Overseer

OverseerFM User Guide

Disclaimer

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Updated October 2019

The User Guide will be updated as required.

The online published guide will be the most up-to-date. It is the responsibility of the User to ensure they are using the latest update.

1 Table of Contents

2 Purpose of this Guide

Welcome to OverseerFM, the new software that is easy to use and delivers modelling results in a way that supports great conversations between farmers and their advisers.

This guide describes the OverseerFM application and provides valuable information to enable you to get the most out of the nutrient analyses. It is set up in 10 sections, aligned with the software's data entry process. Sections include step by step data entry instructions and context separated in coloured boxes as set out below:

- The text in the green boxes provides context around the decision you will have to make when entering the data for that section.
- Text in blue boxes describes new terms in OverseerFM that you may be unfamiliar with.
- Text in the grey boxes provide guidance on choosing your data consistently as per the Best Practice Data Input Standards.

Information about the rationale for specific data entry fields is also provided within the software itself as help messages. If you want to know more detail about the science modelling behind Overseer please refer to the Our Science page on our website.

If you have further questions please feel free to contact the Overseer Helpdesk at helpdesk@overseer.org.nz

3 Overview of OverseerFM

OverseerFM is New Zealand software that enables farmers and growers to improve nutrient use on farms, delivering better environmental outcomes and better farm profitability.

Various forms of Overseer software have been available as desktop applications since the early 2000's with an online version available since 2012. In June 2018, Overseer Limited released the OverseerFM software service.

OverseerFM places the farm at the centre of the software, allowing easy sharing of farm data between different users and organisations who have permission to access it.

There is one account per farm, and permissions to access the account are controlled by the farm account owner (usually the farmer or farm manager). Access can also be managed by the farm account administrator/s, which is often the organisation that set up the account.

Having a single farm account centrally stored is a key element to OverseerFM. The secure and easy sharing of farm information reduces the duplication of effort when many professionals model the same farm, it increases the consistency of analysis through everyone working off the same information, and it allows farmers and farm managers visibility of their farm nutrient analyses and control over what happens to their farm information.

OverseerFM is a decision support tool, not a decision-making tool. The information provided by OverseerFM allows an assessment of various management approaches and as such must be interpreted as an indication based on an understanding of the modelling approach, and not as an absolute value.

New terms used in OverseerFM

OverseerFM uses several new terms that are described below;

The **farm account** represents a single notional farming operation to be modelled. This might be a single farm business, or it might be one operation within a corporate or cooperative farm business.

The **farm account owner** represents the farm, e.g. farmer or farm manager. The owner can grant and revoke permission to access the farm account to organisations or consultancies that they work with.

Farm accounts also have **farm account administrators** who can grant/remove permissions and add other administrators. The person who sets up the farm account is automatically an administrator unless the farm account owner chooses to remove that administration access.

Farm account permissions are granted on an "**organisation**" basis. An **organisation** is a group of users. Some businesses may have multiple organisations (e.g. if they are offering different services). Once permission has been granted all users within an organisation will have access to that farm account.

There are three **access** levels to a farm account:

Owner: Access to the farm account with the ability to grant/remove permissions from any organisation.

Admin: Access to the farm account with the ability to grant access to any organisation. Can only remove access from those organisations that they granted access to. Cannot remove access from owners.

Write: Access to the farm account with no ability to manage any access permissions.

A **Farm Analysis** replaces what used to be known as a farm file or XML. It is a description of that farm management currently in place (Year-End) or a potential future farming system (Predictive & Scenario).

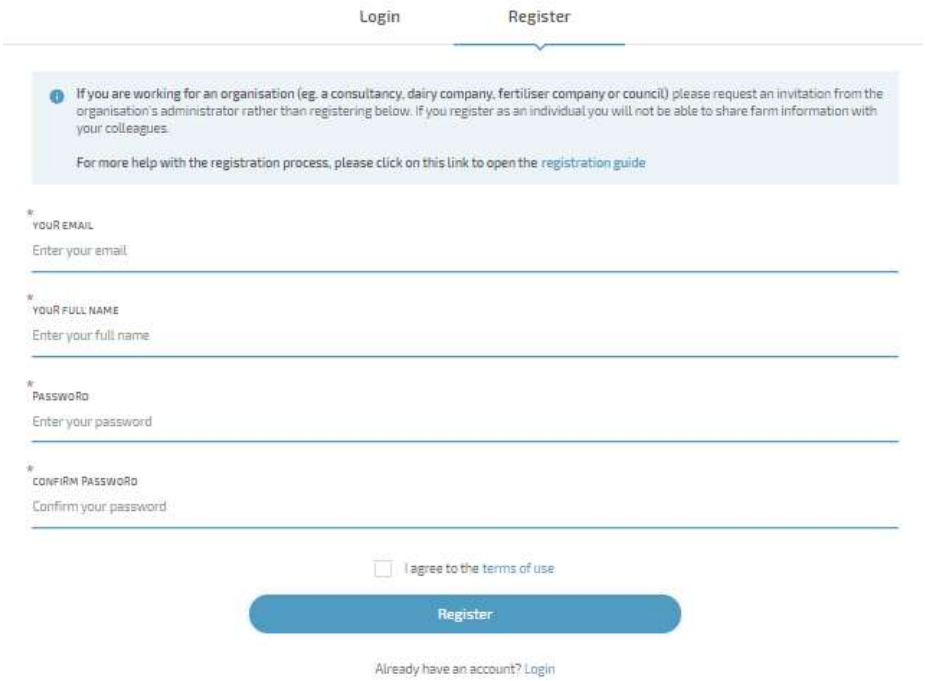
4 Registration for Users and Organisations

