# *GrassGro* Version 3



# Training Manual

CSIRO Agriculture and Food

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# GrassGro Version 3.3 Training Manual

**Aims**

- Understand the tasks you can perform in GrassGro 3
- Understand the terminology used in GrassGro 3
- Drive the interface using examples
- Identify management questions (Issues) that you wish to analyse in GrassGro
- Create a Farm System
- Design a GrassGro Issue
- Export and import Farm Systems and Library components
- Run a tactical analysis
- Use SILO weather files

- Use the GRAZPLAN website: http://www.grazplan.csiro.au/

# Contents

# Using GrassGro to examine Management Questions

## Overview of tasks in GrassGro

GrassGro version 3 is designed to help managers of grazing enterprises and grasslands analyse management questions quickly and easily.

A **Management Question** could be
- What is the most profitable stocking rate in the long term for my farm?
- Which pasture will perform best at this location?
- What is the best lambing time on my farm?



A GrassGro **Issue** is a general description of a Management Question. Such as:
- What is the optimum stocking rate?
- What is the best pasture composition?
- When is the best time to lamb?

GrassGro Issues are templates for analysing Management Questions. GrassGro contains a number of pre-defined Issues.

A GrassGro **Analysis** is the term used to describe the evaluation of a GrassGro **Issue** for a specific **Farm System**.
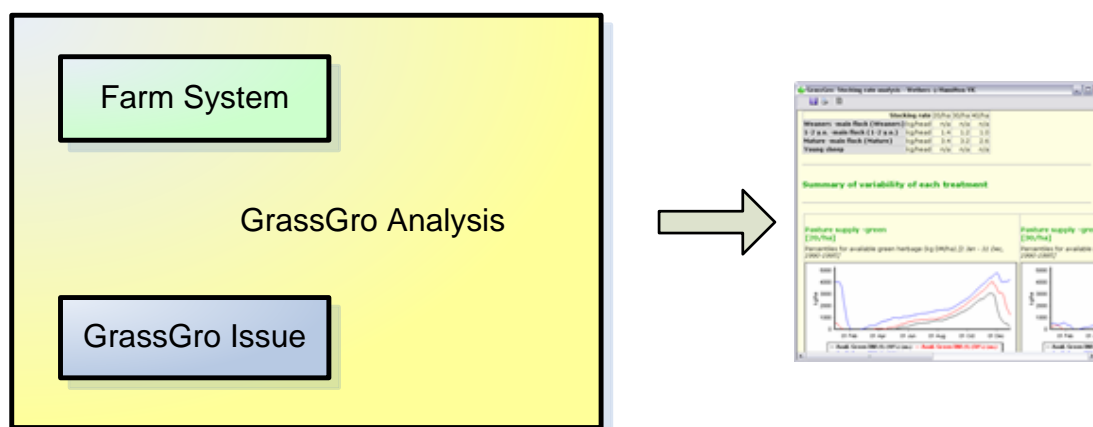


Once the **Analysis** is executed; the result is a **report** that summarises and compares the results of a set of simulations that are based on the **Farm System**.

## *How to perform a GrassGro Analysis*

The first major step in performing an analysis is to design a **Farm System** which describes a specific set of biophysical resources (e.g. a particular property) that replicates as closely as possible a real farming enterprise or grassland system.



Before a Farm System can be used in an Analysis, it needs to be examined very thoroughly so that it is as realistic as possible. This process is called **Acceptability Testing**.



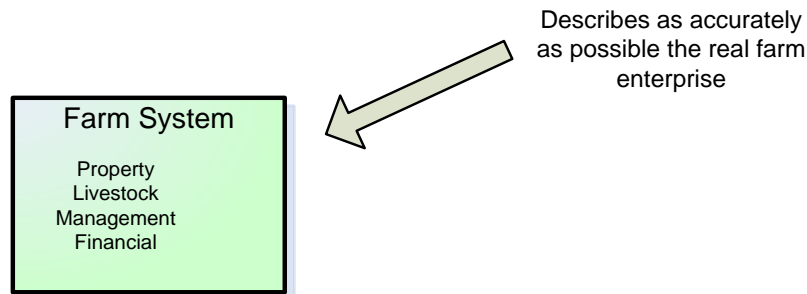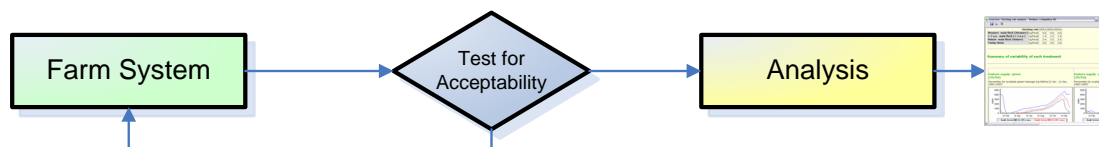The Acceptability Testing process is an iterative one that may take some time. Once it is complete, an Analysis can be quickly performed.

Farm Systems can be built by configuring each part from scratch or from components which have been saved in a special Library inside GrassGro.
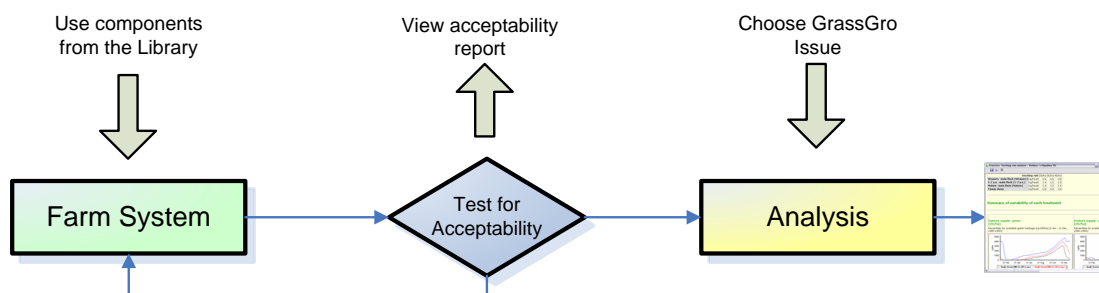


GrassGro generates comprehensive pre-designed reports. At any time these reports can be customised, enhanced or replaced by the user.

## Processes and Tasks in Detail

GrassGro version 3 introduces some new terms to existing GrassGro users. To understand this terminology, it is helpful to understand the process of using the whole system.

The diagram below illustrates the processes and interactions that can be followed when using the new GrassGro:



GrassGro helps a user structure an analysis of a management question and organise and apply relevant information. Some tasks are undertaken by GrassGro and some processes are external to it, such as problem identification and interpretation of the analysis.

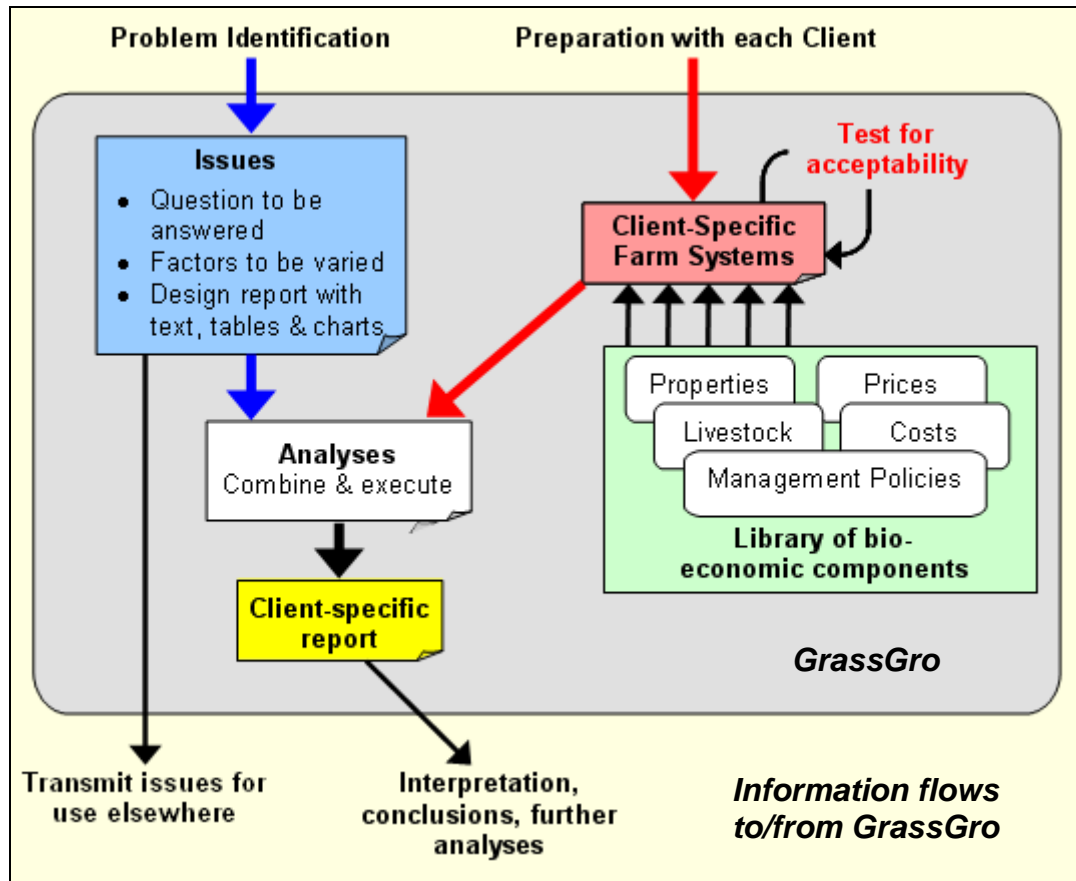The value of this "analysis-oriented" approach is that an analysis containing many alternatives can be repeated - and reported - quickly across a range of specific situations. Also, once a farm system has been set up, it is easy to carry out a range of analyses on it. GrassGro contains features that simplify the exchange of analyses and farm systems between users.

The GrassGro interface supports three main tasks:
1. Designing the **GrassGro Issues** (including the layout of reports);
2. Building **Farm Systems** and testing them to ensure that their design is acceptable; and
3. Combining **GrassGro Issues** and **Farm Systems** together in an **Analysis** to examine *management questions*.

## Table of Terms

| | |
|---|---|
| **Management Question** | The industry or environmental question being examined. For example: What is the best stocking rate? What is the best shearing date? How does soil depth affect pasture growth? |
| **GrassGro Issue** | The framework for examining a Management Question within GrassGro. Defines the input constraints for applying variations to a Tested Farm System, and a design for a base report. |
| **GrassGro Analysis** | The combination of a GrassGro Issue with a Farm System, which allows testing of the response of the Farm System over a range of conditions. Responses are summarised and can be compared directly in a specially designed report. |
| **GrassGro Farm System** | Describes a farm consisting of a GrassGro Property and GrassGro Enterprise. A Tested Farm System is one that has been simulated within a time span and the results examined for acceptability. *Equivalent to a GrassGro 2.5 simulation.* |
| **Acceptability Test** | After a Farm System is built, it must be tested for plausibility before it can be used in an Analysis. Standard Acceptability Test reports summarise several aspects of the whole Farm System for each enterprise. Users may also examine additional outputs before deciding that the Farm System is suitable for analysis. |
| **GrassGro Enterprise** | The type of farming operation such as wether, beef cow or hay cutting. Includes costs and prices, livestock, and a management policy. |
| **GrassGro Property** | A group of paddocks that share a common weather location and could be grouped together for rotation of stock. |
| **Management Rule** | A set of parameters controlling a single aspect of management are contained in a rule such as a Reproduction rule that can be described by a mating date, joining age and male – female ratio. Other rules include; Shearing, Replacement, Maintenance feeding, and Stocking rate. |
| **Management Policy** | A set of Management Rules. The structure will be dependent on the type of farming enterprise chosen. |
| **Farm System Component** | Farm Systems can be disaggregated into the following sections or components: Property, Management Policy, Livestock and Prices-Costs. Each of these components has sub-components, such as Weather, Paddock, Soil and Pasture for the Property component. Components and sub-components are the "experimental units" or Factors that are selected for testing in an Issue. |

# Navigating the interface: Where GrassGro tasks are performed

Tasks are undertaken in different sections of the GrassGro version 3 interface:
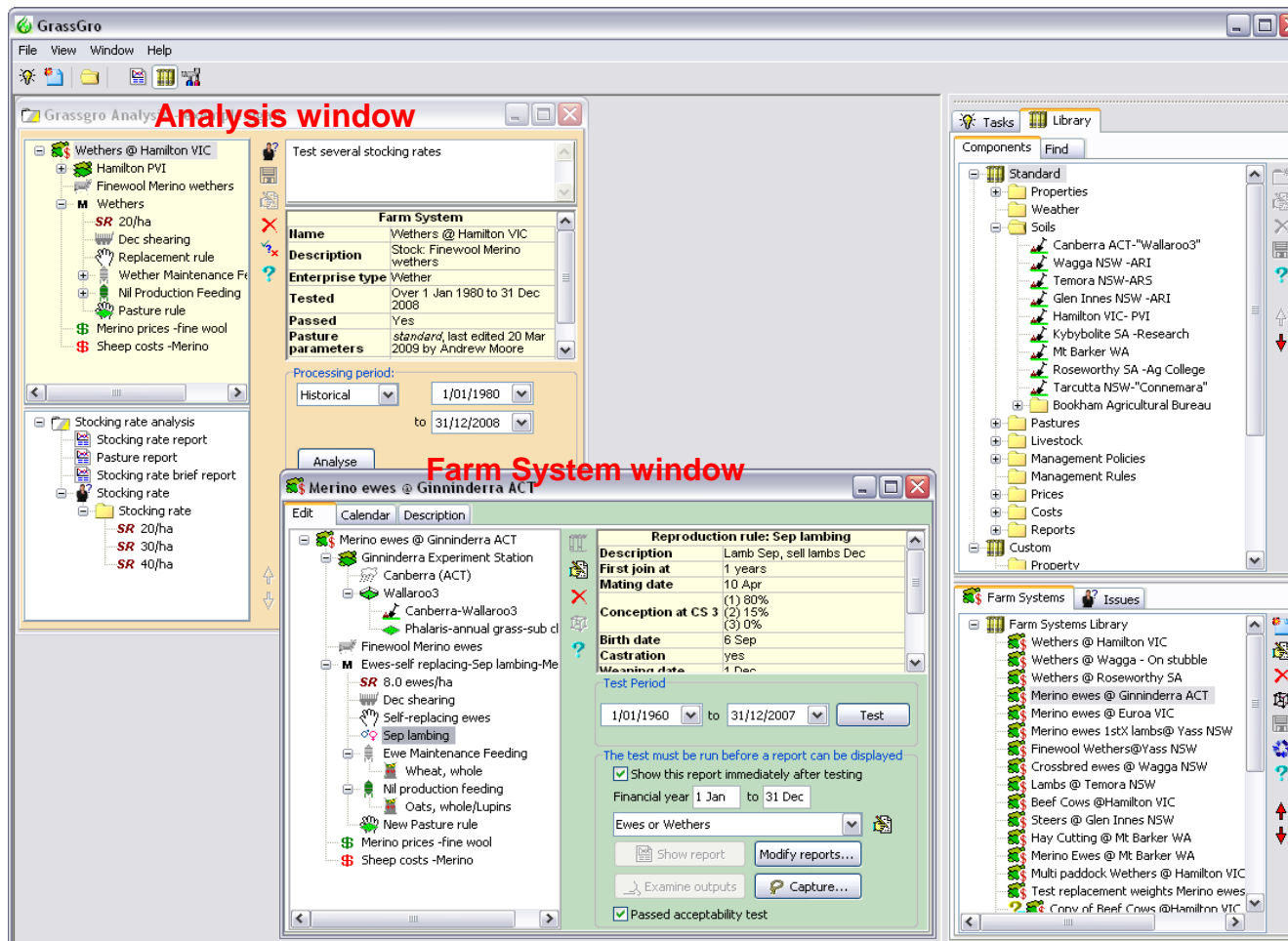
# Starting a task in GrassGro

The GrassGro 3 interface has different sections for several tasks. There is no set order in which to perform these tasks, so when you start GrassGro you are able to select which activity you wish to undertake:

**Main toolbar**

**Tasks tab**

**Working area**

Tasks:

*Analyse* an Issue for a Farm System that you select

*Open* an existing Analysis

*Create* a new Farm System

➡ Click on the Library tab:

