

GrassGro is a decision support tool developed by CSIRO to assist decision-making by farmers and managers of grassland resources. GrassGro helps analyse opportunities and risks that variable weather imposes on the profitability and sustainability of grazing systems

Exciting revisions to GrassGro in version 3 include:

- easily-tailored descriptions of sheep or beef enterprises
- unique capacity to test management options as a season develops
- pre-designed issues for analysis
- automatic reporting
- access to constantly updated weather inputs
- evaluation of possible longer-term shifts in weather patterns

GrassGro[®] 3

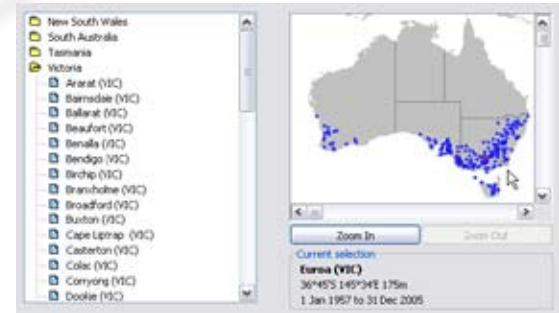
– easier, faster analysis of grazing systems

Matching management goals with land capability

GrassGro is a flexible and powerful computer program that can be applied to a broad range of issues in agriculture and natural resource management at both farm and regional scales:

- real-time review of management tactics during the current season
- testing long-term decisions about herd or flock management
- testing pasture types, animal bloodlines and enterprises
- land capability and production benchmarking
- resource sustainability: ground cover, water balance
- drought management and climate variability scenarios
- supply chain analysis





A user-friendly interface: weather inputs are selected from a list of locations in temperate Australia.



What is GrassGro?

GrassGro is a computer program that delivers grazing systems research in a useable form to farmers, their advisors and others responsible for grassland management. GrassGro is based on decades of field experimentation from across Australia and lets the user focus on the biophysical and business outcomes of management decisions.

GrassGro has been available commercially since 1997 for use in temperate grazing systems across southern Australia. It has also been applied to a variety of overseas grassland environments.

Behind GrassGro's powerful and easy-to-use interface, inputs of historical daily weather data drive models of the interacting processes of pasture growth and animal production. Day-to-day changes in water content of soil, pasture growth and decay and responses to grazing are simulated for a chosen sheep or cattle enterprise.

The user describes their livestock, management, costs and prices and GrassGro predicts animal intake and production of wool, meat and milk. GrassGro is another application of the animal model in the companion decision support tool GrazFeed.

Seasonal and year-to-year variation in pasture and animal production and gross margins are presented in comprehensive reports for analysis of risk.

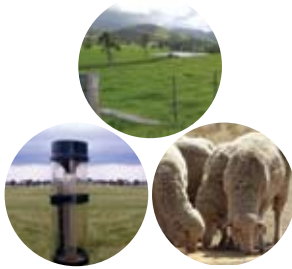
Using GrassGro version 3: efficient problem analysis

GrassGro v3's new interface is designed so that agricultural and land use management problems can be answered quickly and easily. It allows the user to take a grazing system, apply different management options and compare the predicted outcomes in one easily-generated report.

Reports show the user the interactions between key biophysical components of the farm system, management options and economic outcomes. Gross margins show the financial performance of the whole enterprise and sensitivity analyses using different costs and prices can be rapidly undertaken.



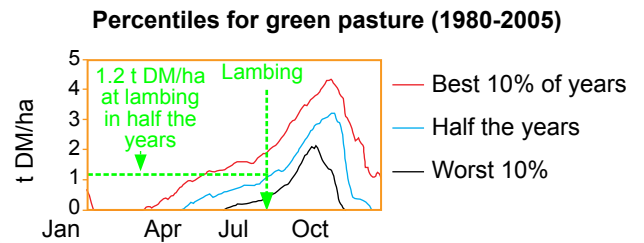
Scaling up: GrassGro analyses can be applied at a paddock, farm, district or regional level.



1. Describe the grazing system



2. Simulation



3. Outputs and analysis

Analysing the components of a grazing system

GrassGro v3 is extremely flexible: each component of a grazing system can be stored in a library for future use and reconfigured in a new analysis.

Pre-designed issues in GrassGro v3 address practical problems that commonly arise but are complex and difficult to analyse objectively over a long range of seasons, such as:

- variation in stocking rates (with or without different lambing or calving dates),
- testing combinations of shearing dates and stock selling dates,
- tactical decisions in response to emerging seasonal conditions.

Many other issues can also be readily designed and examined using GrassGro v3's analysis framework.

Specificity with useability

Users are able to analyse issues for their own farm or other specific grassland systems.

To assist users, each location's unique combination of weather, soils, pastures and livestock are described by using, where possible, databases built in to GrassGro.

Daily weather inputs for the selected location are obtained from farm records, the Australian Bureau of Meteorology databases or downloaded from the SILO website.

The soil profile is described by the user in terms of its water holding capacity. Soil physical properties can be obtained from default values derived from the National Soils Database or from measured values. The user chooses the combination of legumes and grasses from a list of temperate pasture species and cultivars.