All users of OverseerFM will need to register to create a user profile, including previous users of the legacy OVERSEER Nutrient Budgets software. Access to Farm Accounts where farm analysis is undertaken is provided through permissions to organisations. All Users belong to an organisation, either one with multiple users or a single user (outlined below). All users within a organisation have access to all the accounts that organisation has permission to access.

The following sections set out registering as a user, creating an organisation, inviting users to an organisation, and moving between organisations.

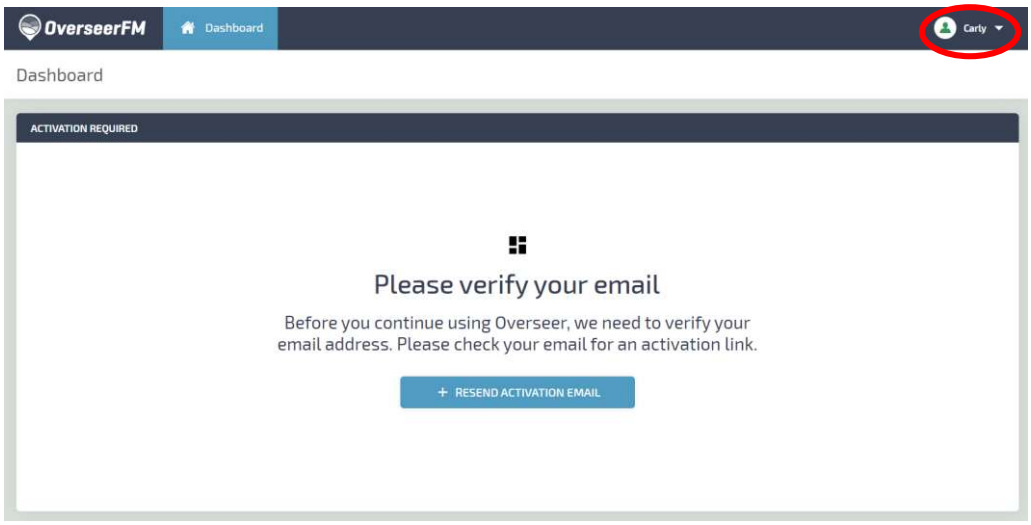
4.1 Registering as a User

To register go to https://fm.overseer.org.nz and select Register at the top of the page. Enter your email, name and create a password. Please make sure you read the Terms of use, checking the box I agree to terms of use means you accept them. You will then see the screen below.

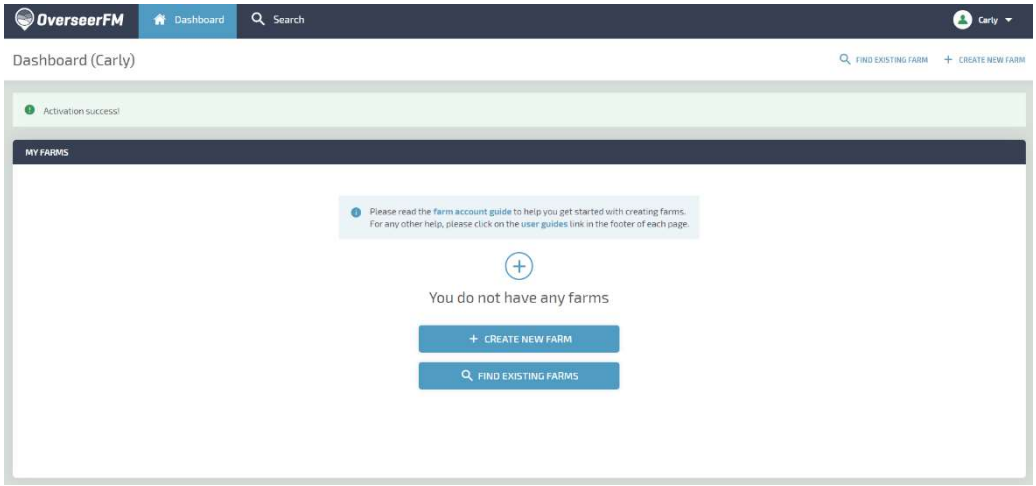


Check your inbox for an email with a link to verify your email address. If you entered your email address incorrectly select your name (at the top right of screen) and edit your email before clicking to resend the activation email. Remember to check your junk mail if the verification email does not arrive in your inbox.