**Library tab**

**Working area**

**Libraries** for:

*Components*
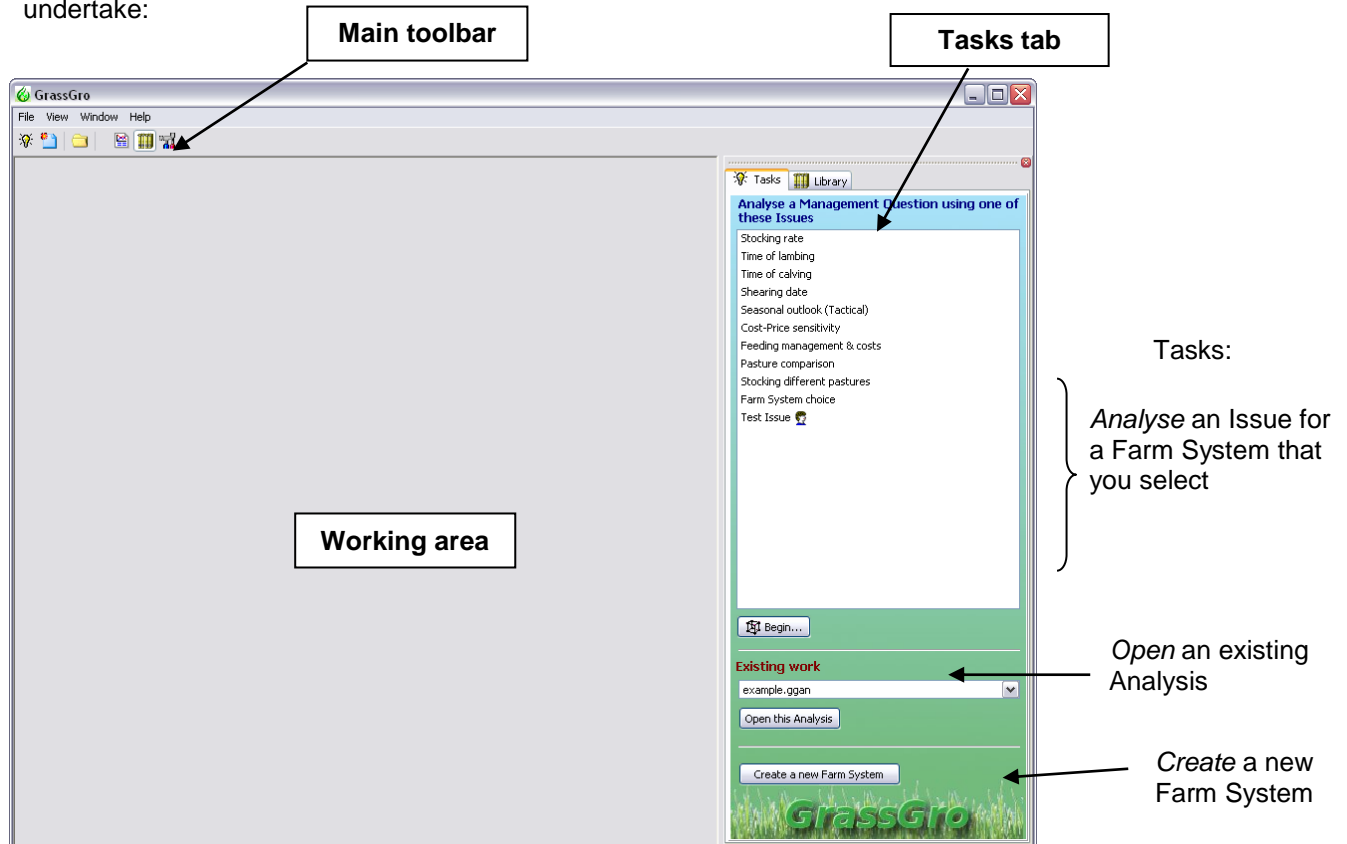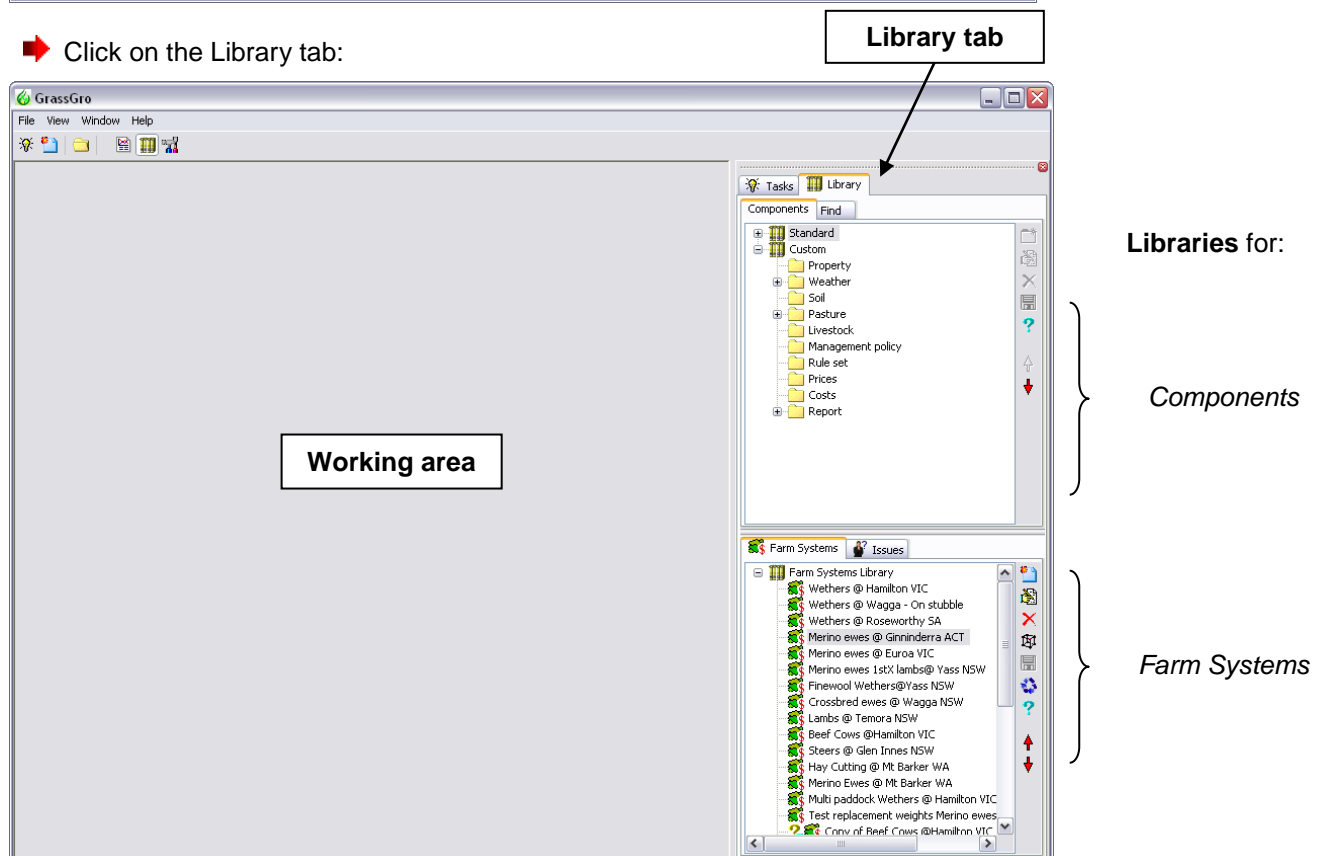
*Farm Systems*

# Exercises

## Exercise 1: Analysing an Issue

To demonstrate the ease of use and power available within GrassGro, the first example will involve looking at the effect of changing the stocking rate on a single Farm System.

➡ With GrassGro running, choose **File** | **Open.** Select the file *example.ggan*. An Analysis window will open in GrassGro:
A GrassGro Analysis is a combination of a GrassGro Issue and a tested Farm System.

**Analysis = Farm System + Issue**



In the GrassGro Analysis above, the "base" Farm System to be analysed is represented in a tree in the top left pane. This is a single-paddock Farm System running wethers at Hamilton in Victoria. This Farm System has been configured previously and cannot be altered in this window. Farm system components can be opened and viewed but not changed.

The Issue that will be analysed, and the details for this specific Analysis, are shown in a tree in the bottom left pane. This Analysis will be processed over a historical period shown on the right side of the window. At the bottom right is shown the report parameters such as the financial year to use and the start and end year for the report.

➡ Click on the **Analyse** button. The Analysis will be executed and a report will open in a new window.

➡ Enlarge this report and view its contents. The report shows the effects of the different stocking rates on different parts of the grazing system.

## Reports

While viewing a report, you can modify any of the charts by clicking on them. When you click on a chart, an editing dialog opens. Any changes you make to this chart can be saved and will then be displayed in the current report.

- Reports can include box plots and summary tables as summaries of the Analysis.
- Reports can be saved as HTML (web page format) for later viewing, or can be printed immediately.
- By clicking on the page button on the toolbar you can hide or show the left Index panel.
- Clicking on the toolbar button to save the report allows it to be saved for easy emailing as an attachment.
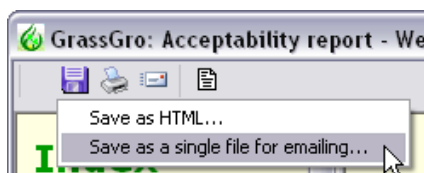


## Changing Analysis Factors

➡ Close the report from the first analysis.

After analysing the Issue at stocking rates of 20, 30 and 40/ha, you may wish to test different stocking rates, such as 25, 30 and 35/ha, or increase the number of stocking rates tested from 3 to 4.
This next exercise shows how to adjust the set of stocking rates (Factor values) and re-analyse the Issue.

*To change the stocking rate values:*

In the bottom left pane of the Analysis window you will see a tree of items. The top level item is the Analysis. Below it are the Reports, and a Stocking rate Issue item. The Stocking rate Issue contains a number of folders that are called **Analysis Factors**. Each of these folders contains one or more items that are called **Factor values**.

➡ Double-click on the "40/ha" factor value.
A dialog will open (shown right), in which you can change the stocking rate value (at the bottom of the dialog). This dialog contains a name and description field at the top. When you change the Notional stocking rate value then Name fields will also change. The name is important, because it is used extensively in reports.



➡ Adjust the other stocking rate values in the Analysis as desired.
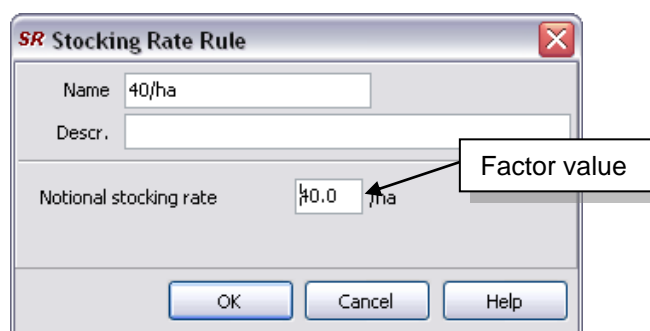
*To add an extra stocking rate:*

➡ Right-click on the Stocking Rate folder, choose **Add…**, and adjust the stocking rate in the new factor value as in the step above. You can also use the folder's pop-up menu to delete unwanted stocking rate items.

➡ When you are satisfied with your changes, click the **Analyse** button again to generate a new report.

## Other features of the Analysis Window

- You can drag existing reports from the component Library and add them to the reports already in the Analysis Window. The report to be shown can be chosen using the drop down menu.
- This Analysis contains other reports. Using the drop down combo on the bottom right of the window, choose another report and then display it by choosing the **Show report** button.
- Adjusting the reporting period can be useful for focusing in closer on a smaller range of years in the Analysis.
- The choice to run a Tactical Analysis rather than this Historical one will be explained later.

## Examining another Management Question

GrassGro version 3 allows a range of management issues to be examined easily.

➡ Close any open Analysis windows.

➡ From the Tasks tab, double click your mouse on the Shearing date Issue
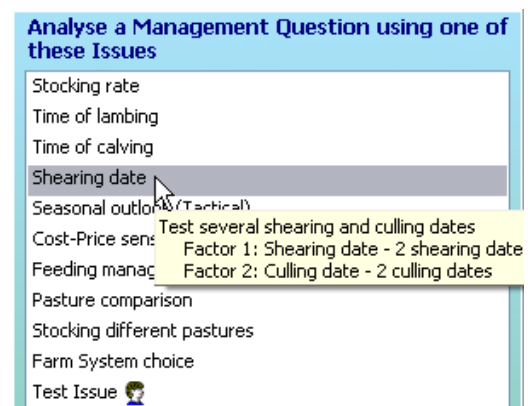


➡ Choose a Farm System from the Farm Systems dialog that appears. Only the items in bold type can be chosen for a Shearing date Analysis.

➡ Edit some of the factor values by adjusting the shearing and culling dates they contain. Double click on the factor values or right click and choose the **Edit** option.

➡ Click the **Analyse** button. The Analysis will be executed and a corresponding report will be displayed.

➡ When you are finished viewing the report you can close the report and Analysis window.
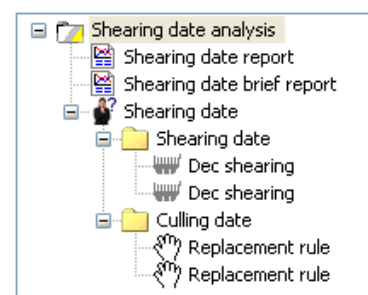


## Using another Farm System

GrassGro also allows you to start the Analysis by firstly choosing the Farm System.

➡ Click on the **Library** tab.

➡ From the Farm System library select a Farm system, right click and choose the **Use in analysis…** option.
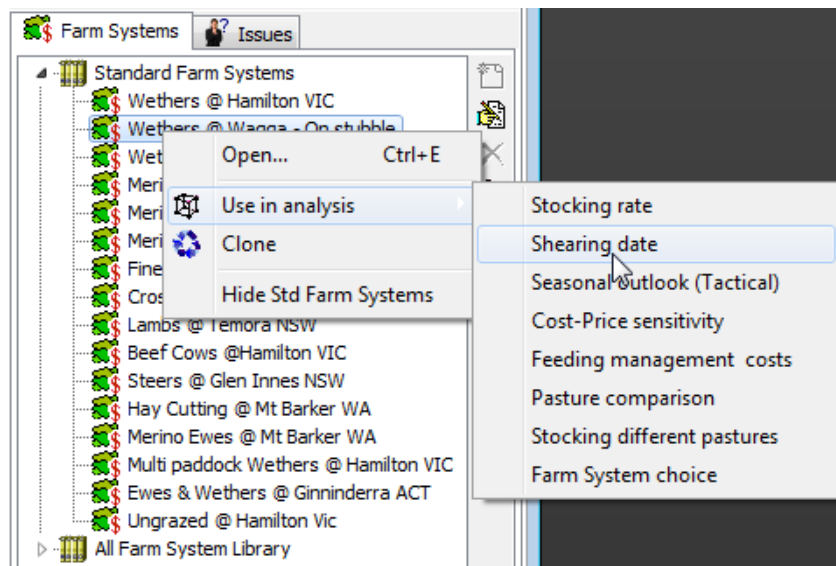
➡ You can now choose the type of Analysis you want to do.

Only Issues that are valid for the Enterprise type of the selected Farm system will be shown here. Items shown in the menu with a small portrait icon are custom Issues that have been created by the user.

Once you have selected the Analysis type a new Analysis window will be opened.

➡ If you want to execute this Analysis you will need to set realistic values for each of the Factor values in the same way you did in the previous examples.

## Exercise 2: Editing and testing a Farm System

GrassGro is designed to help the user build up a library of Farm Systems, each of which is representative of a particular set of conditions on a farming property. Each Farm System can be re-used for a range of Analyses.

In the next example, you will customise one of the pre-defined Farm Systems.

➡ Click on the **Library** tab of the Tasks and Library window.

➡ In the Farm System Library, right click the mouse on one of the Farm systems and choose the **Clone** option. A new Farm system will be created that you can now edit.

The cloning option is useful for making identical copies that leave the original intact for further use.
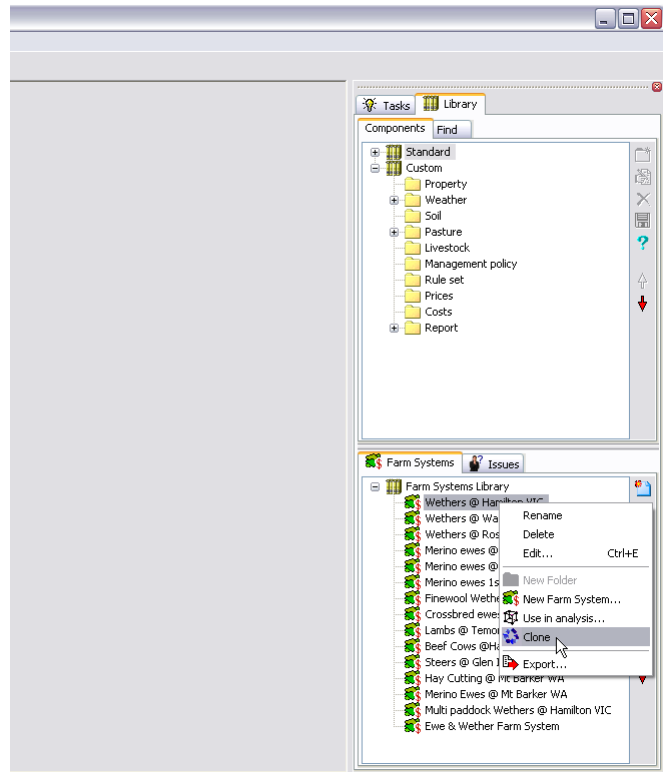


➡ Double click on the new Farm system that was cloned. The Farm System window with a green background appears:



11
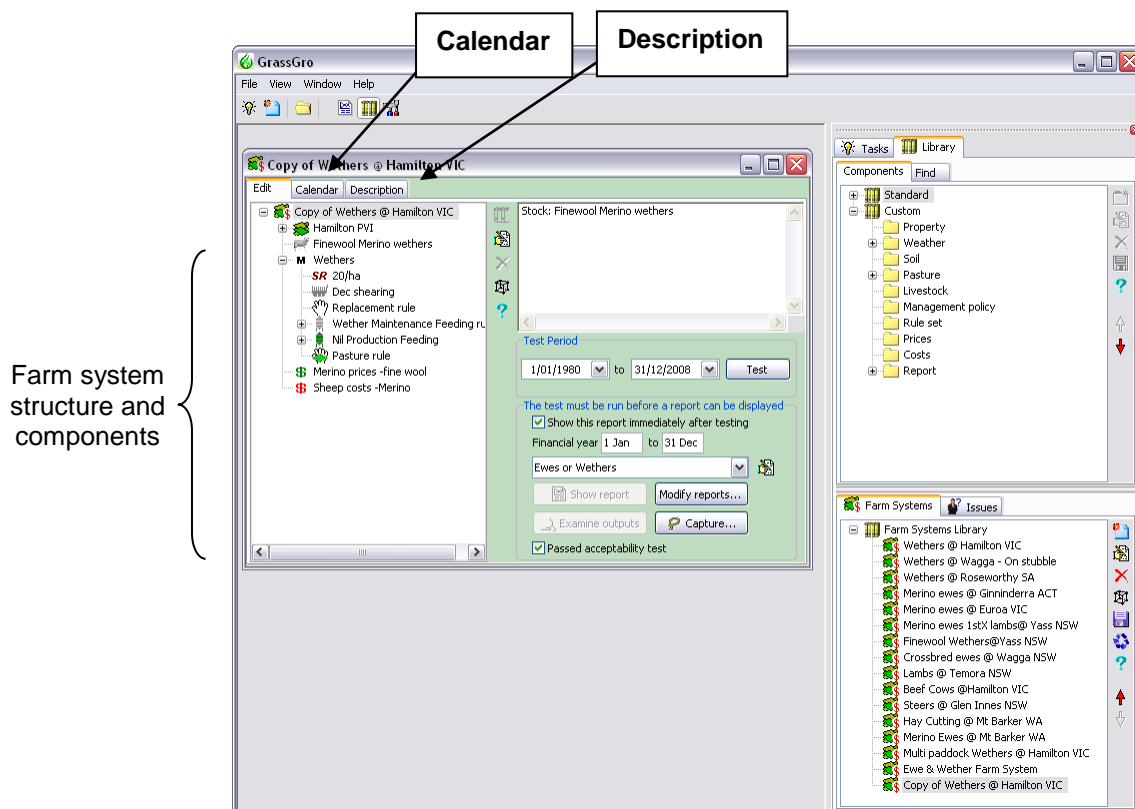
This window allows you to see the structure of the Farm System in a tree design, as well as a **Calendar** of major events or a text **Description** of the Farm System.

The tree of components at the left of the Edit tab allows you to edit all the attributes of a Farm System.

➡ Double click on any of the **components** shown in the tree to adjust the input values (except the Farm System icon, Property icon, or Management Policy 'M' icon). If you make any changes, the Farm System will be assigned an "untested" state shown by a question mark next to the top Farm system item.

➡ If you alter the Farm System, it will need to be re-tested. Click on the **Test** button. This will test the *acceptability* of the Farm System.

➡ Once the processing is complete, a summary of the testing process will be shown in the chosen **Acceptability report**.

➡ Close this report when you have finished viewing it.

➡ The **financial year** dates for the report may be adjusted if required (e.g. for gross margin calculations).

➡ If you wish to generate a table or chart of outputs that do not appear in the report, use the **Examine outputs** button.

➡ View the calendar and the extended description using the **Calendar** and **Description** tabs. These views can be saved to file or printed.

➡ When you are satisfied that the Farm System is giving reasonable results, check the **Passed acceptability test** checkbox and close the window. You will be prompted to save the changes.

➡ Click the disk icon 💾 in the Farm System library to save the new Farm System in the library to disk.

➡ You can now proceed to use this Farm System in an Analysis as you did in Exercise 1.
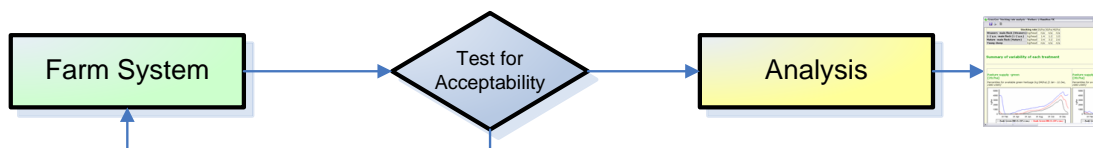

### Other features of the Farm System window

You have a number of acceptability reports to choose from. They may be copied, edited and used immediately to display acceptability results. You can choose them from the drop down list shown below.
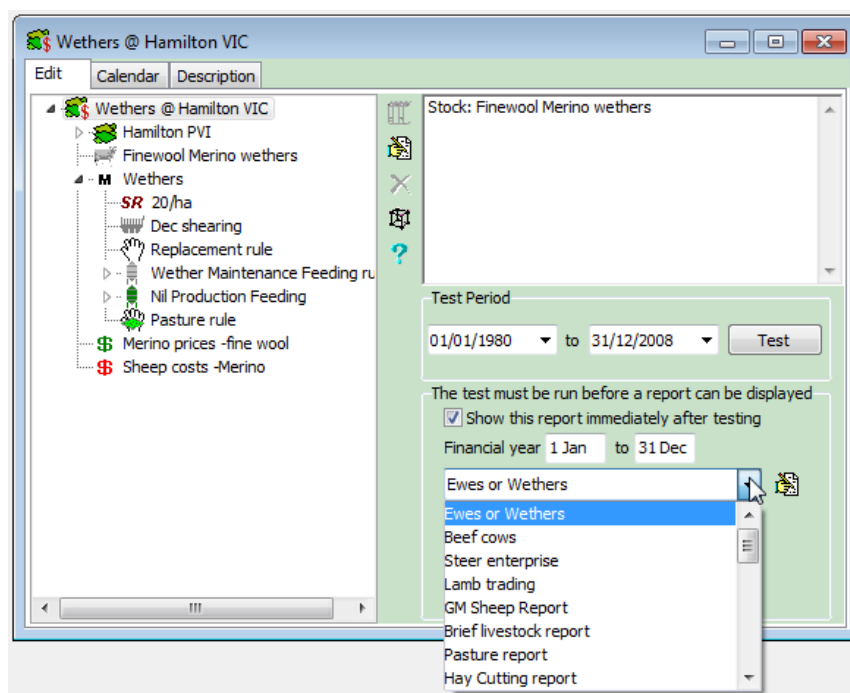
When testing Farm systems it is very useful to use the Pasture report to get detailed information about the pasture behaviour. You can use the **Modify reports** button to open the window with Acceptability reports. From here you can clone and modify existing reports or import and export reports if you want to share them with colleagues.