The pasture can be simulated as an ungrazed paddock, a hay-cutting enterprise or grazed by one of the following sheep or cattle enterprises:

- ewe breeding flock for meat, wool or dual purpose
- wether flock
- prime lamb production
- fattening enterprises for steers or bull beef
- beef breeding herd producing vealers, weaners, yearlings or bullocks
- opportunity feedlotting

GrassGro is suitable for any breed of sheep or cattle. The user sets management rules (for example the time of mating and initiation of supplementary feeding) for each enterprise, along with costs and prices. More than one paddock can be simulated at a time, in which case the user determines when different classes of livestock graze each paddock.

An extensive online Help facility guides the user in the practical application of the tool and provides background information on the biological models that GrassGro uses in its analyses.

Tactical decisions in real-time: "What if?"

Users can download weather data from the SILO website to as recently as yesterday and then run GrassGro to look at the likely range of pasture and animal production outcomes over the next few months.

From their current set of soil and pasture conditions, users can test management alternatives and ask "What if?" questions that analyse short-term risks and opportunities.

Strategic decisions: the best long-term position

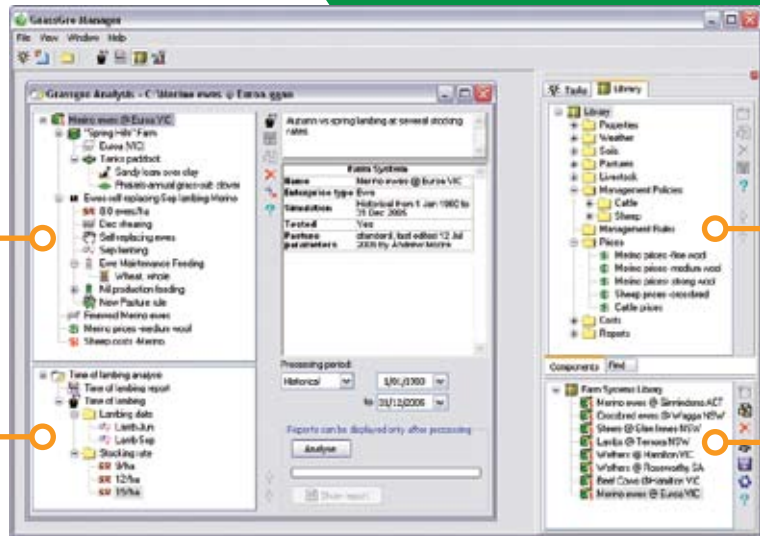
A producer wants to know the best long-term stocking rate for a Merino ewe flock if the lambing date is changed from early winter to spring.

GrassGro v3 is used to test June and September lambing dates for 3 stocking rates (9, 12 and 15 ewes per hectare) on a well-fertilised mixed perennial-annual pasture.

Farm system to be analysed

Issue to be analysed:

Time of lambing
2 lambing dates
x 3 stocking rates



Library of farm system components

Library of tested farm systems ready for analysis

The new GrassGro version 3 interface - flexible analysis of issues

The report shows the distribution of gross margins for each stocking rate over 25 years and the response of different parts of the farm system.