Once activated you will be shown your Dashboard. See section 5.1 for more information on managing your User Dashboard.



Once activated you will be shown your Dashboard. See section 5.1 for more information on managing your User Dashboard.



4.2 Registering an Organisation

OverseerFM automatically creates an organisation when you register. The organisation will have the name that you entered when you registered.

If you want to operate as an individual user, you do not need to do anything.

If you need to create an organisation that will include multiple users or have been invited to an organisation you will need to follow the instructions below.

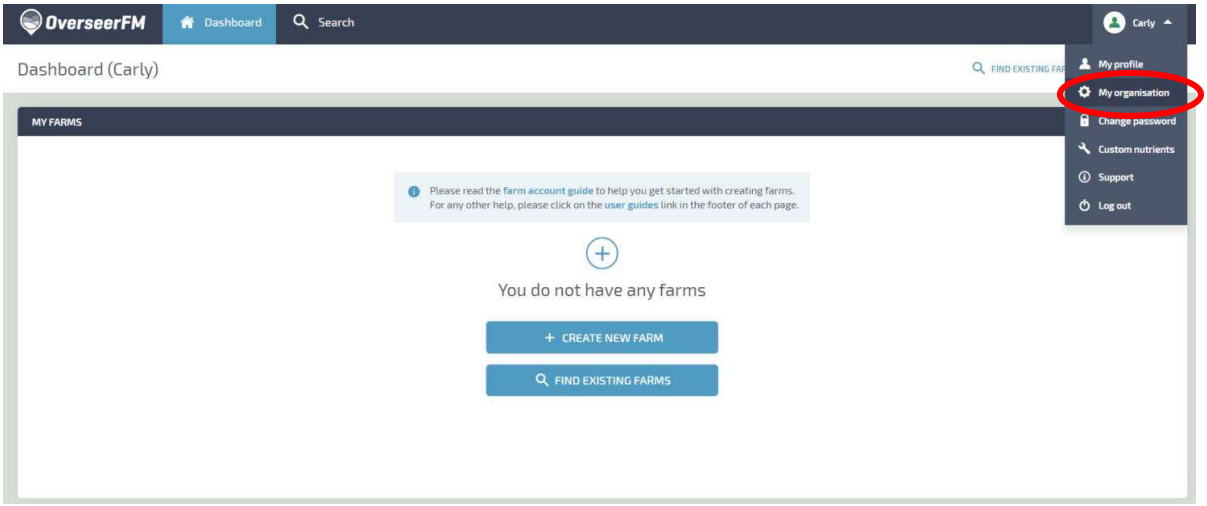
Before registering your organisation, check with your colleagues that it has not already been registered in OverseerFM. If you are unsure, please contact the Helpdesk.

Setting up an Organisation

If there are many users within an organisation who access the same farm accounts, an administrator can set up an organisation and invite users to join. This applies to farm consultancy organisations, fertiliser consultancies, farming organisations (where they have multiple Overseer users) and councils.

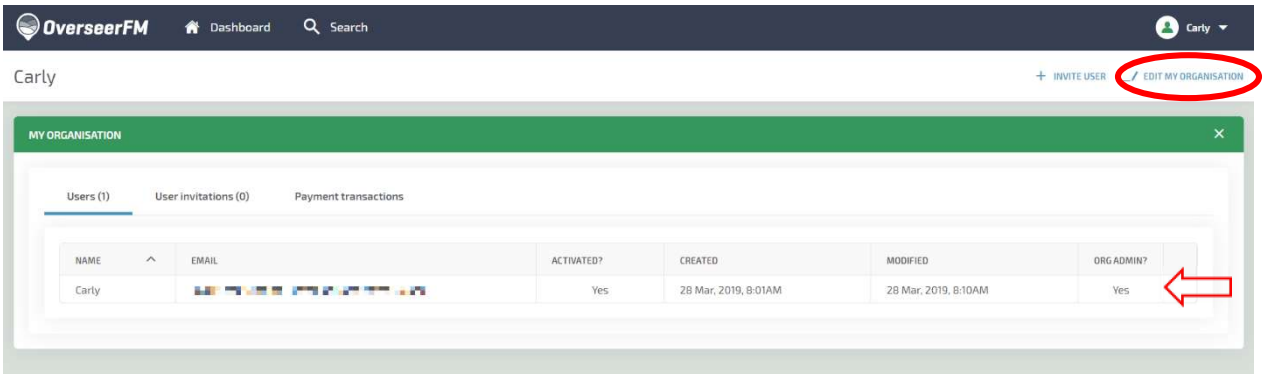
The person who sets up the organisation is the default organisation administrator and has the rights to add/remove other users, including additional administrators.