The **Capture** button allows the state of the Farm System to be moved in time so that Pasture, Livestock and Soil components can be initialised by setting them to a simulated initial state. This is useful if you want to set the state of the Farm System by running the model for a short period of time. This can be a good way to initialise the state of the pasture if you are uncertain how to manually set it's initial state.

**Acceptability testing** is an important step in the process of doing an Analysis when you are attempting to resolve a Management question. The task of getting a Farm System accepted may take some time as it can be difficult to get the interaction between the pasture, soil and animals to closely reflect the real world. It is worth investing time in this process.

**Examine Outputs** is a useful option on the Farm System window for drilling into the behaviour of the Farm System. Using the Output Variables dialog allows you to select many other variables from the Farm System and view them over any period you require. For more information see the later section on designing reports or the help file.
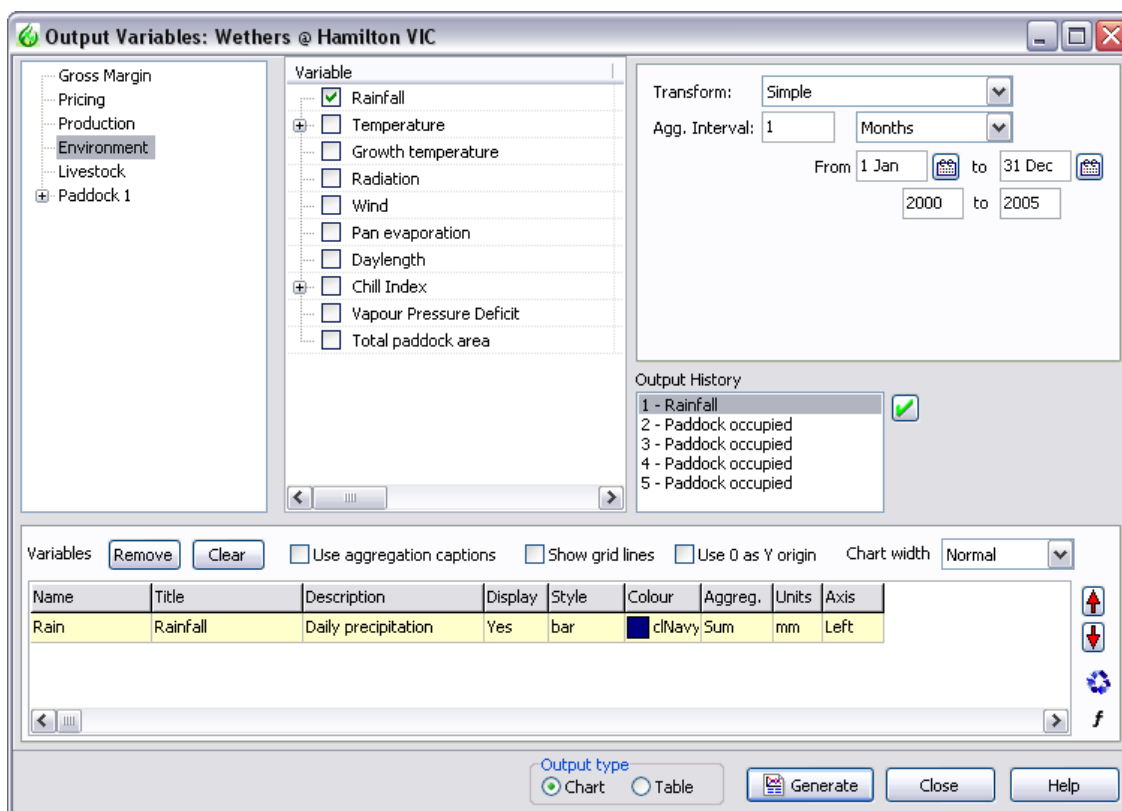
## Exercise 3: Tactical analysis

To answer a "What if?" question over a short time frame (less than 12 months) a **Tactical Analysis** is used.

Previous analyses in this tutorial were **Historical** and used consecutive sequences of historical weather data. A Tactical Analysis applies historical weather between 2 dates from a range of nominated years. An important feature of a tactical analysis is that each run starts with the same initial values.

Differences between historical and tactical decisions:
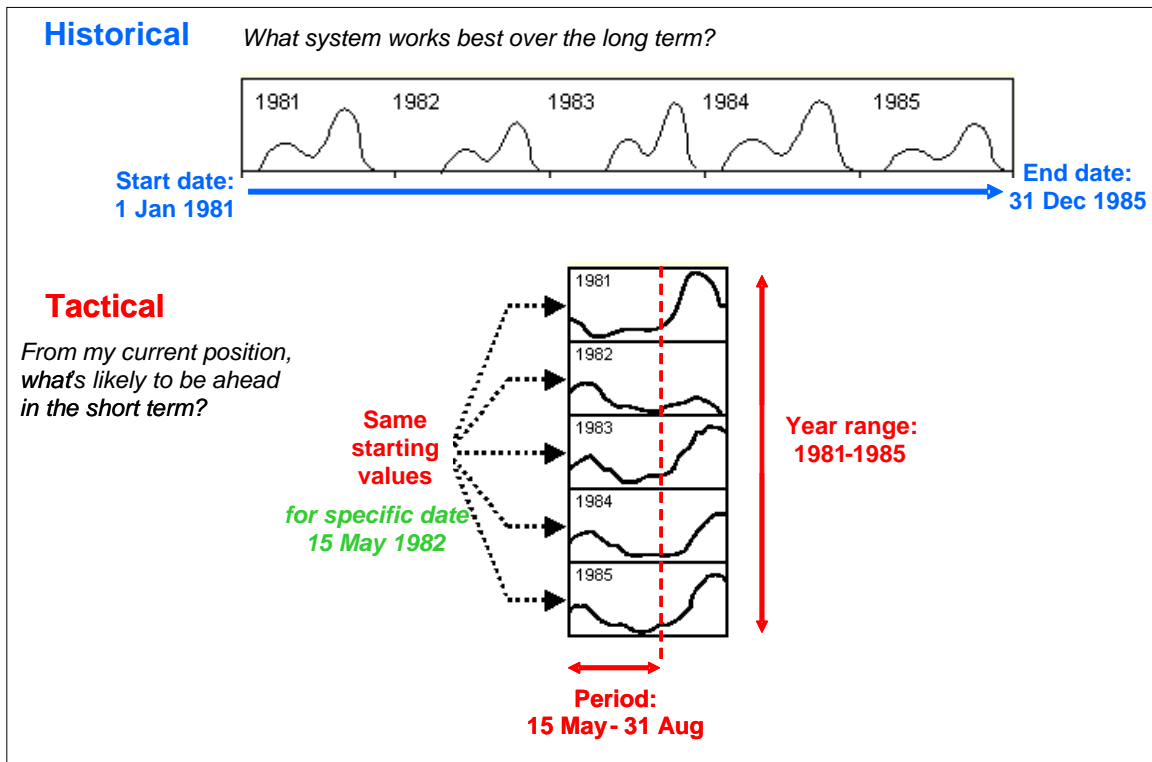


In this example, you are faced with a poor winter at Yass, NSW on 1st June 2008. You want to test the possible outcomes over the next few months until the start of the summer.

➡ With GrassGro running, choose **File | Open.** Select the file *Tactical example.ggan.*

An Analysis window will open in GrassGro:

This tactical analysis will run between 1 Jun - 31 Dec using weather data for Yass from 8 years (2000-2008). Each run starts with the one set of conditions for soil, pasture and stock that were present on 1 June 2008.

The details of the Tactical analysis are shown in a tree in the bottom left pane. There is one factor, which is stocking rate, and this is set at one level, which is the stocking rate of the base Farm System (15 wethers/ha). The bottom right pane shows the period to be analysed (1 Jun to 31 Dec) and the
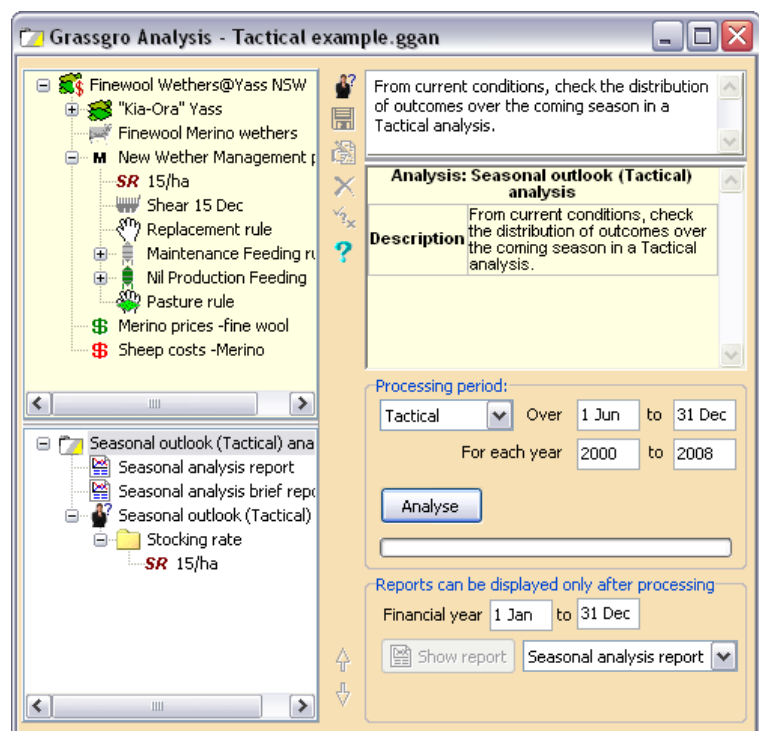
years from which weather data for this period will be used (2000 to 2008).

➡ Click on the **Analyse** button. You may now be asked if you want to use initial values from the last time this Analysis was started. Choose **No**.

Another window will appear that will allow you to use GrassGro to capture the state of your Farm System on 31 May of the current year (2008).

➡ Click the **Prepare** button and wait for the completion of the process.
➡ You can then examine the state of your Pastures, Livestock and Soils by clicking on each component. If desired, these components can be edited to better reflect conditions on the start date.
➡ When you are ready to continue, click the **Proceed** button.

➡ The Analysis will be executed and a report will open in a new window:

View the contents of the report for the Tactical analysis.

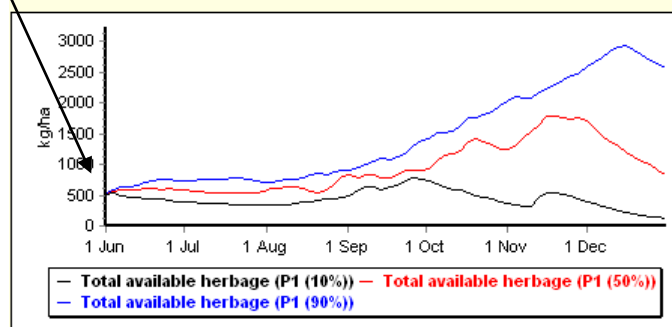Percentile outputs show the common starting point for the tactical analysis:
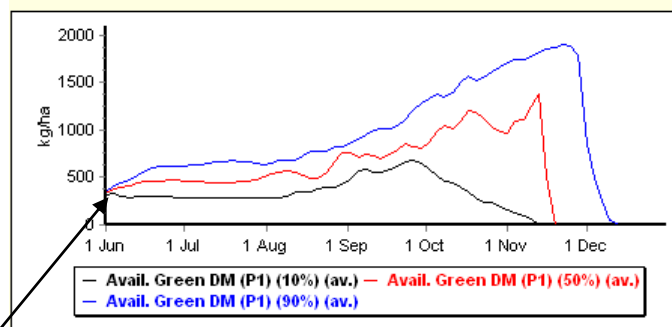
**A single starting point for each variable**

➡ Close the Report and the Analysis window

**Distribution of outcomes given the common starting point**

# Tasks

## Setting up a Farm System

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**Definition: Farm System**

A GrassGro Farm System describes the combination of a GrassGro Property (weather, soil, paddock/s and pastures) with a GrassGro Enterprise (livestock and animal and pasture management) and an appropriate set of Costs and Prices. (Equivalent to a GrassGro version 2.5 *.grw* input file)

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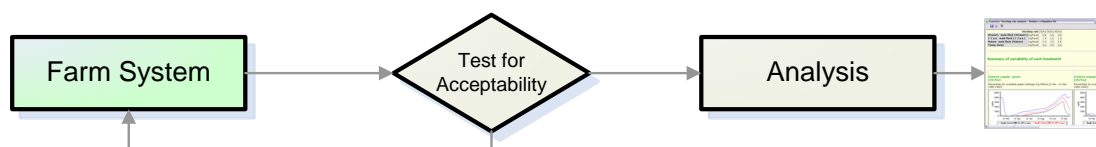


The task of creating a Farm System and performing acceptability testing is the key first stage in the whole process of Analysing management options on relevant Farm Systems. A Farm System will perform best in the Analysis if it reflects closely a real working system. There are many interactions between the pasture, soil and livestock that need to be observed and fine tuned in the Acceptability testing process. See the later section on **Acceptability Testing of a Farm System**.

GrassGro allows you to choose and configure a Farm System in more than one way. You can use an existing Farm System, copy and edit one, or create a new one from scratch.

### 1. Working from a saved Farm System

The Farm System library contains a number or preconfigured Farm Systems. They are a good basis for starting building your own. The most efficient way to do this is to Clone an existing Farm System and then edit it.

➡ Right click on a Farm System and choose the **Clone** option.

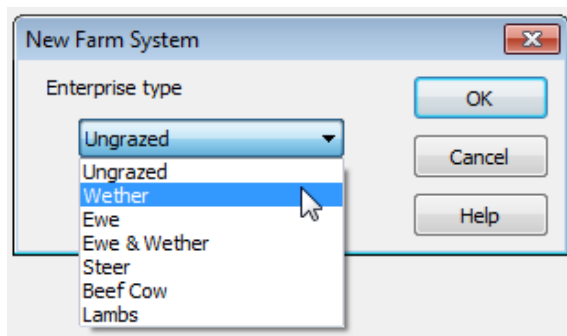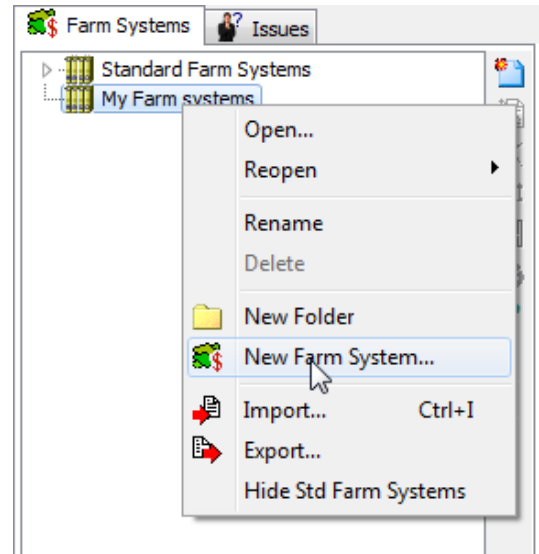You will now have a Farm System in your library that you can open and edit.
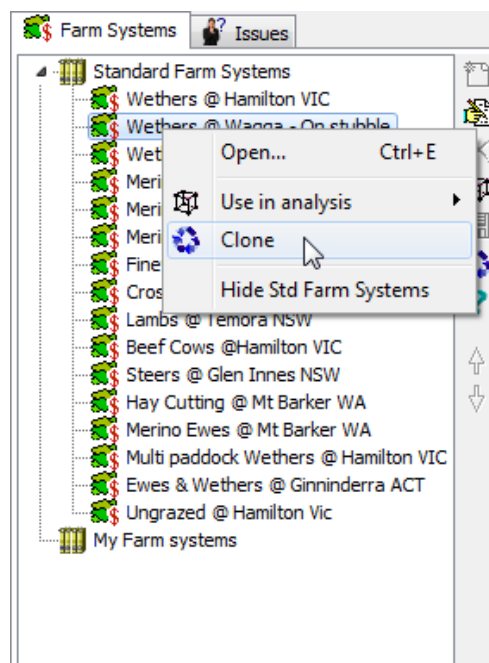
## 2. Creating a new Farm System from scratch

You might want to make a completely new Farm System.

In the Farm System Library:

➡ Click once on the top item in the custom Farm Systems Library tree.

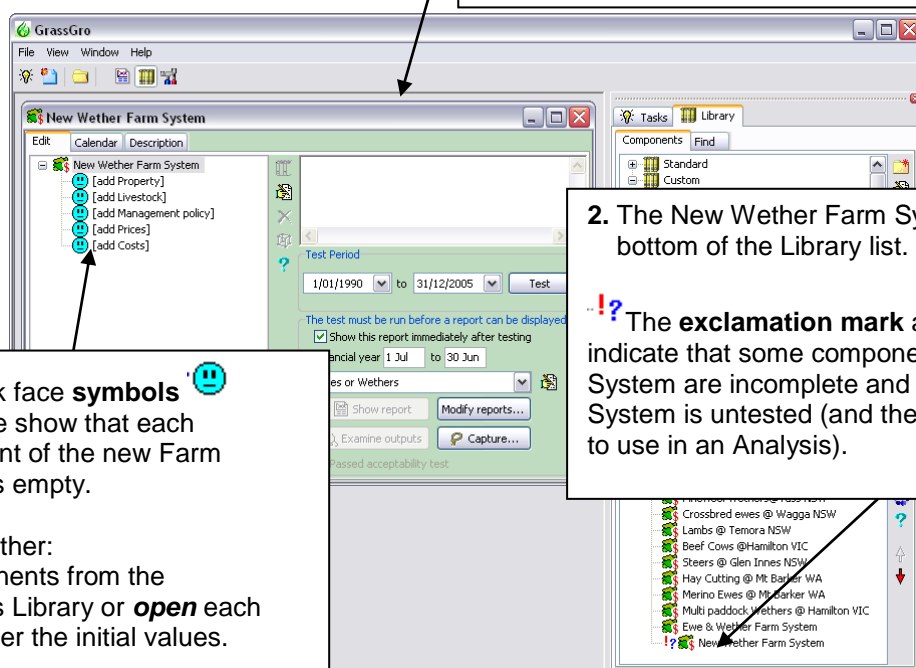➡ Right click and choose the New Farm System option or Click on the new Farm System button in the toolbar.



➡ The New Farm System dialog will appear from where you can set the Enterprise type.

➡ Choose one and click OK.

**Important!**
Once an Enterprise type is selected for a new Farm System, it cannot be changed.

The GrassGro screen now looks like this:

**1.** Your new Farm System window with a tree structure for the selected enterprise (in this case a Wether flock)



**2.** The New Wether Farm System appears at the bottom of the Library list.

⋅⋅!? The **exclamation mark** and **question mark** indicate that some components of this Farm System are incomplete and that the Farm System is untested (and therefore not yet ready to use in an Analysis).

