Landscape Futures Analysis Tool

ABOUT LFAT

The Landscape Futures Analysis Tool (LFAT) enables users to consider how their region may change under different combinations of climate, carbon and agricultural commodity prices, and the cost of agricultural production. It provides a sound base, rooted in good science, for 'climate-ready' planning for biodiversity conservation, carbon sequestration, weed management and agricultural production.

The computer-based tool is highly interactive. Although it quickly computes hundreds of calculations to analyse complex interactions, it is fast and easy to use, generating clear maps and reports in seconds. It can readily generate 256 alternative scenarios of the future, drawing on different combinations of:

- Climate – four options, from 'baseline' through to 'severe warming and drying'.

- Agricultural commodity prices – four options for wheat, wool and sheep meat, from 50% to 200% of 2012 prices.
- Cost of production – four options, from 50% to 200% of 2012 commodity prices.
- Carbon prices – four options, from $15 to $60 per tonne CO_2.

It can also project future distributions for about 400 native plant and 70 weed species, based on alternative climate scenarios.

LFAT has been developed by the University of Adelaide and the CSIRO, in collaboration with regional Natural Resource Management (NRM) bodies and other interested parties.

The Tool can be found at www.spatialonline.com.au/LFA/'

GETTING STARTED

Envisioning

LFAT produces options, not an 'answer'. It is important that users start with a shared vision of the future, so they have a good sense of where they are headed and are able to decide between options. An envisioning process brings groups of people together and draws out explicit shared values, providing a strong foundation for tough, adaptive, joint management decisions. Values such as community, inclusiveness, respect for local knowledge and recognition of aesthetic qualities often surface through the process.

These values, translated into indicators of progress, enable LFAT users to assess which combination of future climates, agricultural profitability and carbon prices seem most likely to bring their vision into being. This is an iterative process that provides a genuine framework for learning through doing. In this way, the best scientific data and scenarios come together to show the options that include how people really want to enjoy their lives in their region.

GETTING STARTED

Climate ready planning

Communities wanting to be proactive in dealing with climate change in a 'carbon economy' (where carbon has a value), are interested in adaptation (avoiding risks and making the most of opportunities) and mitigation (reducing emissions of greenhouse gasses and sequestering carbon).

The resilience of agricultural production systems, the communities that have developed around agriculture, and local flora and fauna must be understood, together with their capacity to adapt or change. Any risks arising from revegetation for carbon sequestration must also be analysed.

LFAT AND NRM PLANNING

Planning questions

Some common critical issues for regional 'climate ready' NRM planning are:

- Resilience of agricultural production systems, including weed management.
- Resilience of local biodiversity, including weed management and the connectivity between habitats.
- Revegetation for carbon sequestration, biodiversity, and/or production purposes – and any risks arising, e.g. reduced water run-off or decline in agricultural productivity.
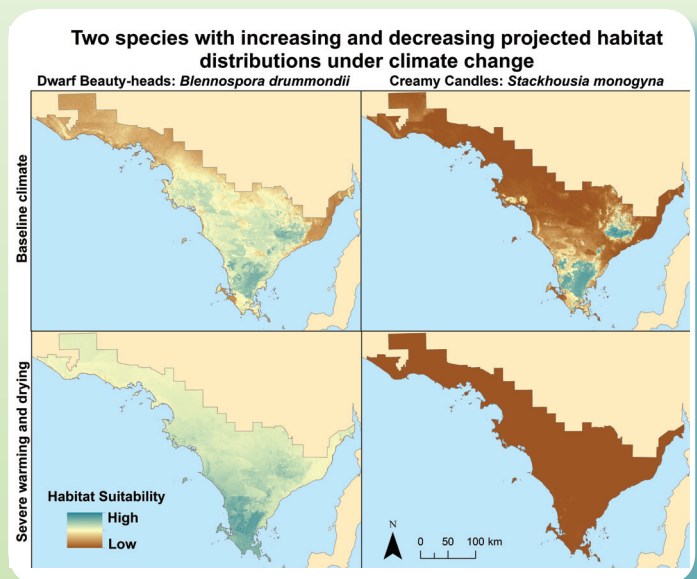
Those issues raise some generic questions affecting biodiversity conservation, agricultural productivity, weed management and carbon sequestration – and their interactions in different climate, carbon price and agricultural profitability scenarios. The Landscape Futures Analysis Tool can analyse the issues and generate information as maps or reports that enable NRM planners to then make well-informed decisions.