To create an organisation with multiple users you can edit the Name of your organisation by clicking on the **Organisation Settings** and editing the **Name** field. You can then start to invite others to join the organisation.



By using your registration to set up an Organisation you will automatically become the Organisation Administrator, but you can add other administrators to the Organisation by clicking the square under **IS ADMIN?** This will allow them to invite and remove users.

The default name for the organisation will be your user name. Select 'Edit my organisation' to change your organisation's name. If you have been invited to join an organisation but you are not an administrator of that organisation, the 'Edit my organisation' button will not be available to you.



Inviting people to your Organisation

To invite other users to join your organisation, click on Invite User and enter their email address in the pop-up screen. You can only enter one email at a time. They will then be sent an email asking them to accept the invitation. If they are not yet registered users, their invitation will take them to the registration page, and then ask them to accept the invitation. The invited user will show as pending until they accept the invitation.

Accepting an invitation to an Organisation

If you are invited to join an organisation and do not have a User Profile you will receive an email with a link that will take you to the registration page. Once registered you will need to accept the invitation notification on your dashboard.

Moving between organisations

Users can only belong to one organisation at a time. If a user wishes to move to a different organisation, the administrator of the organisation they are moving to sends them an invitation, and their acceptance of that invitation removes them from their previous organisation.

If they wish to leave without an invitation to another organisation, the organisation administrator will need to remove them using the "X" remove button. The user then becomes an individual organisation (default to their user name), and the user will have not access to any farm accounts (even if they set some up previously). They will need to either request access or set up new farm accounts.

Shared Workspace

OverseerFM creates a shared workspace where every user with permissions to access the farm account can see and use any Year End Analysis in the account. This allows farm account owners to view and manage who has access to their farm information and avoids duplication of effort by allowing historic analyses to be available for updating and to support predictive or scenario analyses.

Every user with permissions to access the farm account can view and edit the Year End analysis. Changes are logged by time and user, but not by what has changed. It is therefore important to take care when making changes to Year End analysis.

Predictive and Scenario analyses are visible to other users within the organisation. Users can choose to share them with the farm account owners or make them available to anyone that has farm access.

If you have any questions about setting up your Organisation, please contact the Helpdesk at helpdesk@overseer.org.nz.

5 Farm accounts

Farm Accounts are where modelling of the farm takes place. A Farm Account in OverseerFM is an account that represents a single notional farming operation to be modelled. This might be a single farm business, or it might be one operation within a corporate or cooperative farm business.

OverseerFM allows multiple users to access a single Farm Account to undertake different types of analyses. Access to the Farm Accounts is controlled by the Farm Owner or Administrator.

The following sections provide detail on creating Farm Accounts, managing access to Farm Accounts, and managing the Farm Accounts displayed on your User Dashboard.

5.1 User Dashboard

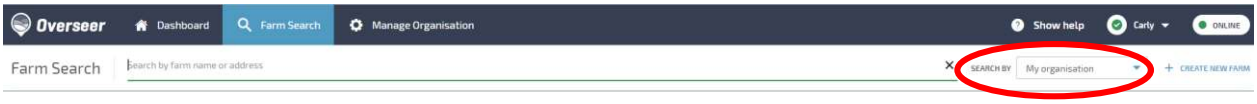
After logging in you are shown your Dashboard. The first time you log in there are no Farm Accounts displayed on your Dashboard.

You can use your Dashboard to display the farms that you are currently working on (like using favourites). To add Farm Accounts to your Dashboard you need to select farms using **Farm Search** and click on the MY FARM box. You can remove them by clicking on the MY FARM box and refreshing.

Any Farm Accounts that you create will automatically be added to MY FARMS on your Dashboard.

Searching for an existing Farm Account

To search for an existing Farm Account, you can use **Farm Search**. Farm Search allows you to search via My organisation, Publications, My farms or All farms.

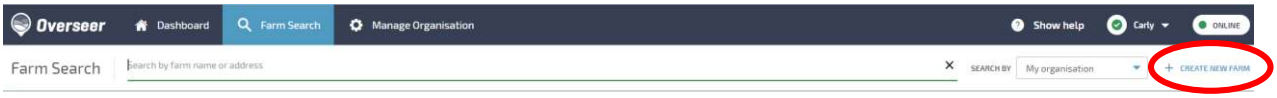


You can search using a Farm name, address or any identifiers added to the Farm Account. When searching across all farms, you must enter 4 or more characters to start the search. All Farm Accounts that match the search are displayed.