**3.** The blank face **symbols** ⊙ in the tree show that each component of the new Farm System is empty.

You must either:
*add* components from the components Library or *open* each one and enter the initial values.

### *Adding components to a new Farm System*

A quick way to build the new Farm System is to use pre-configured components from the Component Library. You can do this by dragging and dropping with the mouse:

➡️ Locate a Property component in the Standard component library. We need to drag this over to the Farm System Window.

➡️ Drag this component over to the Farm System and drop it on the empty Property component. GrassGro checks that the type of components match and will only allow you to drop components on suitable destinations.
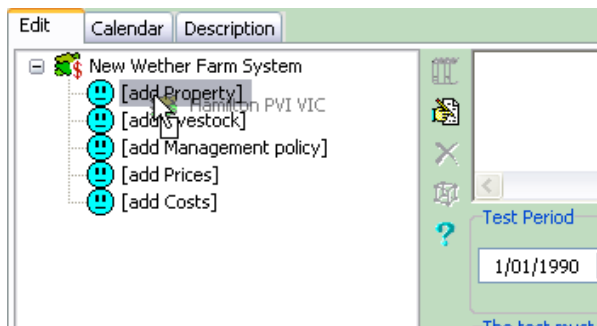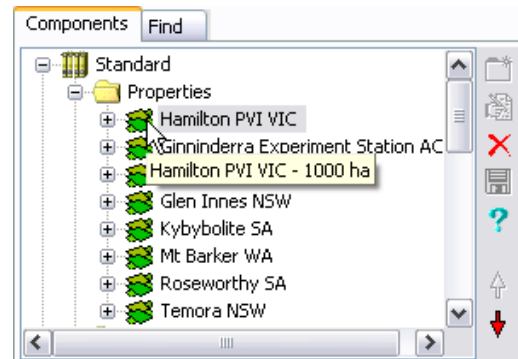




After you drop this Property component you will be able to view and edit any of the internal properties of the components you just inserted.

➡️ Click on the + sign next to the Paddock icon. You will now see all the components that describe the Property.
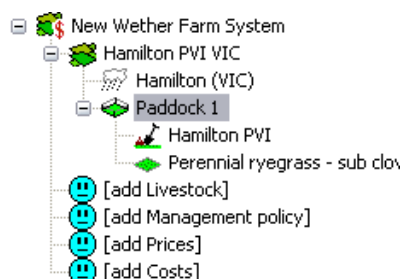


You can then adjust the values of any of the components you have added.

➡️ To open a component, **double click** on it. Check the initial values.

## *Initialising components*

If there are no useful components for your Farm System in the Component Library, open each '😀' component by double clicking on them or using the right click popup menu and choosing the **New** option and enter the initial values.

This illustration shows the process of creating a new Livestock component using the popup menu.

➡ Work systematically through each component in the Farm System and initialise it's values or copy further components from the Component Library.

Newly created components will have their enterprise type set to the same as the Farm System enterprise type. This cannot be changed.
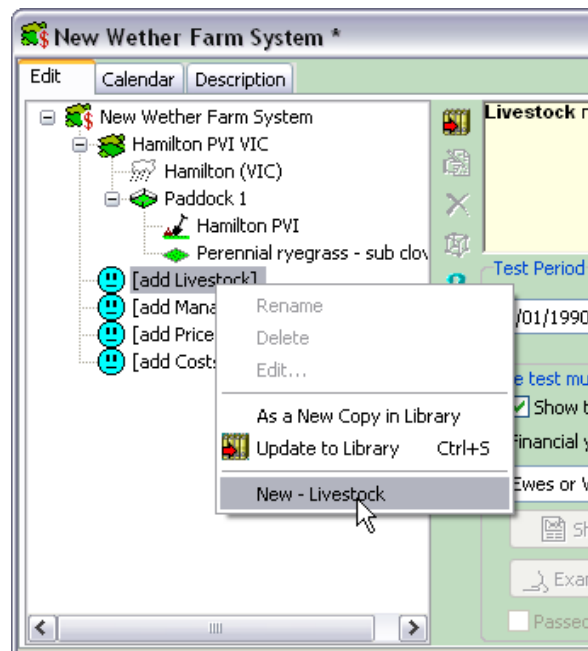
**Note:** You are only allowed to drop components onto this Farm System that have the same enterprise type.

When you open each of the components you will find some common data entry fields on the top of the dialogs. The **Enterprise** fields will be fixed and cannot be changed. The **Name** field is important to set with useful text to provide visual clues when in the Farm System tree. Write something that gives an indication to settings for this component. The **Description** field provides further detail and will be shown at various times in tooltips when you hover the mouse cursor over the component.
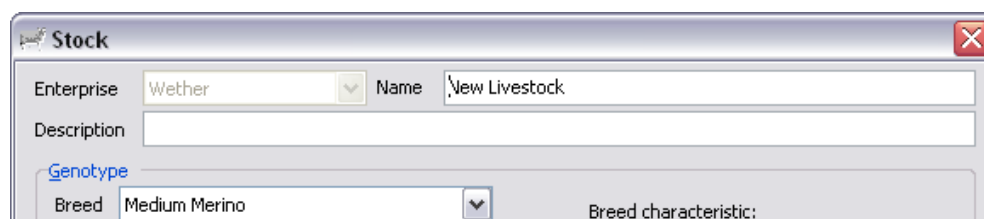
**Note:** The input values for the pasture component, livestock live weights, and soil moisture content should reflect those likely on the first day of the Test Period. A common approach is to start the Test period on the 1st January for a year, in which case there is likely to be minimal green herbage and many pasture species will be in a senescent phenological stage.

## *Farm Systems with Multiple Paddocks*

A Farm System may have more than one paddock. Paddocks may be used to represent different land classes.
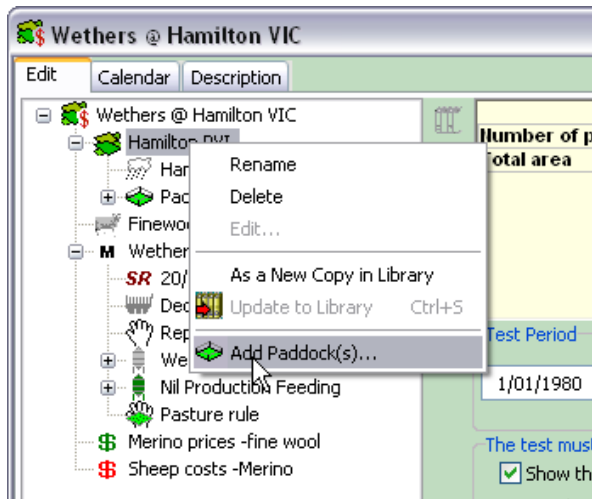


➡ To add a paddock, right click on the **Property component** in a Farm System window and use the pop-up menu.

➡ In the **Paddock component**, set the area of the paddock to represent the proportions of each land class.

**Remember:**
GrassGro only simulates one enterprise for each Farm System, regardless of the number of paddocks.

A Grazing Rotation rule appears in multiple paddock Farm Systems with Livestock enterprises.

## Grazing rotations

The Grazing Rotation rule is only found within a Management Policy when more than one paddock exists.

Once a paddock is added, the **Grazing rotation rule** appears in the tree under the Management Policy '**M**'. Edit the Grazing rotation rule to view the available options. This dialog includes a **Calendar** and **Summary** tab. The Calendar shows the stock movement for different animals throughout the year and the Summary tab shows paddock utilisation.

Property component with 2 paddocks

Management component now contains a **Grazing Rotation rule**
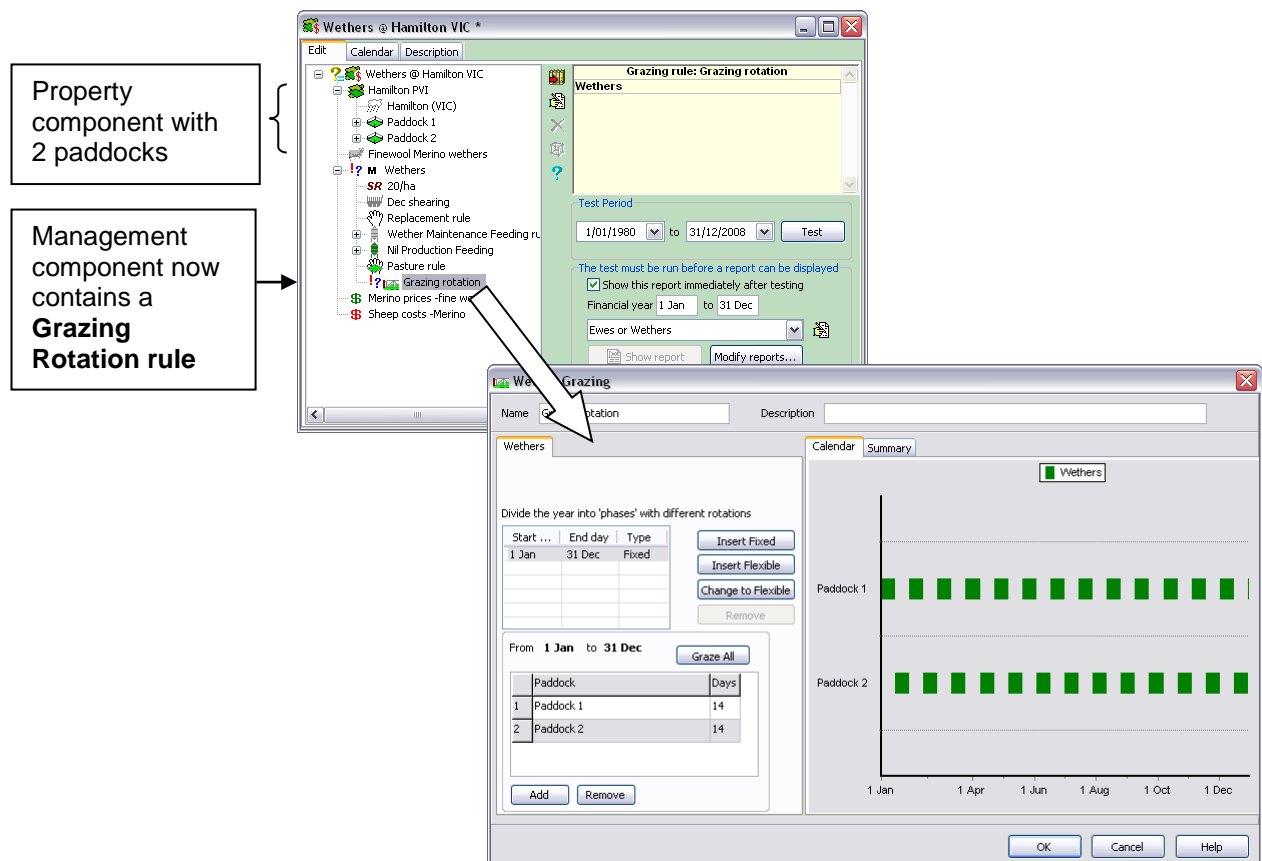
## Flexible rotations

Rotational grazing can be governed fixed date movements or by moving to the best paddock. Using Flexible rotations it is possible to have animals move when they will achieve better daily weight gain by moving.

To specify when the animals may move to another paddock based on potential weight gain, a *Flexible* rotation phase is available. When adding a new rotation phase on the Grazing dialog, specify that it is a Flexible phase and then you have opportunity to enter in the following details for the rotation phase:

| Withholding period | The minimum length of time that the animals must be in the paddock before they can be moved. |
|---|---|
| Interval between paddock checks | The number of days between subsequent checking of potential candidate paddocks. |
| Margin of average daily weight gain | The margin of improvement of amount of average daily weight gain that must be achieved before the animals will be moved. |

**Note:** On the day that the phase starts the paddocks will be examined to see if any rotation should take place. Subsequent paddock checks are done at the intervals specified.

➡ Open the Grazing dialog in a Farm System that has more than one paddock.

➡ Add a Flexible rotation period by clicking on the **Insert Flexible** button.



Now you will have a fixed phase followed by a flexible phase.

Below the Phases list you will see the section where you can specify details for the Flexible phase.

The Allowed Paddock list is the list of paddocks that will be tested at each interval.

➡ Add another paddock to the list by checking the checkbox in the paddock list.



You will see the Flexible phase similar to what is shown on the Gantt chart below.
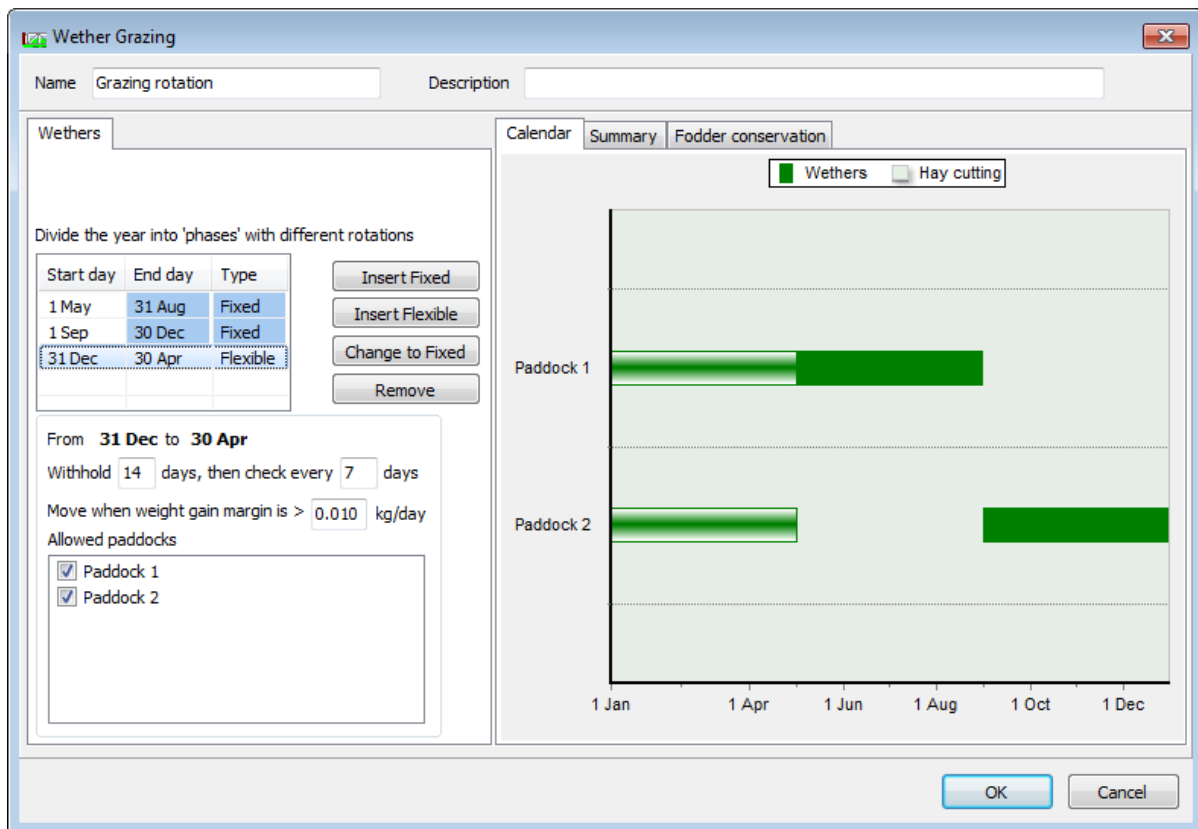
The flexible phase will appear in the correct colours for the animal type but with gradient shading.
The above image shows that this Flexible phase has the animals remain in their current paddock for 14 days from 31 December and then every 7 days each paddock in the lower list will be tested to see if the pasture can improve their weight gain by more than 0.01 kg/day.

If you need to redefine an existing rotation phase by changing it to a flexible or to a fixed phase, there is a button that you can use to choose the other phase type.
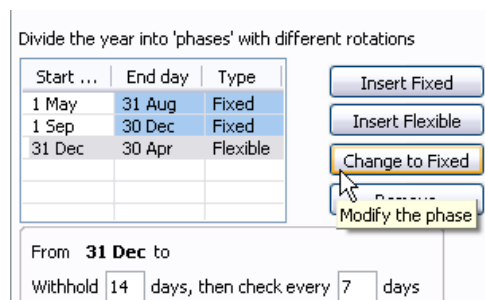
## Acceptability Testing of a Farm System

---

**Definition: Acceptability Testing**

After a Farm System is built, it must be tested to check that the results of a simulation over a given period are plausible and *acceptable* before it is used in an Analysis of an Issue.

Standard Acceptability Test reports summarise several aspects of the whole Farm System for each enterprise. Users may also examine additional outputs before deciding that the Farm System is suitable for analysis.

If the results of testing are unsatisfactory, the Farm System is modified and re-tested.

---

Farm System → Test for Acceptability → Analysis
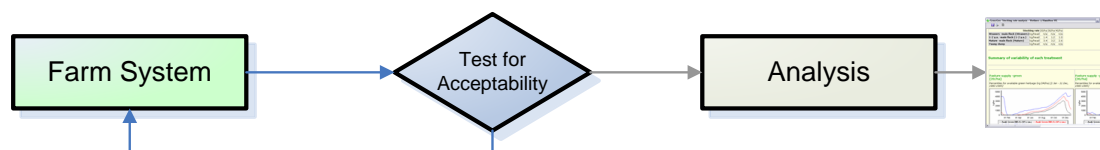
Once each component is initialised, the Farm System is ready to test.

The **?=** symbol shows that this system is untested.

The ' * ' shows that this system has been edited and unsaved.

Use this button to save changes to the Library.

To Test the Farm System:

➡ Set the date range for the **Test Period.**

➡ Set the **Financial Year** for the calculation of gross margins.

➡ Use the drop-down arrow to select a **report** appropriate to your Farm System's Enterprise

➡ Click on the **Test** button.

**Wethers @ Hamilton VIC \***

Edit | Calendar | Description

?= Wethers @ Hamilton VIC
 ⊞ Hamilton PVI
  Finewool Merino wethers
 ⊟ **M** Wethers
   **SR** 20/ha
   Dec shearing
   Replacement rule
  ⊞ Wether Maintenance Feeding ru
  ⊞ Nil Production Feeding
   Pasture rule
  Merino prices -fine wool
  Sheep costs -Merino

| Livestock: Finewool Merino wethers | |
| --- | --- |
| Breed | Small Merino |
| Standard reference weight | 45.0 kg |
| Greasy fleece weight | 4.00 kg |
| Fibre diameter | 18.0 microns |
| Fleece yield | 73 % |
| Death rate: adults | 3.0 %/year |
| Death rate: weaners | 3.0 %/year |

Using default values for initial animal and fleece

**Test Period**

1/01/1980 ▾ to 31/12/2008 ▾ | Test

The test must be run before a report can be displayed

☑ Show this report immediately after testing

Financial year 1 Jan to 31 Dec

Ewes or Wethers ▾

Show report | Modify reports...

Examine outputs | Capture...

Passed acceptability test

**Note:** The Test Period sets the maximum date range for any Analysis that uses this Farm System.

## *The Acceptability Report*

The Acceptability report is a vital tool in understanding the functioning of the new Farm System. The report covers biological factors and economic results. The first part of the report covers the environmental conditions and the pasture and animal performance. The financial results are then shown to give an indication of the how profitable the Farm System would be with the given costs and prices.



Examine the Acceptability report carefully, particularly pasture availability and composition throughout the period simulated.

Note any problems and consider whether any initial values should be adjusted, for example soil properties, pasture species rooting depths or seed banks.

**Note**: Setting up an acceptable Farm System is usually an iterative process.

See the section on the *Farm System Test Report* in the Help file.

**Remember:**
**It is worth spending time to set up a plausible Farm System before proceeding with an Analysis.**

The **Examine Outputs** option on the Farm System window is a useful option for drilling into more detail about the Farm System. This dialog allows you to show results in tabular or chart form over the period you require. The **History** list makes is easy to return to previous configurations of the outputs that you have chosen.