Biodiversity

Generic questions include:

- How will the distribution of different species vary under alternative climate scenarios?
- Which localities will become important refuge areas?
- Where will corridors be needed to help the retreat or migration of species?

LFAT can run appropriate analysis and generate maps such as species distributions (as shown below) and refuge 'hot spots'.

Two species with increasing and decreasing projected habitat distributions under climate change
Dwarf Beauty-heads: *Blennospora drummondii* Creamy Candles: *Stackhousia monogyna*

The LFAT information means that planners can make decisions such as:

- Conservation priorities – localities that will be critical biodiversity refuge areas.
- Vulnerable species – species that will become more or less vulnerable and warrant more or less targeted effort for survival.
- Strategic corridors – localities that link conservation hot spots, or provide for the retreat or migration of vulnerable species.
- Revegetation recommendations – lists of species recommended for planting in different localities.

LFAT AND NRM PLANNING

Weed Management

Generic questions include:

- How will the distribution of different weeds vary under alternative climate scenarios?

LFAT can run appropriate analysis and generate maps such as species distributions. The LFAT information means that planners can make decisions such as:
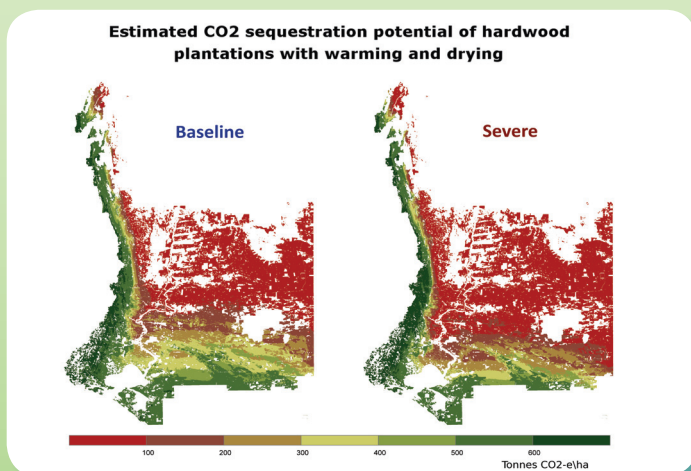
- Weed control priorities – species, in specified localities, that will require increased effort in surveillance for early detection and eradication or control.
- Weed management program reviews – species that will no longer warrant high expenditure in control due to reduced (or vastly increased) viability.

Carbon sequestration

Generic questions include:

- In which localities will carbon sequestration be economically feasible?
- If land in different localities is devoted to carbon sequestration, what (if any) risks will arise for water resources, biodiversity, town fire risk or agricultural productivity?

LFAT can run appropriate analysis and generate maps such as sequestration potential, carbon value, biodiversity benefit, risks to salinity, fire, soil erosion, groundwater recharge areas and wetlands, plus 'go/no go zones'.

Estimated CO2 sequestration potential of hardwood plantations with warming and drying

Baseline   Severe

Tonnes CO2-e\ha

The LFAT information means that NRM and land-use planners can make decisions such as:

- Carbon farming – localities and situations to be targeted in carbon farming initiatives, and the partners to be involved.
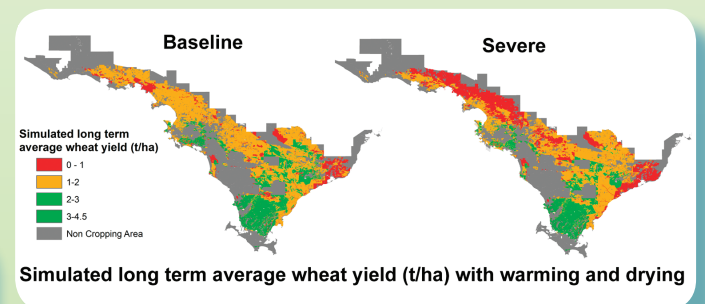
- Revegetation packages – incentives, information, species lists and assistance needed for multi-purpose revegetation initiatives.
- Carbon farming controls – localities and situations where controls on land-use change or management are warranted to avoid or mitigate any risks from carbon sequestration to the broader landscape.