Creating a Farm Account

Before creating a farm, it is important that you check to see if the farm is already registered in OverseerFM. This is to prevent duplicate accounts being created for the same farm.

To create a new Farm Account, click on +Create New Farm.



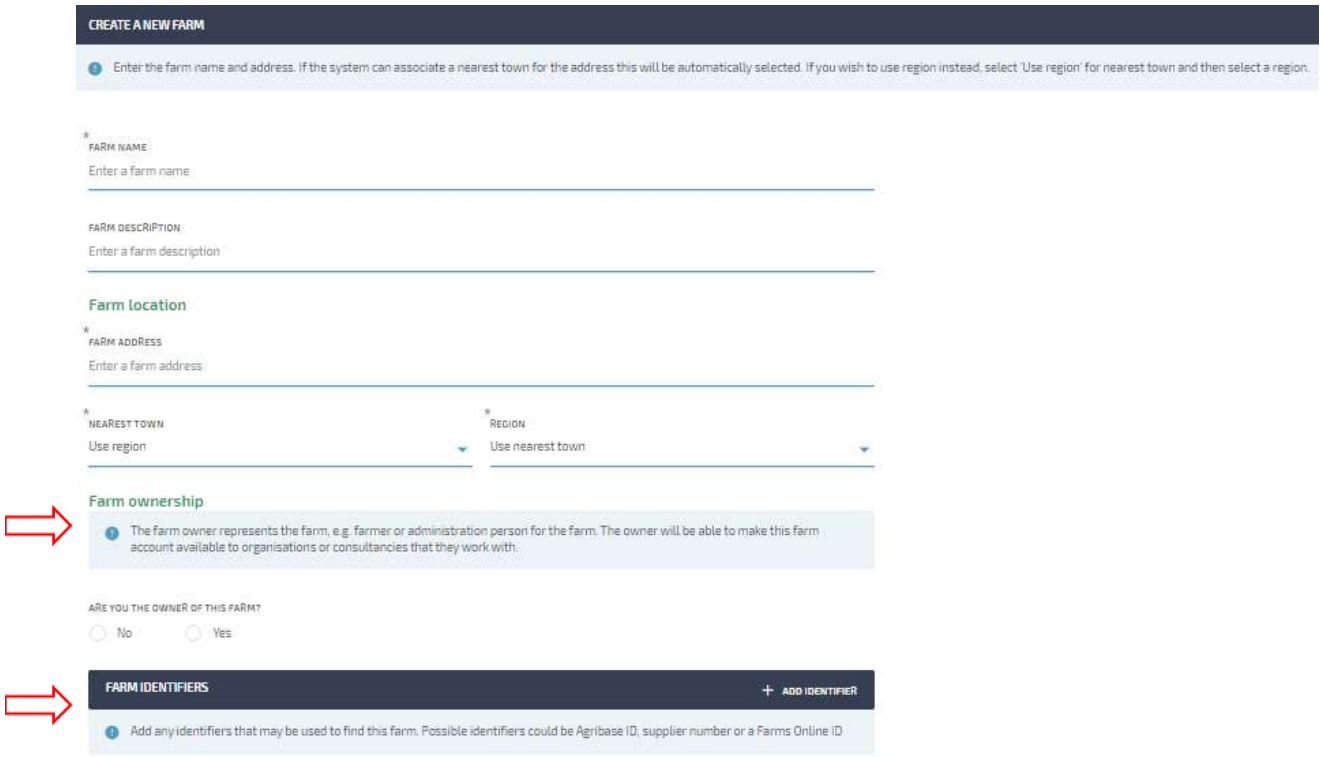
Then enter the Farm Name, the physical Address of the farm. This will situate the Farm Analysis in Google maps and will either automatically populate the Nearest Town or you will need to choose the Region.

You also need to identify the **Farm Owner** (by entering an email address). The Farm Owner can provide permission to others to access to the farm account. If you are the farmer or farm manager, then select yes you are the Farm Owner.

If you are creating a farm account on behalf of the farmer or farm manager, then enter their email and name. An email will be sent to the farm owner for them to accept ownership. The Farm Owner will only be able to manage permissions to the Farm Account once they have accepted the invitation.

As the creator of the Farm Account, your organisation will automatically be granted administration rights to the Farm Account. This allows you to also manage access to the farm account (for more information see the Managing Permissions in OverseerFM Information Sheet).

Finally, you can add a **Farm Identifier** (such as an Agribase ID or Milk Supply number etc.) which will form part of the **Farm Search** information.



Managing farm account access

Farm account owners and administrators can manage access to the farm account. You can view which organisations have access to the farm account by clicking on the farm access link (circled below) on the farm account overview screen. Only the farm account owner can see this full list, while organisations with administrator rights will see the organisations that they have granted access to.