### *Completing the Testing of your Farm System*

➡ Once the Farm System is tested and found acceptable, click on the **Passed Acceptability Test** check box at the bottom of the window.

> The question mark next to the Farm System name has disappeared once the Farm System has been tested



Passed Acceptability Test check box
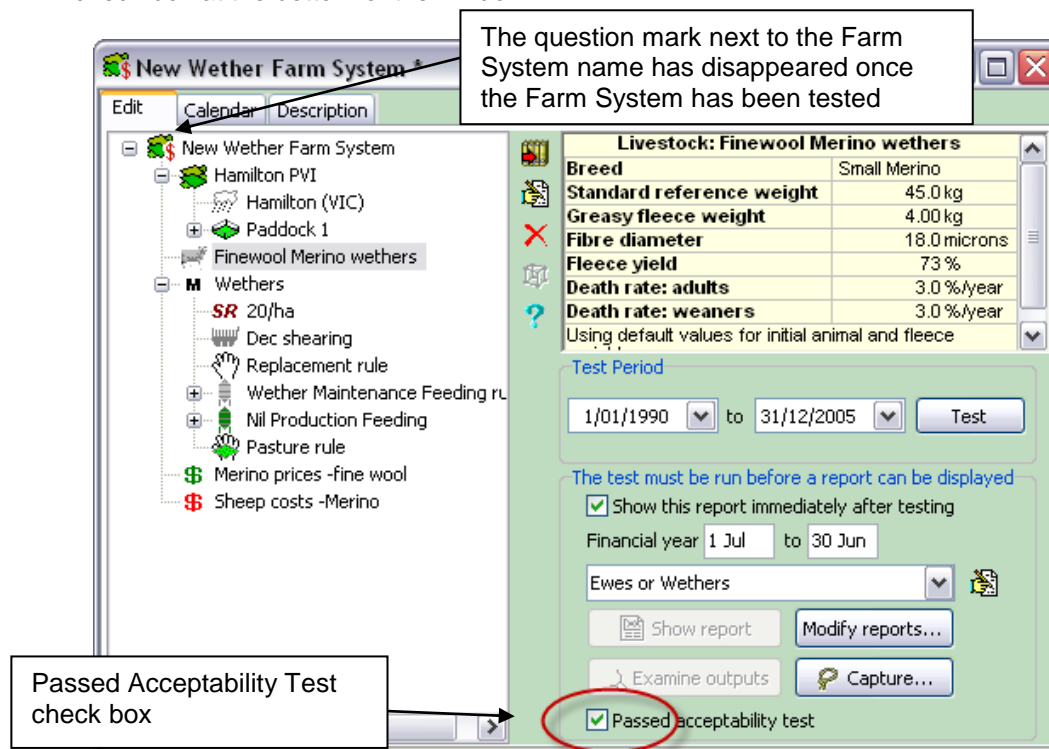
**Important!**
You must select the Passed acceptability test checkbox before the Farm System can be used in an Analysis.

➡ Now close the Farm System window. You will be asked if you want to save the changes. Choose **Yes**.

The new re-named, tested Farm System now appears in the Farm System Library, without the question or exclamation marks.

The Farm System is now ready for use in an Analysis.
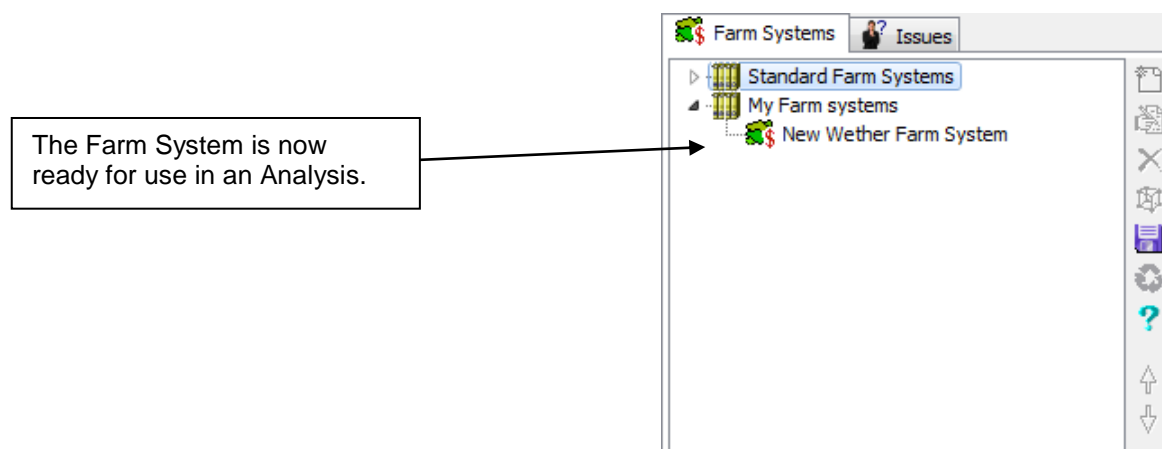
## Using your Farm System in an Analysis

> **Definition: GrassGro Analysis**
>
> A GrassGro Analysis is the examination of a Management Question (Issue) for a specific Farm System. An example of a GrassGro Analysis might be:
> *"What is the best long-term stocking rate for a wether enterprise on my farm (20, 25 or 30 sheep/ha)?'*
>
> The base Farm System has been tested for acceptability and cannot be modified in the Analysis.
>
> The Analysis window shows the selected Farm system and the Issue which will be examined. The user can see which factors will be tested by this Issue and modify the factor levels and values.
> The Analysis report shows the response of the selected Farm System to the different factors and levels.
>
> GrassGro is distributed with a standard set of Issues and a library of Farm Systems that can be quickly combined in an Analysis.
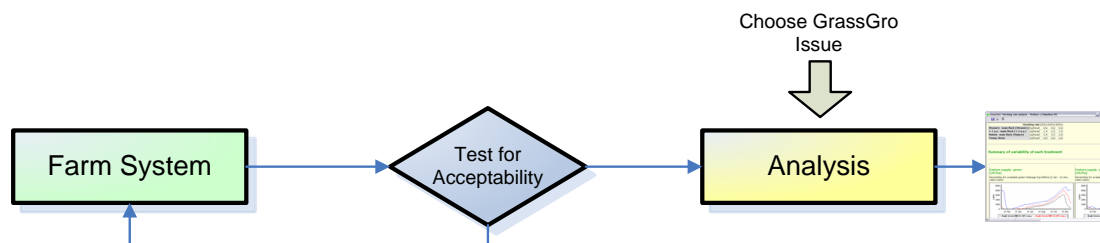


In the Farm System library:

➡ Select the Farm System you wish to use in an Analysis by clicking on it.

➡ Next, click on the **Use in Analysis** button 🔲  (OR **right click** on a Farm System and select **Use in Analysis…** and select the Analysis type from the menu that appears).

The **Available Issues window** appears if you clicked on the **Use in Analysis** button, (with an **Analysis window** behind it):

➡ Select the Issue you want to Analyse from the list:
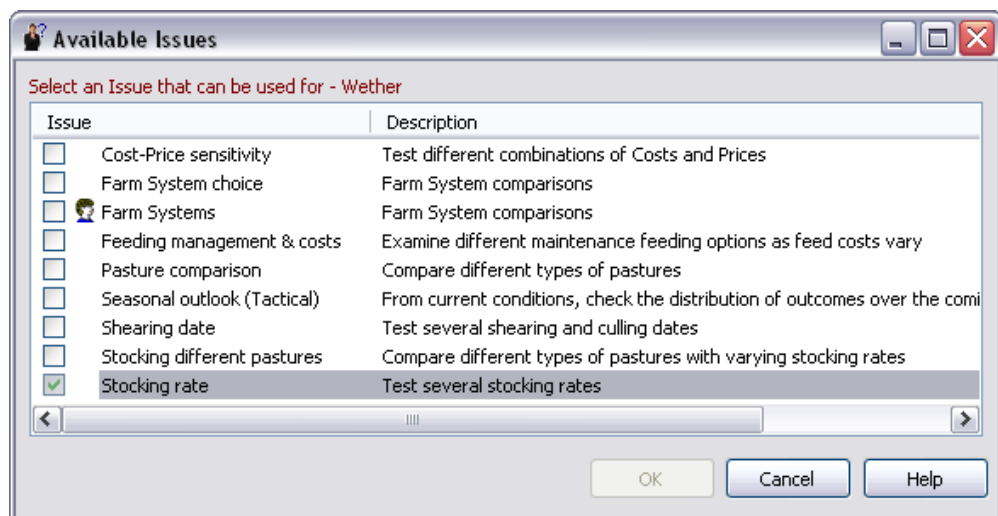
The Analysis window will now be active (orange background):

The Analysis window has several sections:



**Farm System**

**Issue**

Available **reports**

Component (**Factor**) that will be varied to analyse this issue

Different **Values** of the Factor that will be tested in this analysis

Period over which the analysis will run

Select which report to display

Period which will be displayed in the report

➡ Edit each Factor value item to set the stocking rate.

➡ Check that the **Processing Period** for the Analysis is correct. It must be within the period tested for that Farm System.

➡ Click the **Analyse** button.

➡ After the analysis has run, the report is normally automatically displayed. If not, click on the **Show Report** button.

➡ Check that an appropriate financial year is used for the production system analysed.

➡ Examine the biological responses at the end of the Analysis report and check that any variation with Factor level is plausible.

An analysis can be saved using the 💾 icon. Saved analyses can be used later or sent to other GrassGro users.

**Note:** If sending an Analysis to others, you may also need to send any customised weather files that have been used in the Farm System.

## Designing a new Issue

Consider a Management Question. Which components of the Farm System (Factors) do you need to test to examine this question? How many levels of each factor should be tested?

**Analysis**

**Issue template**

**Management question:**

The **Factors** (components) that must be tested to investigate my Issue:

| Factor 1 | Factor 2 |
|----------|----------|

**Number of Levels** of each Factor to test and **Values** for each Factor Level:

**X**

**Issue report**

Key outputs
Arrangement of Factors and Levels
Transformations

**Farm System**

Weather
Soil
Pasture
Enterprise
Livestock
Management

## Designing a new Issue

---

**Definition: GrassGro Issue**

A GrassGro Issue is a framework for examining a Management Question.
Much like a template, it applies constraints for applying variations to a tested Farm System. For example the Issue might allow only a variation to stocking rate and restrict the number of stocking rates that may be tested.

The Issue also contains one or more pre-defined reports containing outputs relevant to the Issue and the enterprises for which it is valid.
A typical GrassGro Issue might be: '*What is the best long-term stocking rate?'*.  The attached report would then contain many sections specific to animal production.

GrassGro is distributed with a standard set of Issues but users can also design their own.

---

Users can create their own Issues which are stored in the Custom Issues Library.

➡️   Select the Issues tab in the Library window.

The Issues library is divided into two sections. The **Standard** section contains Issues distributed with the software. The **Custom** section contains Issues created by the user.
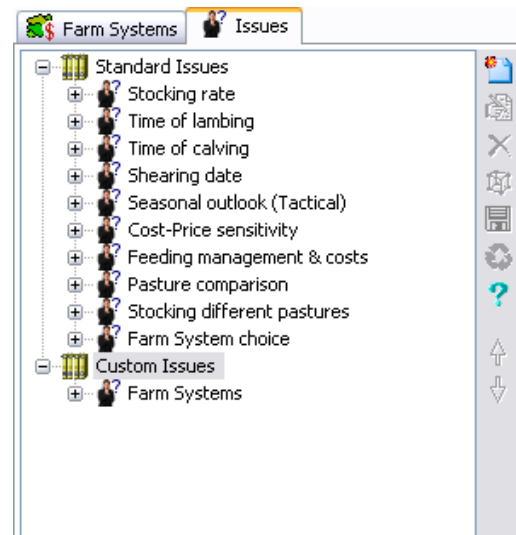
**To design a new issue:**

➡️   Right click on the Custom Issues item in the tree.

➡️   Choose **New Issue…**
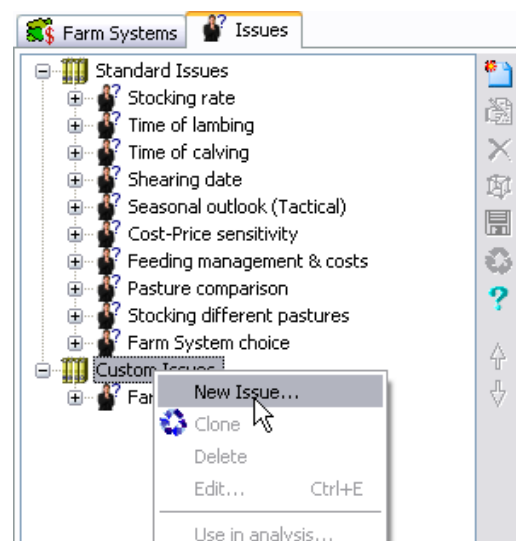
The **Edit an Issue** window appears. Use this window to:

1. Name the Issue
2. Choose the type of Factor/s you wish analyse in this Issue.
3. Name each factor
4. Set the default and maximum number of levels of each Factor that will be tested
5. Set the Type of Analysis (Historical or Tactical)
6. Set the enterprises to which this Issue can be applied
7. Design a specific report for this Issue (can be delayed until the next step)

**1.** Enter a **Name** and **Description** for this Issue



**6.** Click on the check boxes to select the **Valid farm enterprises** to which this issue may be applied

**5.** Click on the appropriate radio button to set the **Type of Analysis** to Historical or Tactical

**2.** What **Type** of Factor do you want to investigate? Click on the down arrow to select the component that you wish to use as a factor in the Analysis.

**3.** Enter a factor **Name** and **Description**. This name will be used as a label in the Issue Report.

**4.** Set the **Default number** of levels for this Factor. Set a maximum number of levels that will keep the presentation of the Analysis in the report manageable.

This is an example of an Issue that examines how heavily a Farm can be stocked when it has a specified soil fertility. Using two Factors: **Paddock** and **Stocking rate** it is easy to test different stocking rates on paddocks of different fertilities.

To construct this Issue as above:

➡ Ensure that the Stocking rate tab uses a Stocking rate type of component.

➡ Click the Add button to add the second Factor.

➡ Ensure that the Soil fertility tab uses a Paddock type of component.

➡ Fill all the data entry fields as shown.

➡ Click **OK** when finished.

In the Issues tree you will now see the new Issue.

### Adding a Report to an Issue

You need to give your Issue a report that is relevant to it's design by selecting particular outputs and presenting them so that you can easily compare responses to the different factors and factor levels. The report should also enable any user to quickly evaluate the response of the *whole system* to the tested factors.

An appropriate report can be added to an Issue in one of 3 ways:

1. Use a pre-existing report (drag and drop a report from the component library) and then modify it by adding or deleting charts and tables.
2. Use a pre-existing report from another Issue in this library. It can be dragged using the mouse and dropped on the new Issue.
3. Design your own report from scratch.

Modification of a pre-existing report (2) is preferred in the first instance. GrassGro provides you with a number of report section templates to design a new Issue report but this is time consuming.
When designing a report for an Issue, it is important to consider the enterprises and Farm Systems that may be analysed with that Issue. See *Report Design* in the Help files for more information.

### Using an existing Issue Report in an Issue

➡ Click on the **+** next to the new Issue to expand it and then you will see the new empty report.

Note that the New Report is blank and needs to be made relevant to the Issue. The easiest way to give this Issue a new report is to copy an existing one from the Standard Library.

➡ Expand the Stocking rate Issue in the Standard section.

➡ Drag the Stocking rate report and drop it on to the New Report.
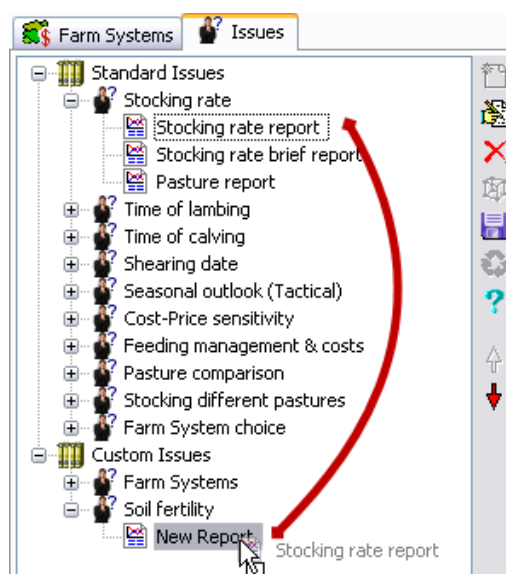
## Modifying an Issue Report

Every GrassGro Report is composed of a number of sections. The section types are:

| Section | Details |
|---------|---------|
| Chart | Graphical time series that can be formatted in a number of ways such as line, bar, or area style. |
| Table | Grid layout of data values with column headings. |
| Text | Formatted text that is normally used for explanation text. Uses HTML mark up. |
| Summary Table | A table that shows one value per treatment for each chosen variable. Usually used for showing long term average values. |
| For Each Treatment | A grouping section that will group a number of child sections together by treatment. |
| Farm System Description | The detailed configuration of the base Farm System. Same as the description found in the Farm System editing window. |

In the previous example, the report from the Stocking Rate Issue was dragged from the Standard Issues onto the New Issue Report.

➡ Double click on the report to open the Report Designer window:

Different **sections** of the report are listed in this panel

These **Headings** and sub-headings appear in the report for the selected output variable.

Daily data for the selected output variables may need to be **Transformed**. For example, gross margins may need to be calculated on a financial year basis.

The output **Variables** and their presentation are selected here.

**Select** a Variable to add

**Remove** the highlighted Variable

**Clone** a selected variable, using the **clone** button.

Add a calculated variable using the **calculated expressions** button.

➡ Close this Report Designer

## *Adding and Removing report sections*

Starting with an empty Report the next exercise will build a basic report using pre-configured report sections.

➡️ Right click on the custom Issue that was created in the Issues tree. Choose **Add report**.

This will create a new empty report under the Issue.

➡️ Open the new report by double clicking on it.

The New Report will have no sections in it. To get this Reporting working the next task is to add a new section.
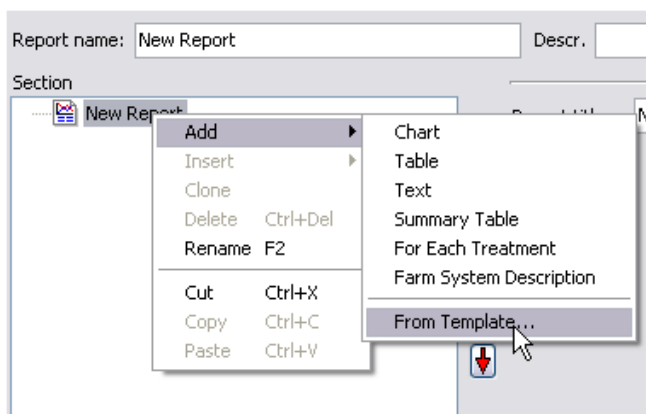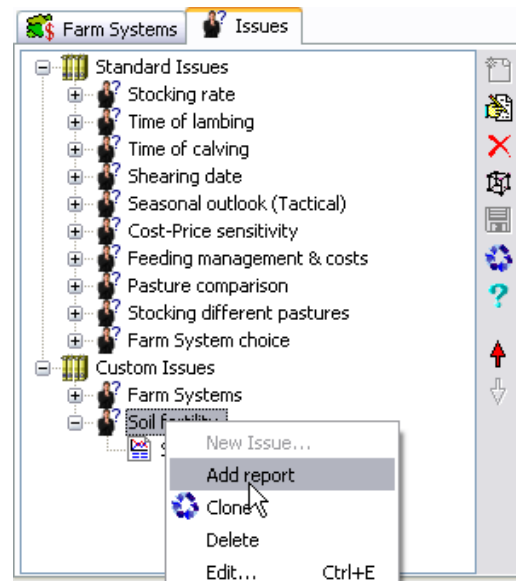


➡️ Right click on the top item in the tree in the Section pane.