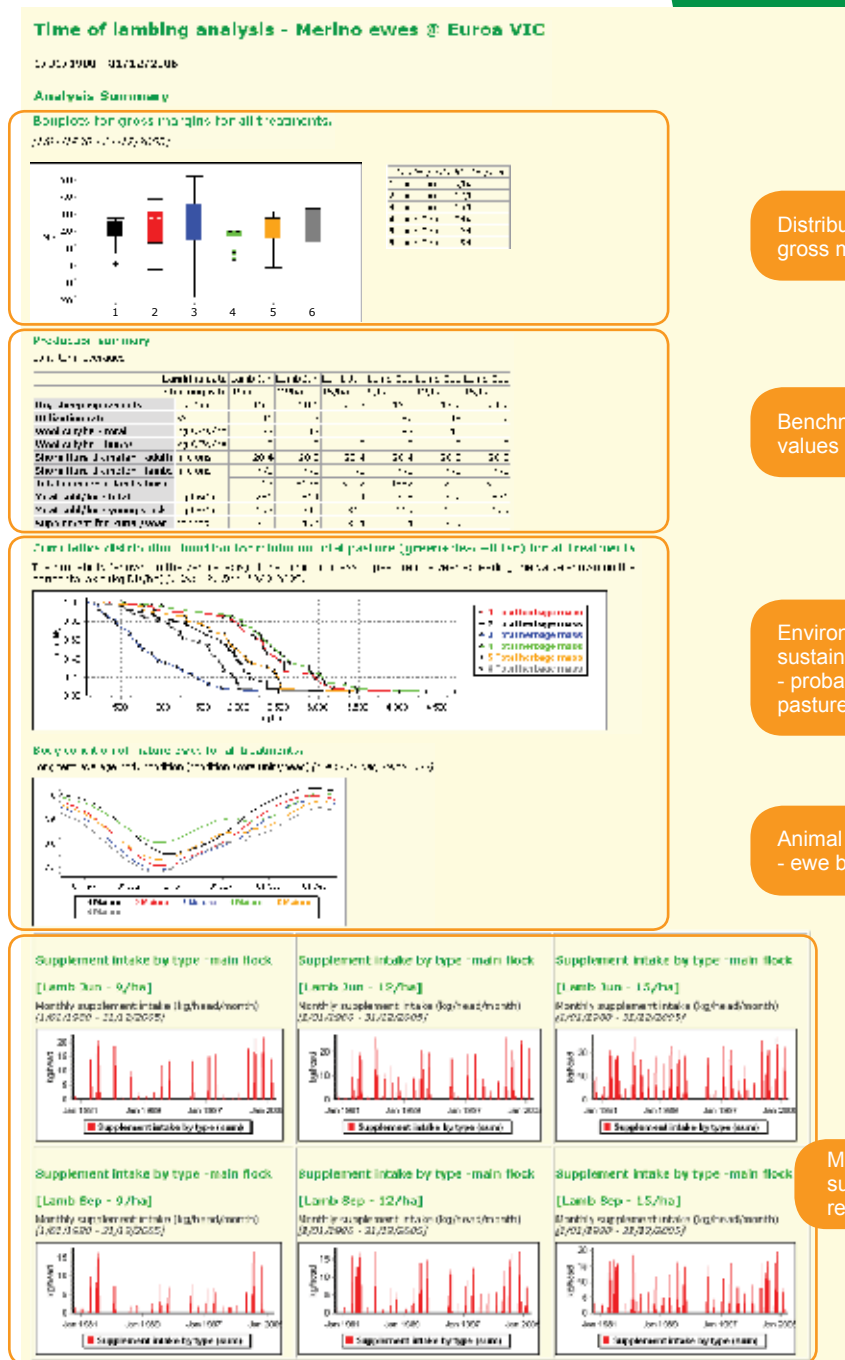
At rates above 12 ewes per hectare, the risks start to outweigh the benefits for both lambing dates. However, these risks are more manageable with a spring lambing.

Risk analysis

Summary tables

Comparisons of treatments

Effects over years



Distributions of gross margins

Benchmarking values

Environmental sustainability: - probability of low pasture residues

Animal production: - ewe body condition

Monthly supplement requirement

Comprehensive reports



Applications

GrassGro's flexibility makes it applicable to a wide range of issues, both on-farm and beyond.

Long term decisions:

- what is the best long term stocking rate?
- what is the best time to calve or lamb?
- should I run a different bloodline of sheep?
- in how many years will I need to supplement stock?

Short term decisions:

- how do current soil and pasture conditions affect pasture supply over the next few months?
- drought management — how much feed should I buy?
- what is the chance that these animals will meet production benchmarks or market weights?

Agricultural business and finance issues:

- supply chain management across a range of environments
- establishing risk for contracts

Research:

- animal and pasture science and agricultural economics
- studies of land use options across river catchments

Education:

- a new approach in teaching 'systems thinking' in agricultural science

Policy-making:

- modelling for drought, dryland salinity, greenhouse gas emissions, grassland fire risk, food sources for mouse plagues



Adoption

Since its release in 1997, GrassGro has been adopted by agricultural advisers, researchers, tertiary educators and policy makers. GrassGro analyses are typically interpreted and disseminated to farmers by advisers, both private and within state government departments. Over 240 licensed copies of GrassGro, with a training package, have already been sold to users across the temperate regions of southern Australia.

Teaching

GrassGro is used by several universities in southern Australia and overseas to integrate specialist expertise in animal science, agronomy, soil science and economics and to develop 'systems thinking' in agricultural studies. Innovative web-based delivery of GrassGro and course materials has developed by the University of New England with the support of Australian Wool Innovation Limited.

End Users

The role of the user is important — a GrassGro analysis depends on accurate description of the site and the user's ability to interpret and apply the outputs to a particular issue. A GrassGro analysis should be used as a tool to *support* rather than *make* decisions.

Training

To get the most out of GrassGro, training is essential. Training aims to improve the user's level of understanding and application of the tool, and to appreciate any limitations imposed by gaps in our scientific knowledge of the grazing system simulated.

Technical support and development

GrassGro users have ready access to technical support from CSIRO's scientists and software development team. New releases of GrassGro incorporate new science.

To broaden the range of environments in which GrassGro can be applied, descriptions of new plant species are developed and made available. This is a major scientific undertaking that incorporates the latest published information on the interactions between a plant genotype and its environment. As a result GrassGro requires no 'tuning' but users must choose appropriate species and management when describing a grassland ecosystem.



**For information
on pricing and purchase, contact:**

Horizon Agriculture Pty Limited
PO Box 598, Roseville, NSW 2069
Email: horizonag@hzn.com.au
Website: www.hzn.com.au/grassgro.htm

**For technical information
about the program, contact:**

CSIRO Plant Industry Communications Unit
GPO Box 1600, Canberra, ACT 2601
Phone: 1300 363 400
Email: grazplan@csiro.au
Website: www.grazplan.csiro.au

Horizon Agriculture
LINKING SCIENCE TO PRODUCTIVE SOLUTIONS