If you are a Farm Owner or Administrator you can grant access to a Farm Account by clicking on +Grant Access and entering the email address and level of access to be granted (owner, administrator, write).

Admin or **write access** will grant that user's organisation access to the farm account.

Owner access will create an invitation for the owner to accept. Pending invitations can be viewed within the manage access screen.

The Farm Owner can revoke any organisations access to the farm. The Farm Administrator can revoke access to organisations they have granted access to.

6 Farm analyses

Once you have created or been granted access to a Farm Account, you can start to create analyses. It is possible to create multiple analyses within a farm account including Year End, Predictive and Scenario analysis. There are some assumptions to consider when creating each type of analyses.

Types of analyses

An analysis describes a farm system for a specific purpose. OverseerFM allows you to choose from three different types of Analysis:

- A **Year End Analysis** to record historical information about how the farm is currently operating. There can only be one Year End analysis for any given year. These analyses are used to baseline and analyse changes over time.
- A **Predictive Analysis** to assess future farming systems. You can use this for informing farm environment plans, consent and fertiliser plans.
- A **Scenario Analysis** to develop "what if" scenarios to assess specific changes.

Comparing analyses

The benefit of OverseerFM is that you can produce current state or baseline analyses to understand the current farm system and then use the predictive analyse to determine potential changes that meet your farm needs. Any real changes made on farm can then be represented in Year End Analyses to monitor change over time.

OverseerFM is designed to allow this comparison and as such requires users to create analyses that represent a farm system in a steady-state (sometimes referred to as quasi-equilibrium). That is, the inputs and farm management practices described are in quasi-equilibrium with the farm productivity.

6.1 Creating an Analysis

You can create an analysis by clicking +Create New Analysis or by uploading an XML file created in the legacy OVERSEER Nutrient Budgets software.

Select the type of analysis and then either pick the year for a Year End Analysis or type in a name for Predictive or Scenario Analyses.

6.2 Uploading farm files from Legacy Overseer (XML)

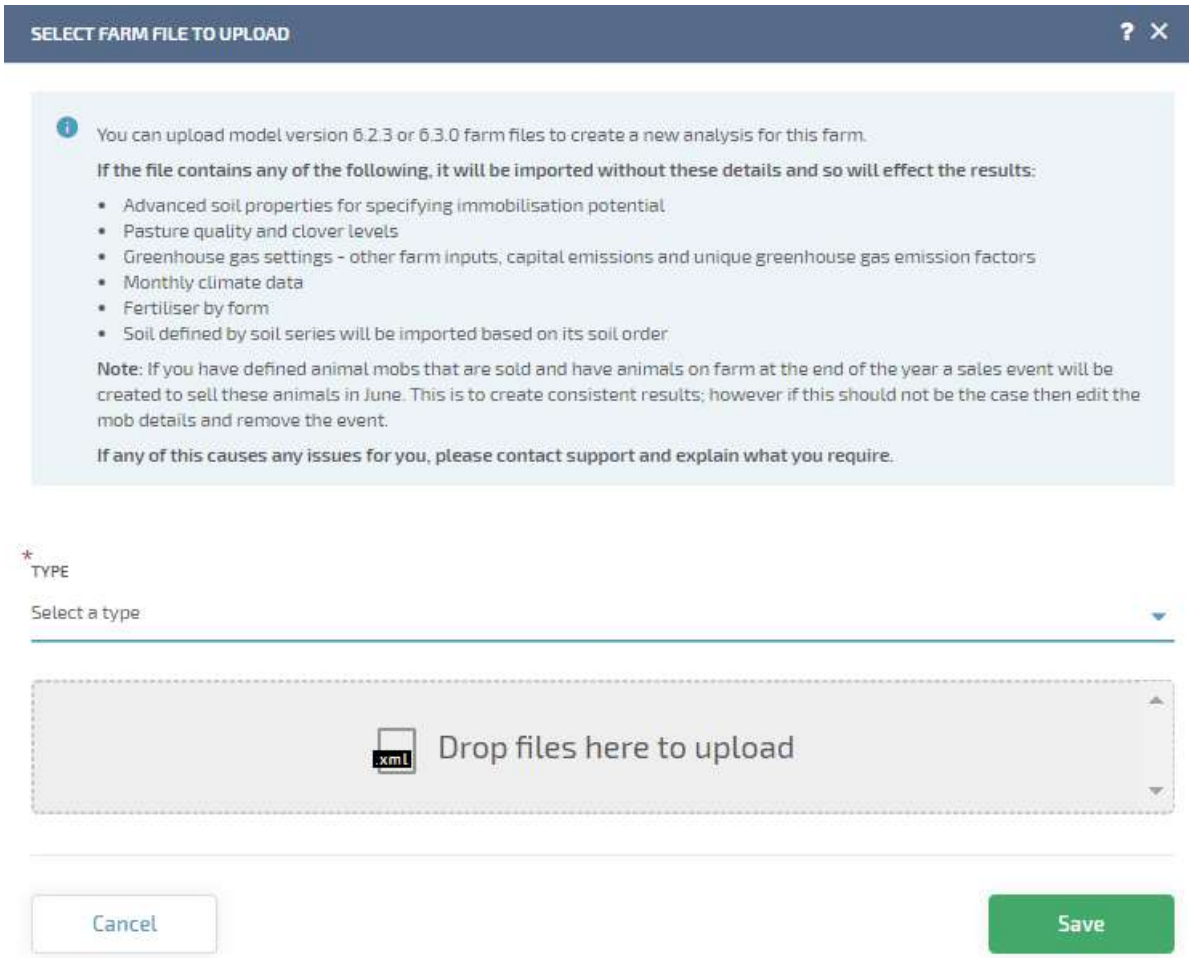
If you are uploading XML farm files into a Farm Account, you need to make sure they were created (or have been updated to) version 6.2.3 or version 6.3.0and 6.3.1 . Files from earlier versions of Overseer are not supported in OverseerFM.