➡️ Choose **Add** from the menu that appears

There are a number of report sections that you could choose. Each of them requires you select the variables and transformations. The easiest is to choose From Template.

➡️ Select **From Template…**

The Report Section Templates dialog allows you to choose some pre-configured report sections.
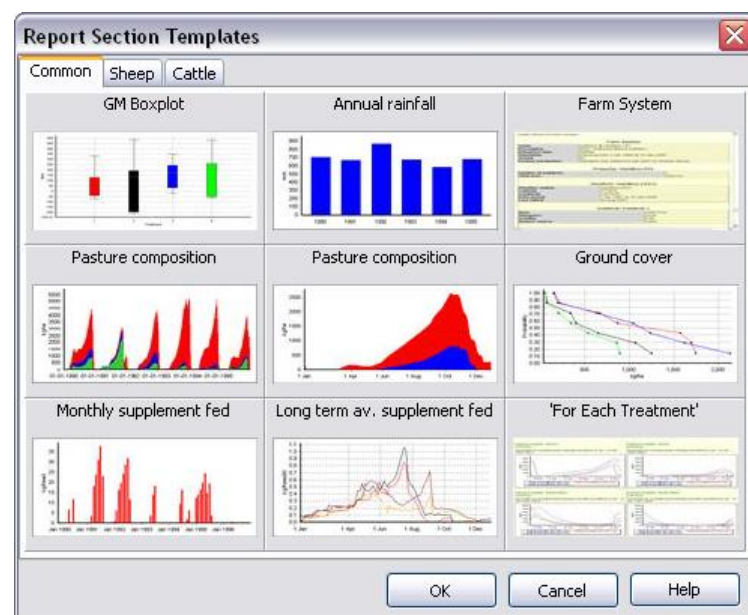


➡️ Choose the Annual Rainfall chart and click **OK**.

The Report now has a single report section.

➡ Add a **For Each Treatment** section.

➡ Select the For Each Treatment item and add a Pasture Composition section using the From Template option.

➡ Repeat this process and add some more sections.

➡ Click **OK** to save the Report.

➡ Save the changes to the Issues Library by clicking on the **OK** button.

To **copy** an existing section from another Report it is a simple process which uses the Windows clipboard.

➡ Open the Stocking rate report.

➡ Right click on Gross Margin table and choose **Copy**.

➡ Close the report by choosing **Cancel**.
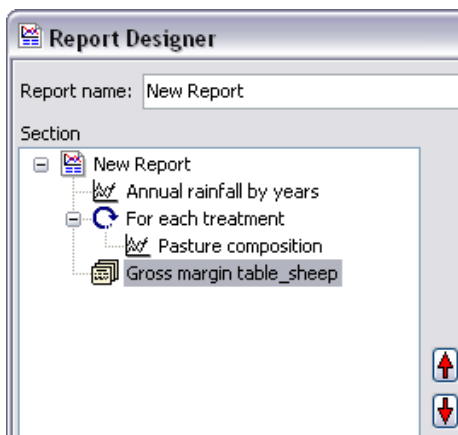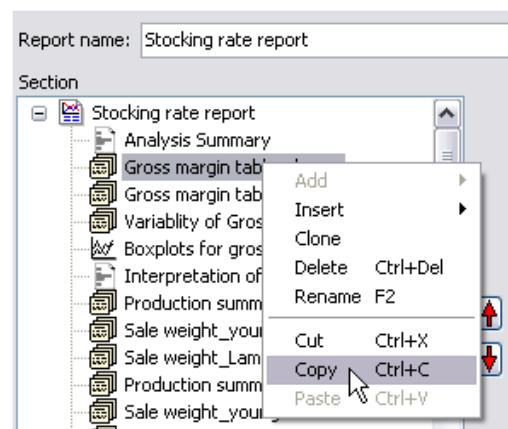
➡ Open the New report that was opened previously.

➡ Right click on the top item in the Section tree.

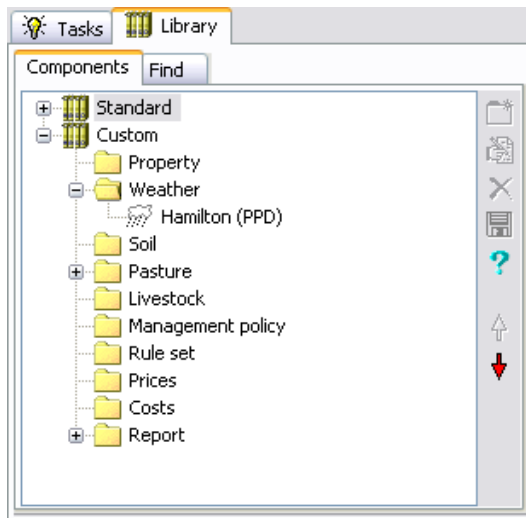➡ Choose **Paste**. The Gross margin table will be placed in the report as the last item.

The Report has enough detail now for use in an Analysis.

To delete report sections use the popup menu on the report section tree and choose the **Delete** option. Cloning of a report section is also possible. To reorder the sections use the up and down arrow buttons next to the Section tree.

For more details on report building see *Report Design* in the Help file.

# The Library

## *The Component Library*



- The Library can be used to store useful or commonly used components to streamline Farm System building.

- Components in the **Standard** library can be viewed and used, but cannot be edited.

- Components can be added to the **Custom** library, where they may be edited or deleted.

- To modify a component from the Standard library, first copy it (drag with mouse) to the Custom library.

- Components in the Library can be copied (dragged with the mouse) into the Farm System editing window.

- Reports stored in the Library can be copied for use in Analyses, Issue design and for acceptability testing.

- Items in the Library folders can be reordered by selecting the item and using the up- or down-arrow buttons on the side toolbar

## *Searching the Component Library*

The **Find** feature is particularly useful if your library becomes large.

The **Find** tab allows you to search the library in a number of ways:



➡ From the **Find** tab, enter text to search for in the **Look for** box at the top.

➡ Click the **Search** button and you should see any items that matched your search criteria.

➡ From the **Found** tree, right-click on an item and choose **Go to original** from the pop-up menu. This takes you to the selected item in the component library.
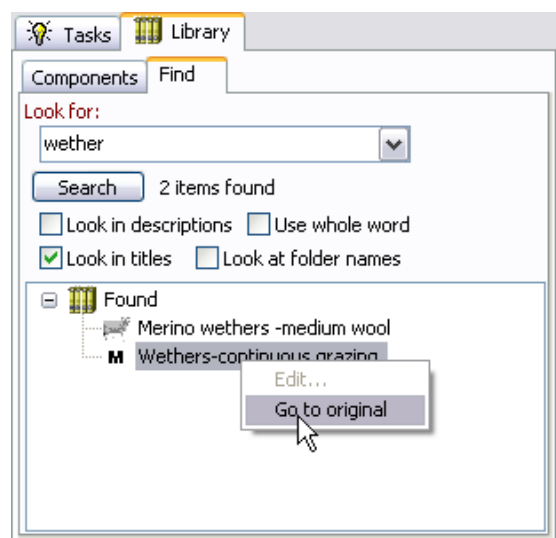
## *The Farm System Library*

The Farm System library contains Farm Systems that can be used in Analyses. To assist organisation in this library it is often useful to create sub folders. You can do this by choosing the **New Folder** option in the popup menu after selecting the top item or another folder.



The Farm System library exists in it's own file. If you want to open another library choose **Open…** from the popup menu. To create a new Farm System library, choose **File | New | Farm System Library** from the main GrassGro menu.
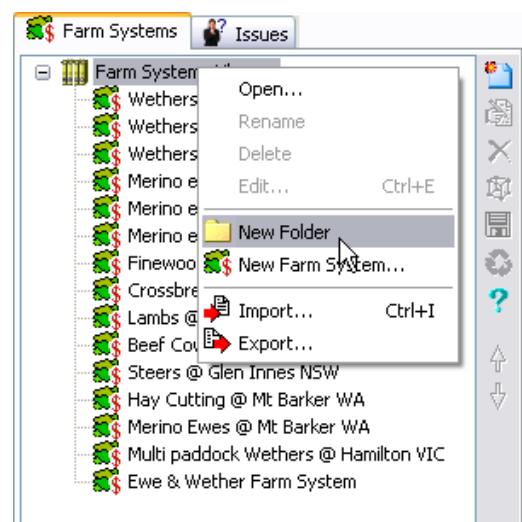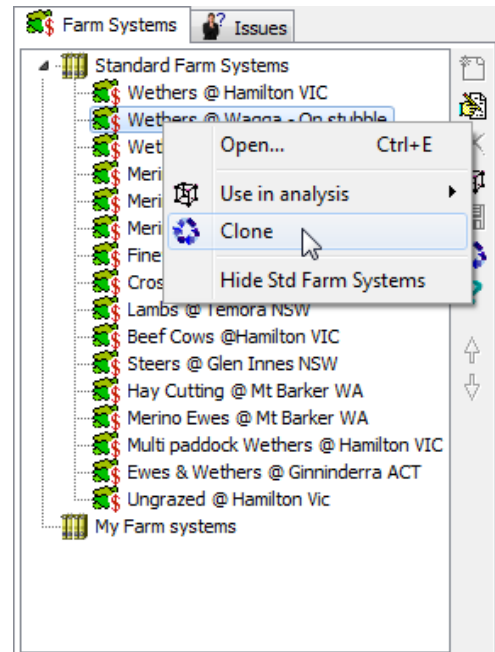
## Cloning a Farm System

You can also "clone" (copy) an existing Farm System in the Farm System Library:

➡ Right click on a Farm System and choose the **Clone** menu option.

Cloning a Farm System allows you to change various aspects in the cloned Farm System without losing the specifications in the original Farm system.
Farm Systems from both the Standard and the Custom library sections can be cloned.



## Sharing Libraries, Farm Systems and Components: Importing and Exporting

GrassGro 3 lets you export or import all or any part of a Farm System, Issue or Component Library (including importing of GrassGro 2.5 simulation files). This allows GrassGro users to share Farm Systems, Issues, Reports, and other components.

To **export** a Farm System:

➡ Go to the custom Farm Systems Library

➡ **Right click** on the Library tree node or on a selected Farm System

➡ Select **Export** from the menu that appears

➡ Next a **Save As** window appears.

➡ Save the Library or Farm System to the directory of your choice as a *.ggfl* file.

➡ Click Save
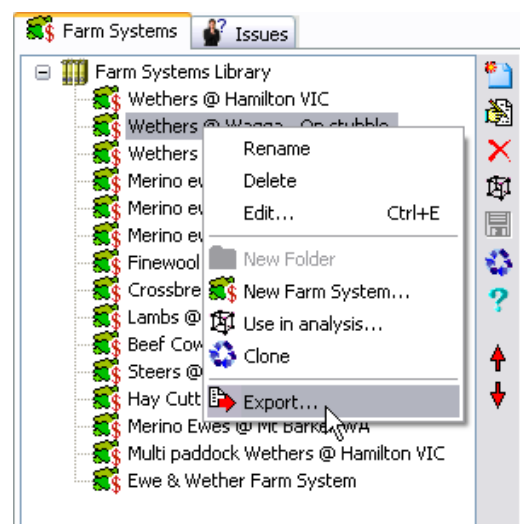


This Farm System (or entire Farm System Library) can then be sent to other GrassGro users (e.g. via email). If the Farm System includes a custom weather locality such as a SILO weather station then you will need to provide the other person with the weather data also.

To **import** a Farm System:

➡ Go to the custom Farm Systems Library

➡ Right click on the Library tree item or a folder item.

➡ Select **Import** from the popup menu. An **Open** window appears:

➡ Navigate to the *.ggfl* file that you wish to import.

➡ Click Open

An **Import Farm System Component** window appears:
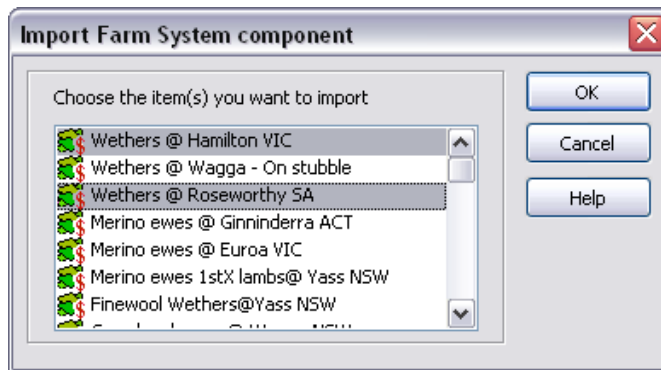


All of the Farm Systems found in the *.ggfl* file are shown in the list. You can multi-select any Farm Systems that you wish to import.

**Importing and Exporting Library Components**

The import and export procedures are similar for the **Component Library**, except that the files have the extension *.gglb.*

To import library components you need to select a folder in the Custom Component Library.

➡ Right click and choose the **Import…** option.

➡ Choose the file that contains a library component. (*.gglb*)
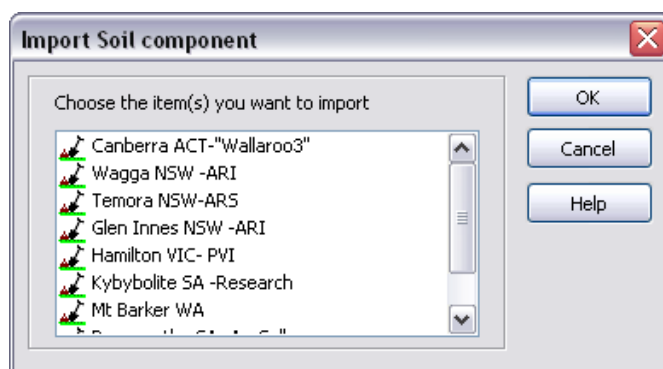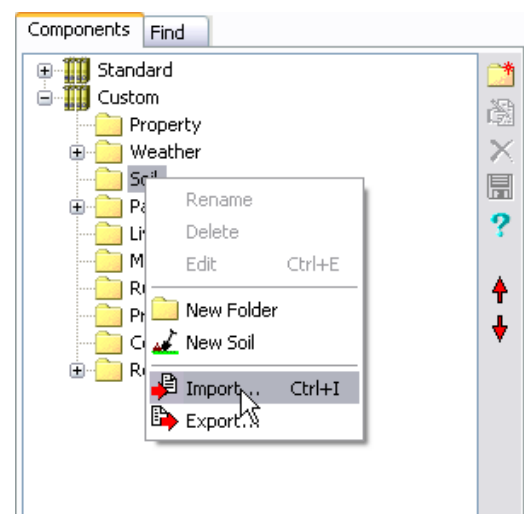




The dialog that opens next allows you to choose a component of the same type as the folder that you selected.

To export components, choose the **Export** menu option. You can export a single library component or a whole folder with it's contents.

**Importing or Exporting an Issue**

➡️ Go to the Issues library and select the Custom Issue item.

➡️ Right click and choose the **Import** or **Export** option.

➡️ The exported or imported files have the extension *.ggis*.

The exported Issues can be shared with other users.
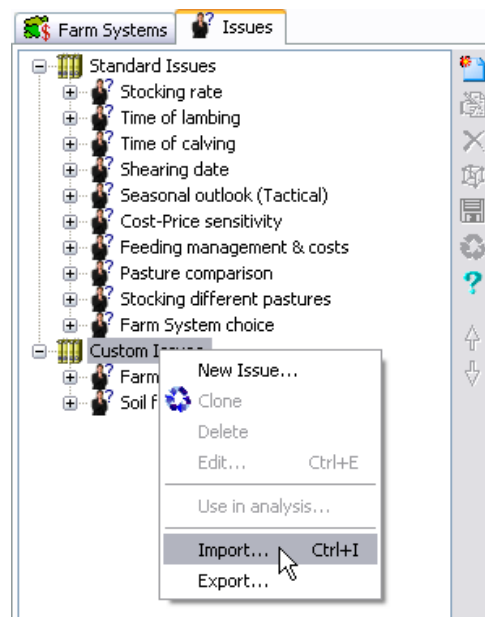


**Importing and Exporting Acceptability Reports**

Acceptability reports can also be exported and imported to a file for sharing with others. They can also be dragged from the Acceptability reports library into the Component library tree. This can be done only if the Acceptability reports library is opened from the main toolbar or main menu.
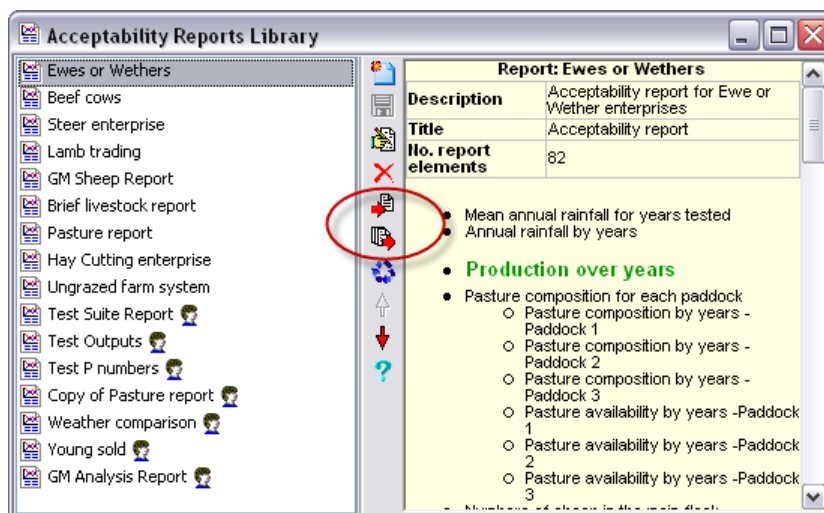
## Setting up a Tactical Analysis

When setting up your own tactical analysis, the initial values of a Farm System are very important, as they are assumed to accurately reflect conditions at the commencement of the Tactical Analysis period. The soil moisture, plant growth stage, mass of shoots and roots of each pasture species and animal weights must be as accurate as possible for the starting date. GrassGro can initialise these values automatically for you in the **capture** process. Alternatively, you can apply the initial values already present in your Farm System (in which case, ensure they reflect conditions at the start date).

See **Exercise 3** in an earlier section for a further introduction on Tactical Analyses.

In this example we assume that you want to start the Tactical Analysis on 15 October 2007.

### *Set initial values (Capture)*

The following section shows you how to **capture** the initial state of a Farm System on a particular date within a tactical analysis. See Help files on tactical analyses for further information.

➡ Select the Issue: **Season outlook (Tactical)**, and click the **Begin** button.
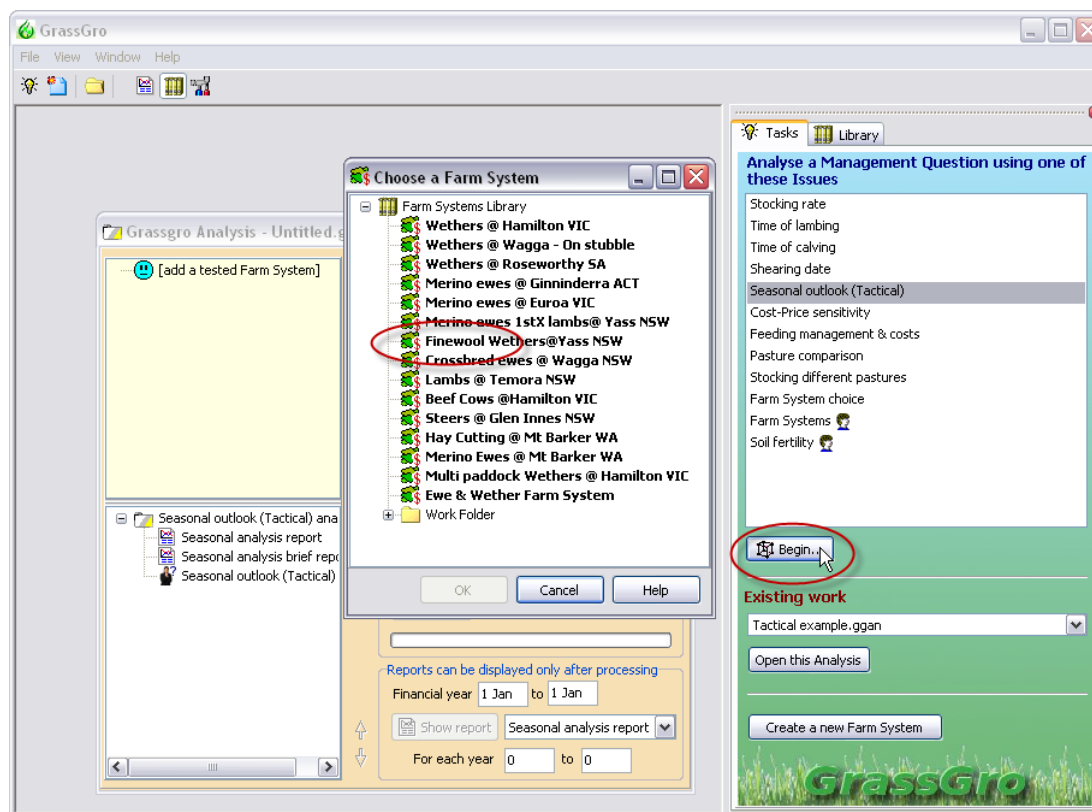


➡ Choose the Farm System *Finewool Wethers@Yass NSW*.

