It may still be necessary to change actions that may lead to loss of native biodiversity**

Seeking positive behaviours that maintain native biodiversity may not be enough, in some cases a focus on changing actions that would lead to a loss in native biodiversity may be required. These negative changes may come from the application of new technologies, which often have long lead-times.

#### **For more information**

Visit [www.dse.vic.gov.au](http://www.dse.vic.gov.au) > conservation & environment > biodiversity & agriculture

Contact Jim Crosthwaite; Phone (03) 9637 8457 or email [jim.crosthwaite@dse.vic.gov.au](mailto:jim.crosthwaite@dse.vic.gov.au)

© The State of Victoria, Department of Sustainability and Environment, March 2006

This publication is copyright. Apart from fair dealing for the purposes of private study, research, criticism or review as permitted under the Copyright Act 1968, no part may be reproduced, copied, transmitted in any form or by any means (electronic, mechanical or graphic) without the prior written permission of the State of Victoria, Department of Primary Industries. All requests and enquires should be directed to the Nominated Officer, Copyright, 8 Nicholson Street, East Melbourne, Victoria, 3002.

ISBN 1 74152477 6

#### **Disclaimer**

This publication may be of assistance to you but the State of Victoria and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.

[www.dse.vic.gov.au](http://www.dse.vic.gov.au)

[www.dpi.vic.gov.au](http://www.dpi.vic.gov.au)