You do not have to reblock your existing farm files before uploading them into OverseerFM. They will run with the existing data. Any new analyses created should be re-blocked to align with the new OverseerFM functions.

This will show the following screen, for you to select a file and type of analysis.

There is no functionality to bulk upload XML files into a farm accounts due to the need to include meta data around the analysis type. Please refer to farm account, section 5, for information on setting up farm accounts.

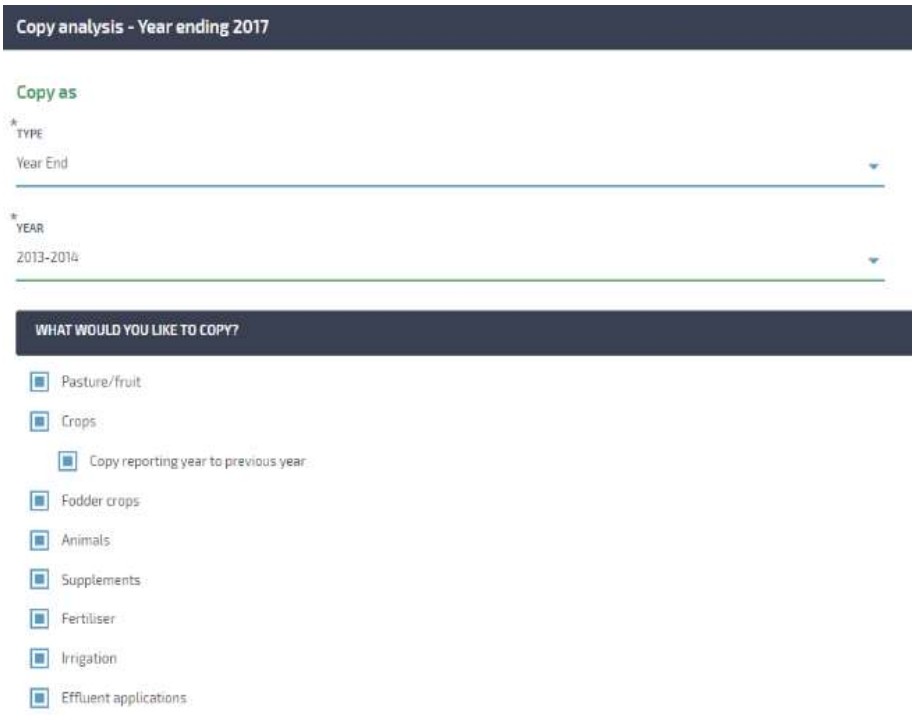
We are continuing to incorporate existing functions from the legacy OVERSEER software into OverseerFM , however, not all data is currently supported. When you click Upload Farm File a pop-up will identify which data is not currently supported, this will change over time. Ensure that you keep a copy of the XML if it contains data that isn't currently accepted.



6.3 Copying an Analysis

You can create a new Analysis by simply copying an existing Analysis from the farm Overview page. Click the Copy button and a screen will pop up to confirm what data you would like to copy (defaulted to all data) and what type of Analysis you would like to create.

You can copy a year end analysis and create a predictive analysis. This will allow a copy of the farm characteristics and management practices. You can choose which management practices you wish to copy, by checking the appropriate boxes.



For **Crop Blocks**, you can copy the reporting year crop data into the previous year section of a new analysis or make a direct copy.