The Analysis window then opens for the Seasonal Outlook Issue.

The Analysis window for the Seasonal outlook Issue shows the dates for the tactical period as 1 Jan to 31 Dec over the years 2000 to 2008.

In this example we are interested in the Tactical period from 15 October 2007 to 31 July 2008.

➡ Change the *start* day to 15 Oct and the *end* day 31 Jul.

➡ Change the *years* over which the tactical analysis will use weather data for the selected period. In this example, change the start year to 1970, and the last year to 2006.

**Note:** The final year is 2006 rather than 2007 because the last tactical period simulated will use weather data from 15 October 2006 to 31 July 2007.

Think carefully about the **Processing period** used for the Tactical Analysis. A longer period of years will give you a greater sample of the possible variation in weather conditions that may be experienced in the tactical period, however, a longer Processing period will also take longer to run.
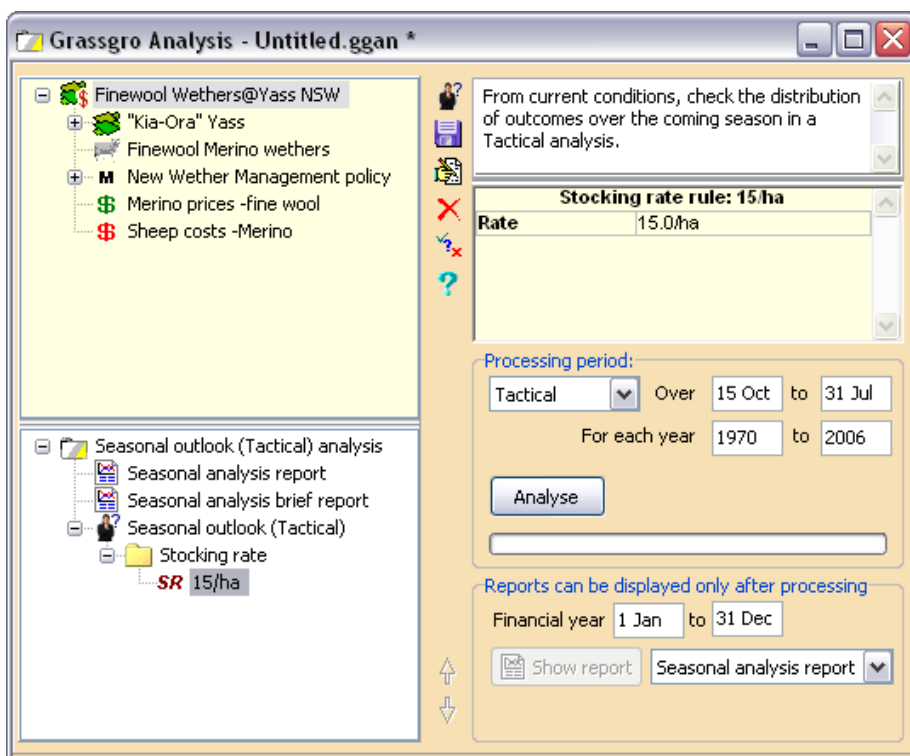


➡ Set the factor value if required (stocking rate value)

In the bottom left part of the window, the Seasonal outlook (Tactical) analysis has been designed to have one factor (stocking rate) which can have up to three values. The default setting is one stocking rate set at the current rate in the base Farm System.

➡ Now click the **Analyse** button.

We are now asked to choose whether we want to use the current Farm System initial values. For this Farm System, the initial values represent conditions typical on 1 January, however, we are starting our tactical analysis on 15 October 2007. So:

➡ Choose **No.** We are then directed to initialise the Farm System.

The Capture process occurs in 3 steps:
  1. *Run* the Farm System up to the starting date for the tactical analysis
  2. *Check* the initial values, making changes where appropriate
  3. *Copy* the initial values back to the Analysis window

➡ Select a date range over which the Farm System will be run, bringing it up to the day before the tactical period commences (14/10/2007), and providing initial values for the tactical analysis.

➡ Click the **Prepare** button. The program runs to the end date (14 Oct 2007) and stops.

Now your Farm System should reflect the state of the system on the 14 Oct 2007.

➡ Check that the captured values for soil moisture, pasture inputs and livestock live weight are correct in any of the following ways:

1. Look at the values in the **Description** of the relevant component.

2. Click on the **Examine outputs** button in the bottom right corner to see graphs and tables of all outputs over the last capture period.

3. Double click on the component to open it. The initial values can be adjusted in the component dialog, just as if you were setting up a Farm System.



At this stage, any of the active input values can be adjusted. For example, you may wish to change the pasture mass to a measured value or mimic pasture slashing by transferring the mass of green herbage to litter.

The new initial values for the Tactical analysis can now be copied back to the original Farm System in the Analysis window. To do this:

➡ Ensure the check boxes are selected in the bottom left hand corner. This determines which values will be copied back to the Farm System.

➡ Click the **Proceed** button.

The Tactical Analysis will now run and a report will be produced.

If you want to run the Tactical Analysis again with different initial values:

➡ Click on the **Analyse** button again (in the Analysis window) and you will be asked if you wish to use the initial values you prepared last time.

➡ If you choose **No**, you can initialise your Farm System again, and make further changes to the initial values if desired. Otherwise choose **Yes**.

## Multiple Captures

In the **Initialise** (capture) window for a tactical analysis (used in the previous example) it is possible to run a *series* of captures. You might want to do this if you have measured data for some of the Farm System variables prior to the commencement of the Tactical period. Running a series of captures (**multiple captures**) allows you to alter soil moisture values, pasture values or livestock live weights at different times prior to the beginning of the Tactical period. This can improve the estimates of the initial values generated by GrassGro.

In this example, we will run a similar Analysis to the previous example, but we will assume that we measured our pasture biomass on 1 July 2007, and will use this data to help GrassGro generate more reliable initial values for our Tactical Analysis.



➡ In the Tactical Analysis window, click **Analyse**, then choose not to use initial values you prepared last time.

You are taken into the **Initialise Seasonal outlook** window as shown here.

➡ Activate multiple captures by ticking the **Assist with multiple captures** box.

➡ Set the end date of the 1st capture period to 1/07/2007.

➡ Click the **Prepare** button.

The Farm System has been initialised to 1 July 2007.

The Start button has changed into a **Continue** button.

The start date for the 2nd capture period has been automatically reset to 2/07/2007.

In the bottom right corner of the window the **Last completed period** is 1 Jan 1970 to 1 Jul 2007.

We can now open the **Pasture component** of the farm system and enter our measured pasture data for 1 July 2007.

➡ Double click on the **Pasture component** of the Farm System



42

The Pasture component dialog box appears, showing the pasture values captured for 1 July 2007.

➡ Change some values of the pasture component (e.g. increase the Green DM of sub clover)

➡ Click **OK**



➡ Now that you have changed the pasture component to reflect the measured pasture data for 1 July 2007 and the end date for the next capture period has been set to 14/10/2007. Click **Continue**.



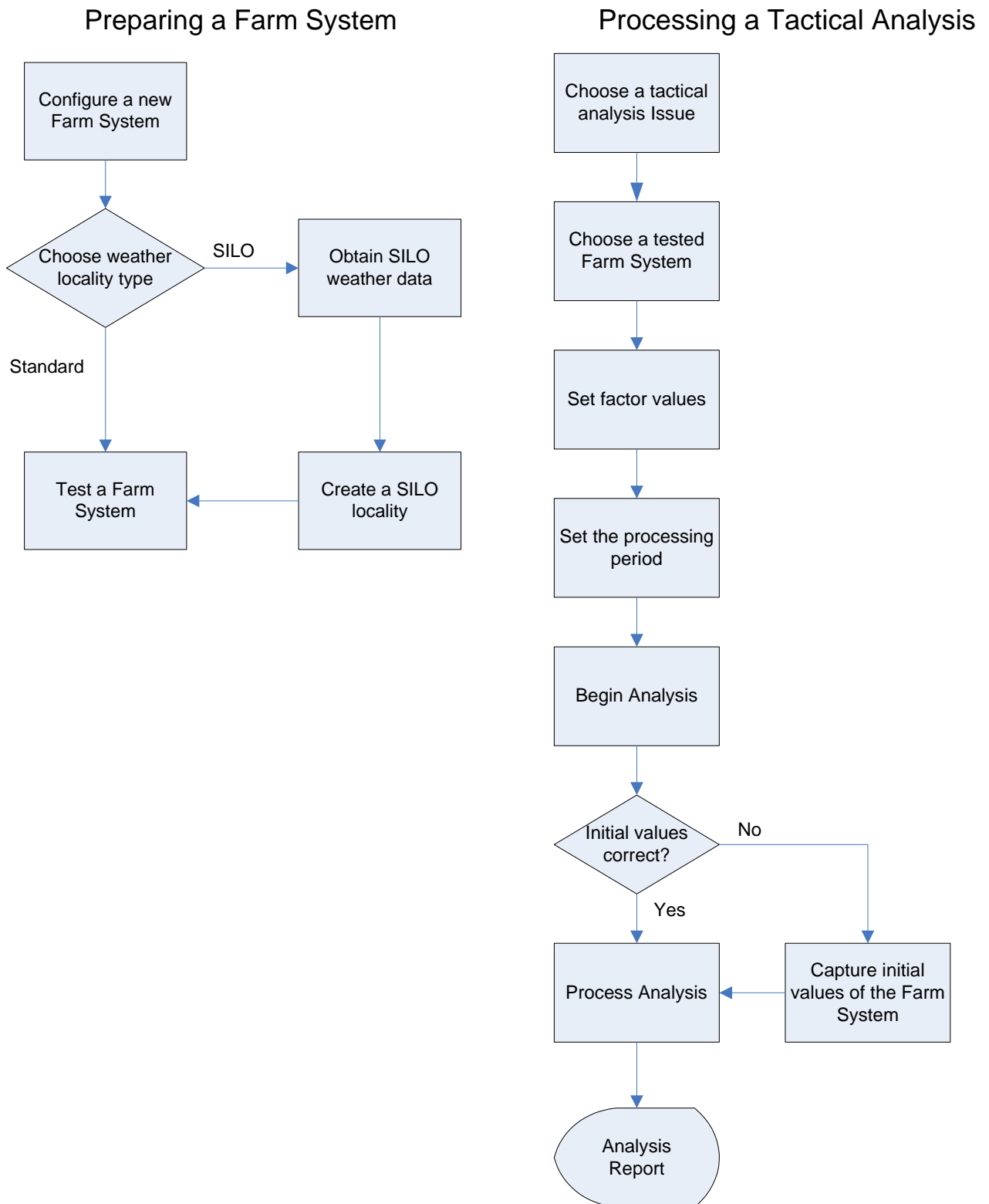The simulation runs until 14/10/2007 and stops. We now have initial values for our Tactical Analysis.

The **Next capture period** would be 15/10/2007 to 31/12/2007, but we do not want to continue.

The **Last completed period** is 2 Jul 2007 to 14 Oct 2007.

➡ Click on the Farm System components to check the initial values, and make further changes where needed.

➡ Once you're satisfied with the initial values, use the check boxes in the bottom left corner to select the components to copy: **All Paddocks** and/or **Livestock**

➡ Click on the **Proceed** button at the bottom of the Initialise Seasonal outlook window.

The Tactical Analysis now runs with our new initial values.

## Summary of Steps in the Analysis of a Tactical Issue

### Preparing a Farm System

```
┌─────────────────┐
│ Configure a new │
│   Farm System   │
└────────┬────────┘
         │
         ▼
    ╱─────────╲              ┌──────────────┐
   ╱  Choose   ╲    SILO     │ Obtain SILO  │
  ╱   weather   ╲──────────▶ │ weather data │
  ╲ locality type╱           └──────┬───────┘
   ╲           ╱                    │
    ╲─────────╱                     │
         │                          │
      Standard                      ▼
         │              ┌─────────────────┐
         ▼              │  Create a SILO  │
┌─────────────────┐◀────│    locality     │
│  Test a Farm    │     └─────────────────┘
│     System      │
└─────────────────┘
```

### Processing a Tactical Analysis

```
┌──────────────────┐
│ Choose a tactical│
│  analysis Issue  │
└────────┬─────────┘
         ▼
┌──────────────────┐
│ Choose a tested  │
│   Farm System    │
└────────┬─────────┘
         ▼
┌──────────────────┐
│ Set factor values│
└────────┬─────────┘
         ▼
┌──────────────────┐
│ Set the processing│
│     period       │
└────────┬─────────┘
         ▼
┌──────────────────┐
│  Begin Analysis  │
└────────┬─────────┘
         ▼
     ╱─────────╲        No    ┌──────────────────┐
    ╱  Initial  ╲─────────────│ Capture initial  │
    ╲  values    ╱            │ values of the Farm│
     ╲ correct? ╱             │     System       │
      ╲───────╱               └────────┬─────────┘
         │ Yes                         │
         ▼                             │
┌──────────────────┐◀──────────────────┘
│ Process Analysis │
└────────┬─────────┘
         ▼
    ╭──────────╮
    │ Analysis │
    │  Report  │
    ╰──────────╯
```

# Using SILO Weather Files

SILO weather files (Data Drill or Patched Point Dataset) can be purchased by the user to run tactical or historical simulations over long periods (from 1889) or up until yesterday.

*Read the SILO website carefully to obtain:*
- *estimates of the accuracy of SILO weather data, which are based on the availability of records for different periods. For example, there are relatively few sites with temperature data before the late 1950s.*
- *conditions of use. For example, SILO data are not recommended for use in studies of climate change.*
- *purchase arrangements*

## *Obtaining SILO files- Data Drill or Patched Point Dataset*
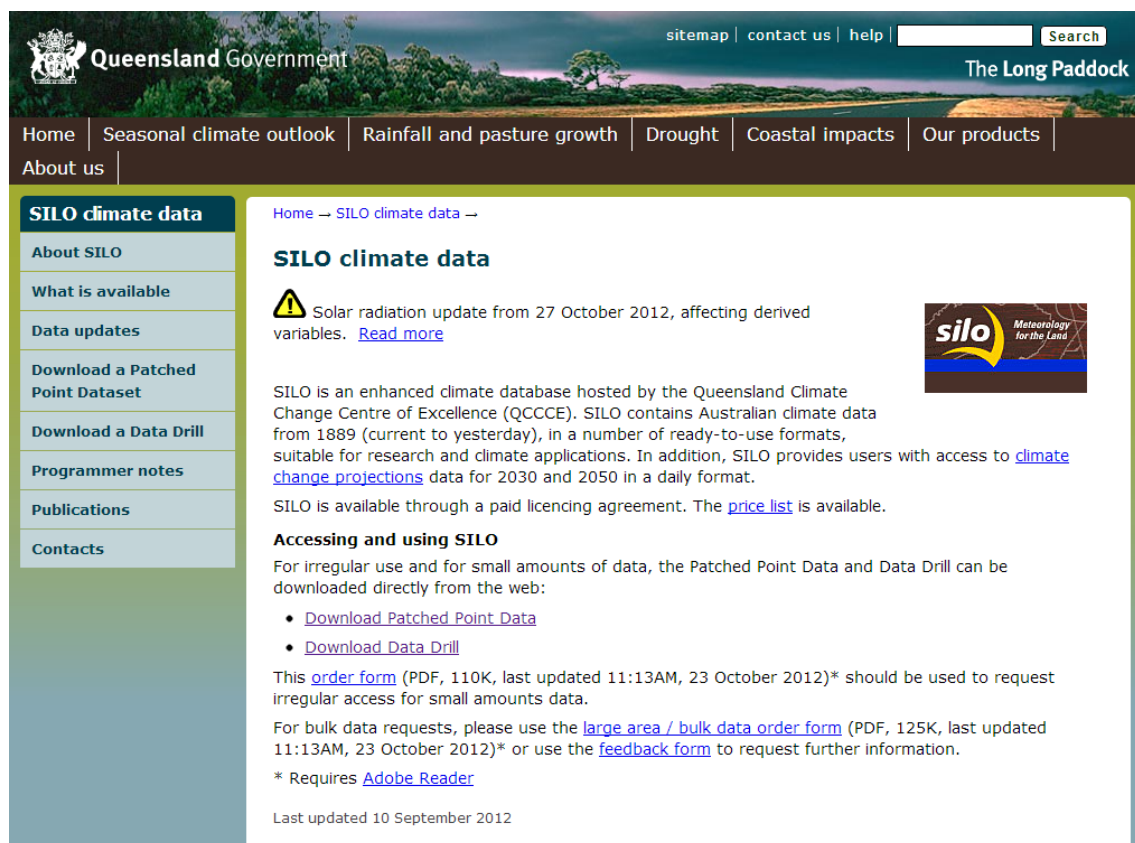
See the Help file section: Dialog reference |Create SILO Locality

For custom weather localities based on SILO data, GrassGro uses the SILO values for rainfall, maximum and minimum temperatures and radiation. Potential evapotranspiration is calculated from the SILO temperature and radiation values and the soil albedo entered in the Soil components.

**Note:** SILO files do not contain wind speed data; a constant value for wind speed is entered by the user, or wind speed data from a nearby weather station is selected.

For more information about the SILO weather data set see http://www.longpaddock.qld.gov.au/silo/

You can also click on the SILO icon [silo] on the Preferences dialog or the Select Weather Locality dialog.

After choosing **Download Patched Point Dataset** or **Download Data Drill**:

Follow the sequence to enter your user information, location, date range and then the format.

- To nominate the correct data **format** for use in GrassGro, select *Standard including ETo* (FAO56) format.

- The SILO file will be emailed to you as a *.zip* file.

- When you receive it, save the unopened *.zip* file to your hard disk, typically to the directory *My Documents\GrassGro\Weather*, and proceed to create the new custom weather locality in GrassGro.

### Creating a SILO weather locality in GrassGro

A SILO weather locality can exist in the Component Library, within a Farm System, and can be also accessed from the preferences dialog.

**To create a SILO weather locality in the Component Library:**

➡ Select the Weather folder in the Custom Component Library and right click to choose **New Weather…**.

This will create the new component and open the Select Weather Locality dialog.
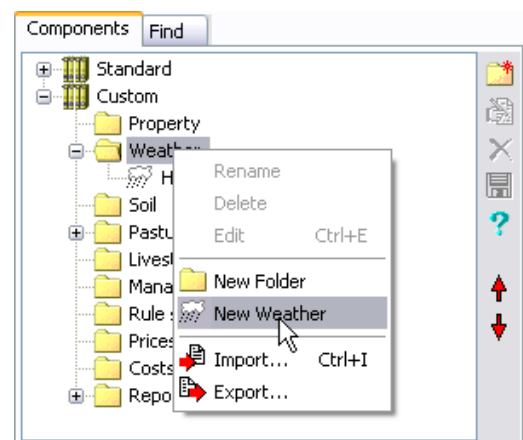
The Select weather locality dialog shows localities from the Standard set and the Custom set. You cannot edit the Standard localities but you can add to and edit the Custom set.