Agricultural production

Generic questions include:

- In which localities will agricultural production systems have to adapt – and what adaptations will be most feasible economically?
- In which localities will agricultural production systems (or land-use) have to make substantial change – and what changes will be most feasible economically?

LFAT can run appropriate analysis and generate maps and reports such as agricultural production and agricultural value, along with temperature and rainfall projections.

Baseline   Severe

Simulated long term average wheat yield (t/ha)
- 0 - 1
- 1-2
- 2-3
- 3-4.5
- Non Cropping Area

Simulated long term average wheat yield (t/ha) with warming and drying

The LFAT information means that NRM and land-use planners can make decisions such as:

- Adaptive agriculture – localities where specified adaptations will optimise future profitability, together with the type of information or assistance required by landholders and key partners.
- Alternative production – localities where specified changes in production systems will optimise future profitability, together with the type of information or assistance required by landholders and the key partners.
- Research priorities – information gaps to assist with adaptations and changes in production systems.

LFAT AND NRM PLANNING

Landscape

Generic questions include:

- What balance of carbon sequestration, agriculture and conservation is likely in different localities?

LFAT analysis can generate maps and reports showing land use and management options that meet specific natural resource management objectives. The LFAT information means that NRM and land-use planners can make decisions such as:

- Communication and collaboration – partners to engage in sharing information and planning how to assist landholders in different localities to make optimal decisions on how they use and manage their land and other resources.

- Land use controls – localities and situations where controls on land-use change are warranted to avoid or mitigate any risks to the broader landscape or community.

Summary

The Landscape Futures Analysis Tool helps answer questions about the future, through the complex analysis of many factors to generate simple, easily interpreted maps or reports.

Armed with information from LFAT, regional NRM planners can make well-informed decisions, based on sound science, to help ready their region for climate change and the carbon economy.

Carbon value distribution under severe climate change and a carbon price of $60/tonne CO_2-e.
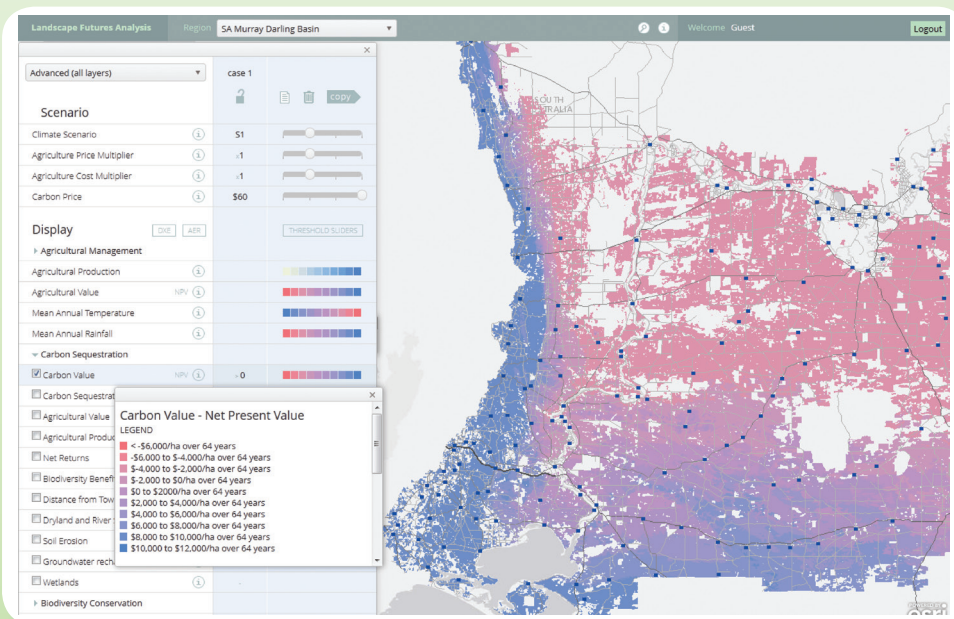
**To view LFAT:
www.spatialonline.com.au/LFA/'**

MORE INFORMATION

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