All the localities can be displayed on the map. There are options to turn on or off the visibility of the Custom and Standard sets.
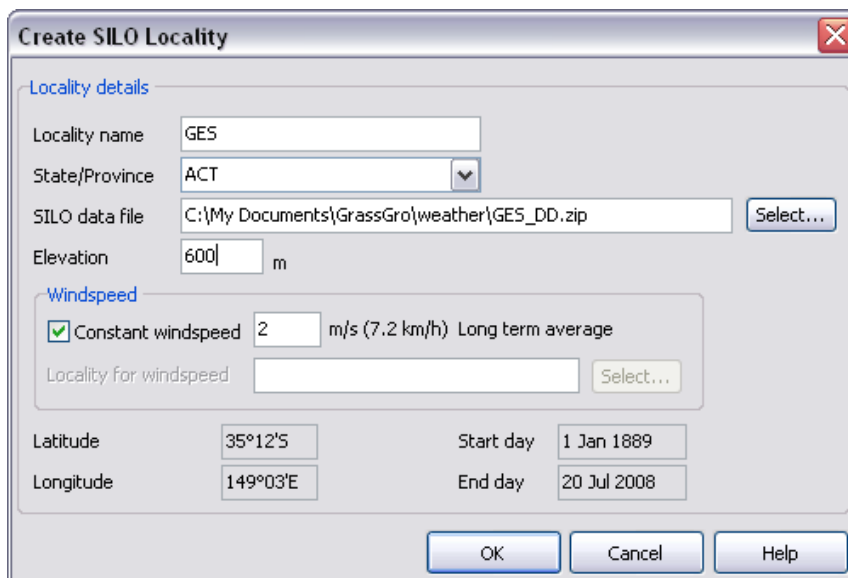
➡ Right click on the Custom item in the locality tree.

➡ Choose the **Create from SILO…** option.

The Create SILO Locality dialog will appear and allow you to select your data file. You can then specify further details about the locality.
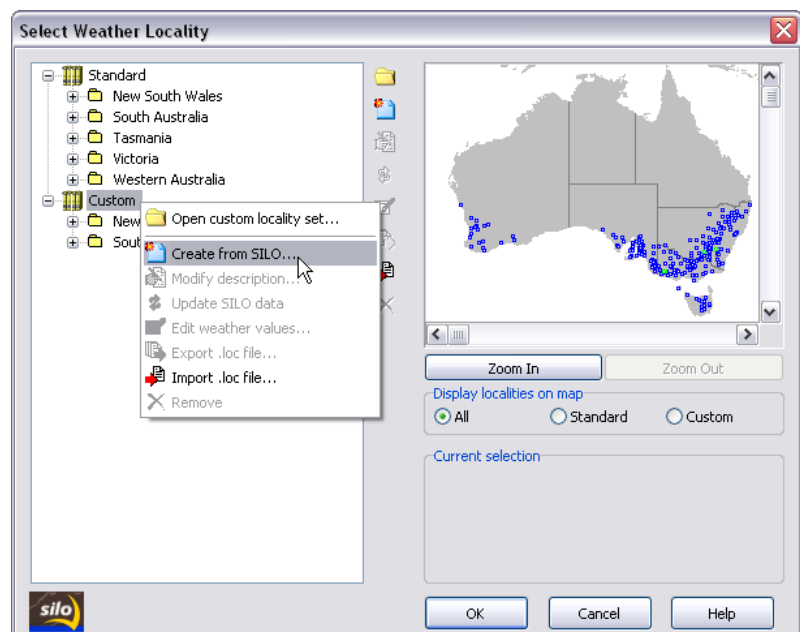
- From the Create SILO Locality dialog, choose the **Select…** button.

- Choose the file (*.zip*) and click **OK**.

- Once you have chosen the file. Set the locality Name, State and Elevation.

The choice to use a constant wind speed or a locality for wind speed will depend on whether there is an appropriate standard locality to match your new SILO locality.

If you want to use a standard locality for better estimation of wind speed then uncheck the **Constant wind speed** and choose the **Select…** option.

- When you are finished click the **OK** button.

- Once you are back at the Select Weather Locality dialog you can review your locality, modify it or delete it from here.

- Click **OK** to close the dialog.

You now should have a new weather locality in your Custom Component Library that can be dropped into any Farm System.
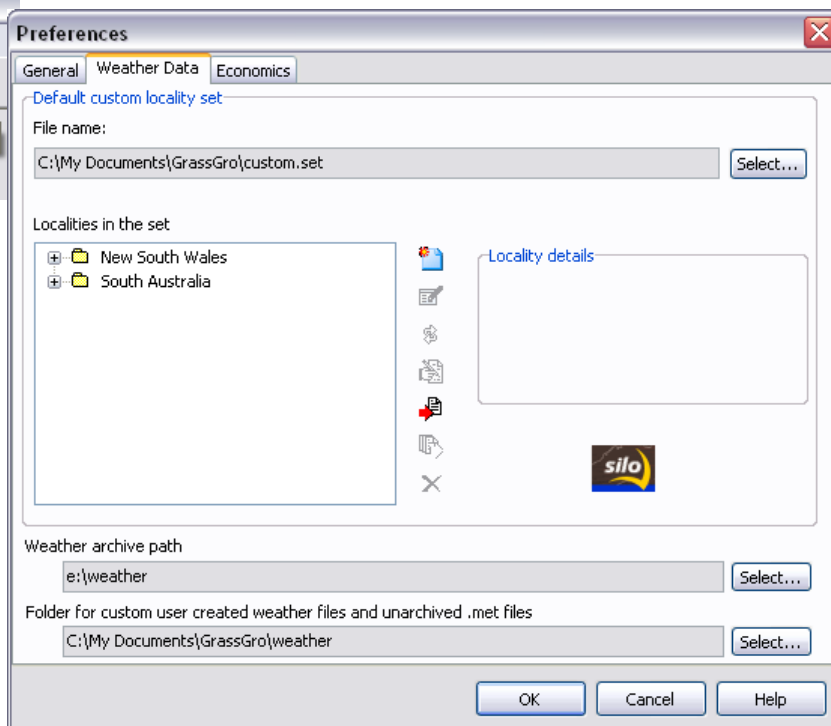
**To add a new SILO locality using the Preferences dialog:**

- From the main GrassGro toolbar, click the Preference button.

You can also open the Preferences dialog from the main menu using **View | Preferences…**.
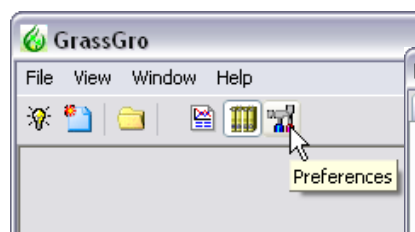


New localities can be added in the same way as shown in the previous example.

47

## Keeping the SILO weather up to date

After using the SILO data that you obtained, it may be useful to reprocess a Tactical Analysis after the season progresses. To do this you will need to download some new weather data. The steps to take are:
1. Download new weather data in a similar way as last time.
2. Place the new file in the correct location for GrassGro.
3. Reprocess the Analysis after setting up new initial conditions.

When you download the new data it is important to follow the same steps as you did previously. You will need to remember the name of the file that you used last time and the location of where you stored it.
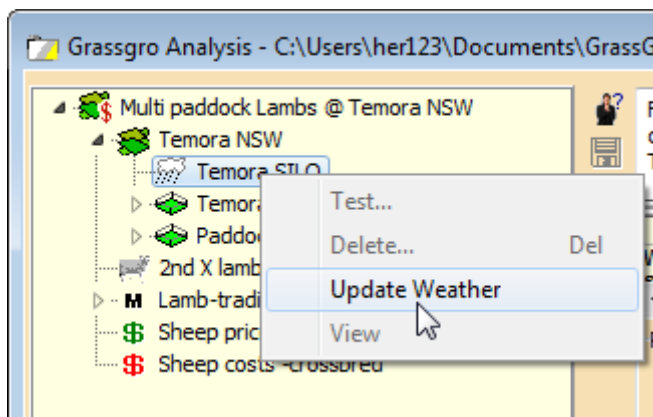


➡ Once you have the file downloaded, ensure that it has exactly the same name as the previous one. Copy the new file over the old one.

➡ Open up GrassGro and the tactical Analysis that you used. Right click on the Weather component.

➡ Choose the Update Weather option. This will read the new file and extend the time period that GrassGro knows about.

Proceed to processing the Tactical Analysis as you did previously.

You can follow this process for any SILO weather locality that you have in the Component library or any Farm system.

## Where to get assistance

The GRAZPLAN team at CSIRO want to help you use GrassGro efficiently to investigate your grazing system questions.

- To purchase a user license for GrassGro or for installation and upgrade queries, contact Horizon Agriculture by phone (02-9440 8088) or email horizonag@hzn.com.au
  or website http://www.hzn.com.au/

- For a guide to using GrassGro, definitions and explanations of the interface see GrassGro's extensive **Help** files, which include a comprehensive Glossary

- For typical user questions and examples of applications of GrassGro, check the GRAZPLAN **Web site**  http://www.grazplan.csiro.au/

- For any other queries about using GrassGro contact the Facilitator - Decision Support for Grazing Systems by phone (02- 6246 5290) or email grazplan@csiro.au

# Revision exercises

## Quiz 1: Understanding the interface and terminology

Q1. Assign each of the numbers on different sections the GrassGro interface below to a name from the following list:

| Section | Number |
|---|---|
| Farm Systems Library | |
| Analysis window | |
| Farm System being analysed | |
| Farm System window | |
| Analysis Factors | |
| Component Library | |
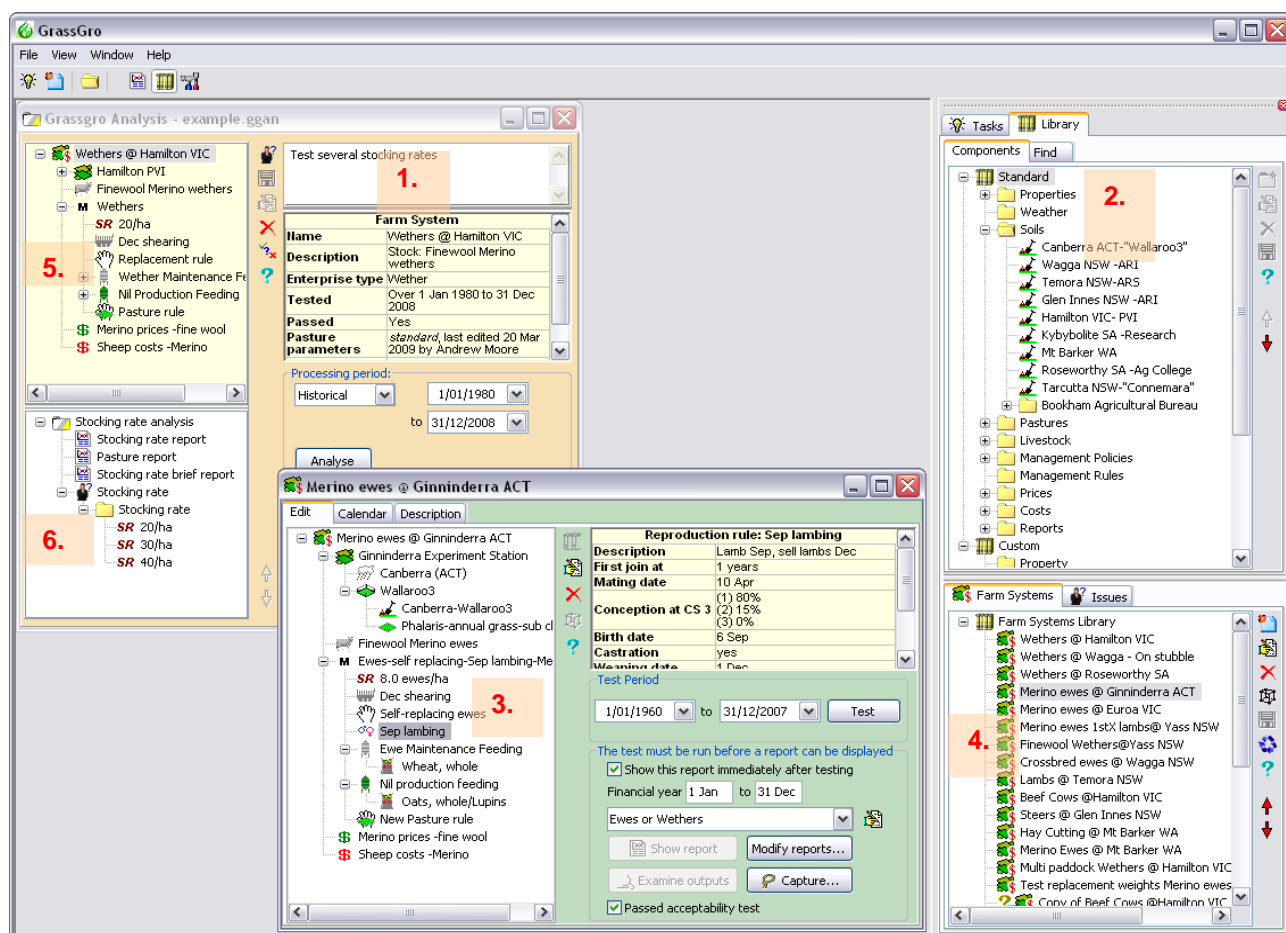


2. In the GrassGro interface above, what **Issue** is being analysed?
     (a) Stocking rate
     (b) A ewe flock at Euroa, VIC
     (c) Time of lambing at several stocking rates
     (d) A wether flock at Hamilton, VIC
     (e) Any you might choose from the Library
     (f) Shearing date                                    Answer: _____

Q3. You want to test the effect of changing the shearing date for a ewe flock located at Wagga Wagga. Which **factors** are tested in this analysis?

Answer: _____

Q4. In GrassGro, an **Analysis** consists of:
      (a) An un-tested Farm System
      (b) A tested Farm System
      (c) A tested Farm System and an Issue
      (d) A tested Farm System and an Issue and a Report      Answer: _____

## Exercise 1

Management question: *What is the optimum stocking rate for a wether flock at Roseworthy, SA?*

To investigate this question, set up a Stocking Rate analysis for a wether flock at Roseworthy. Test 5 stocking rates: of 3-11 wethers/ha from 1990-2000.

*Before you run the analysis, answer the following:*
(a) What is the **factor** tested in this analysis?    _____

(b) What are the **levels** of the factor that will be tested?   _____

## Quiz 2: Editing a Farm System

Indicate the most accurate answer/s to each statement

Q1. A new Farm System can be created by:
      (a) Checking a box in the Analysis window
      (b) Right clicking on the Farms Systems Library node
      (c) Double clicking on a Farm System in the Farm System Library
      (d) Right clicking on a Farm System in the Farm System Library
      (e) Cloning a Farm System in the Farm System Library

Answer: _____

Q2. Match the symbols in the table with the following Farm System Library terms:

*Edit Farm System, Delete Farm System, Save Farm System, Help, Use in Analysis, Custom Issue, Clone, Incomplete component, New Farm System, Incomplete Farm System, Move up list*

| Symbol | Term |
|--------|------|
|  | |
|  | |
|  | |
|  | |
|  | |
|  | |
|  | |
|  | |
|  | |

Q2. Match the symbols in the table with the following Farm System components and terms:

*Management component, Report, Production feeding rule, Weather component, Paddock component, Prices component, Property component, Costs component, Maintenance Feeding rule, Livestock component for sheep enterprise, Pasture rule, Supplement component, Empty component, Shearing component, Replacement rule component, Incomplete component, Farm System, Stocking Rate component, Soil component, Paddock management rule, Livestock component for cattle enterprise, Reproduction rule, Edit component, Use in Analysis*

| Symbol | Term |
|--------|------|
| ♂♀ | |
| 🌱 | |
| 🌿 | |
| 🖐 | |
| !? | |
| ☁ | |
| 🏭 | |
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| $ | |

Q2. The Financial Year for a Farm System should be set so that:
     (a) It corresponds to the annual production cycle of that Farm System
     (b) The accountants are happy
     (c) Production risk can be accurately interpreted from distributions of gross margins
     (d) A July-June period is always used for gross margin calculations

Answer: _____

Q3. After running a Farm System, outputs are available:
     (a) Only in an Analysis Report
     (b) Only in an Acceptability Report
     (c) Only by clicking on the Examine Outputs Button
     (d) In an Analysis Report and an Acceptability Report
     (e) In an Acceptability Report and via the Examine Outputs Button
     (f) In an Analysis Report and via the Examine Outputs Button

Answer: _____

Q4. After running an Analysis, outputs are available:
 (a) Only in an Analysis Report
 (b) Only in an Acceptability Report
 (c) Only by clicking on the Examine Outputs Button
 (d) In an Analysis Report and an Acceptability Report
 (e) In an Acceptability Report and via the Examine Outputs Button
 (f) In an Analysis Report and via the Examine Outputs Button

Answer: _____

Q1. To use a Farm System in an Analysis you must have:
 (a) Examined individual outputs
 (b) Looked at the Acceptability report
 (c) Looked at the Acceptability report and checked
    the *Passed Acceptability Test* box
 (d) Saved it to the Farm System Library
 (e) Saved it to the Component Library   Answer: _____

## Exercise 2

Management question to analyse: *What is the best time to lamb a Merino flock at Euroa?*

To investigate this question, set up a Time of Lambing analysis for a Merino ewe flock at Euroa, VIC for 2 lambing dates: 15 Aug and 15 May at stocking rates of 8, 10 and 12 ewes/ha from 1990-2006.

*Before you run the analysis, answer the following:*

(a) What are the **factors** for this analysis?

(b) What are the **levels** of each factor that will be tested?

(c) In the Reproduction component, do not change the selling dates for lambs but which other inputs *must* be changed?

(d) What criteria will you use to answer the management question?

*Run the analysis and examine the report.*

(e) Did you find your criteria in the report? (Yes or No)

(f) What other criteria did you use, if any?

(g) Which output presentations did you prefer?

(h) What is the best lambing date and why?

## Quiz 3: Revision of concepts and Tactical Analyses

*True or false?*

Q1. You can only use a tested Farm System in an Analysis. _____

Q2. In GrassGro, you cannot change the number of levels for a Factor. _____

Q3. A Farm System must be checked as acceptable before it can be
 saved to the Library _____

Q4. The end year for an *historical* GrassGro Analysis can be later than
that of the Tested Farm System. _____

Q5. The end year for a *tactical* GrassGro Analysis can be later than
that of the Tested Farm System. _____

Q6. The soil moisture, pasture mass and livestock live weight for
the start date of a *tactical* GrassGro Analysis can be:
      (a) Entered by the user _____
      (b) Captured by GrassGro _____
      (c) Captured by GrassGro and adjusted _____

Q7. You cannot change the number of factor levels in the *tactical* GrassGro Analysis
called "Seasonal Outlook". _____

## Exercise 3

Management question to analyse: You own a steer fattening enterprise at Glen Innes in northern NSW.
Imagine that it is 15 August 2002 and pasture supply is less than usual for this time of year. What is the
likelihood of these steers reaching 450 kg by the end of January on pasture alone?

(a) What type of Analysis is this? (Historical or Tactical) _____

(b) Why?_____

_____

(c) What was the initial amount of available green pasture (on 15 Aug 2002)?_____

(d) What was the initial live weight of steers (on 15 Aug 2002)? _____

(e) What is the likelihood of the steers reaching 450 kg by the end of January on pasture alone?

_____

(f) What is the likelihood of needing to supplement these steers to maintain body condition
between August and the end of January? _____

(g) Before you ran the tactical analysis, what did you need to understand about the enterprise?

_____

_____

(h) To examine the management of the farm system used in the tactical analysis, what section
of the GrassGro interface did you need to use?

_____

_____