6.4 Sharing an Analysis

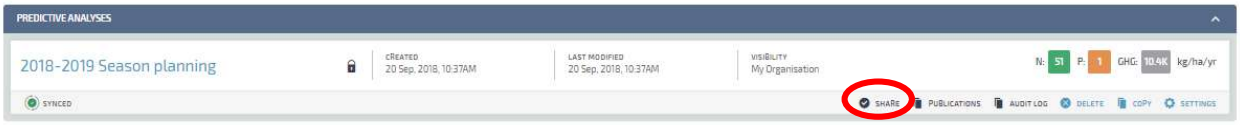
Year End analyses are automatically visible to all users who have access to a Farm Account.

When you create a Predictive or a Scenario analysis this is only visible to your Organisation, regardless of how many other users have access to that Farm Account.

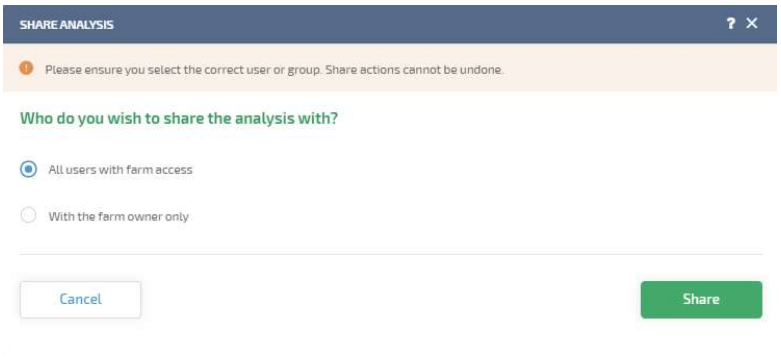
To share a predictive analysis with a user who is not in your Organisation, and who has access to the Farm Account you can "Share" the analysis using the Share button underneath each analysis

There are three visibility settings available when sharing an analysis; **Farm** (All users with permission to access the Farm Account), **Owner** (only the farm owner), and **My organisation** (only users within your organisation). and

To share an analysis, click on SHARE



When you are creating Predictive or Scenario analysis e.g. forward planning for the next season. You can copy a Year End and create a Predictive or Scenario analysis. You can also choose to make the analysis available to whomever you choose.



6.5 Publishing an Analysis

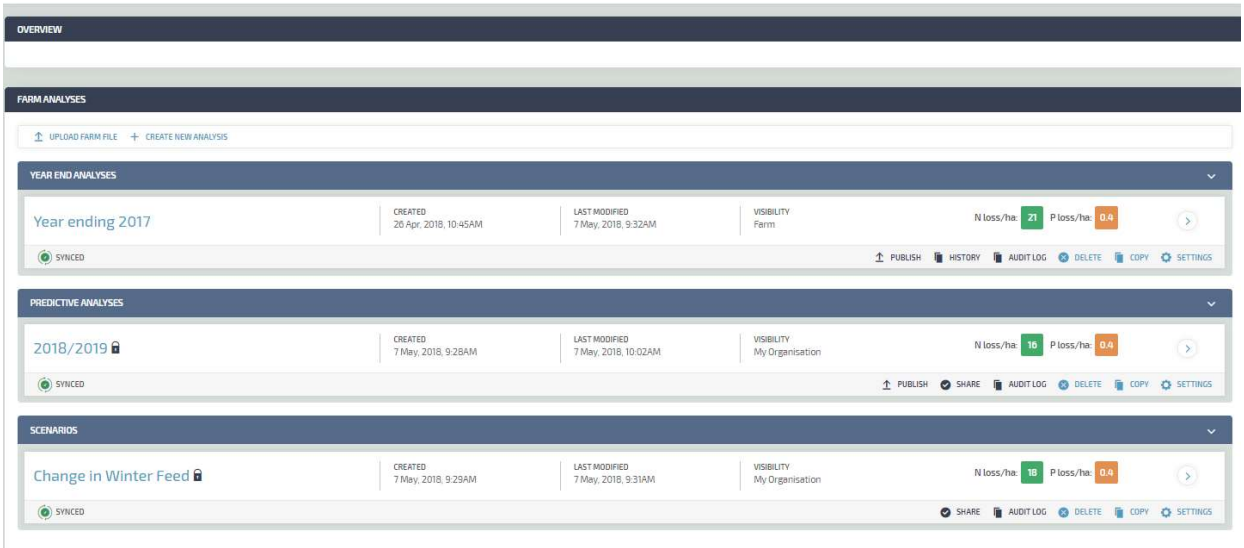
The Publish function is designed to enable you to share a "read only" or reporting version of an analysis with another organisation. Organisations have to be setup within OverseerFM to receive publications. An example of the use of publications is sharing a specific analysis with a Regional Council for a consent application or report.

A publication represents the farm analysis information at the time it was published. Any subsequent changes are made to the new working version and will not be reflected in Publications unless it is published again. An analysis can be published multiple times in both draft and final versions.

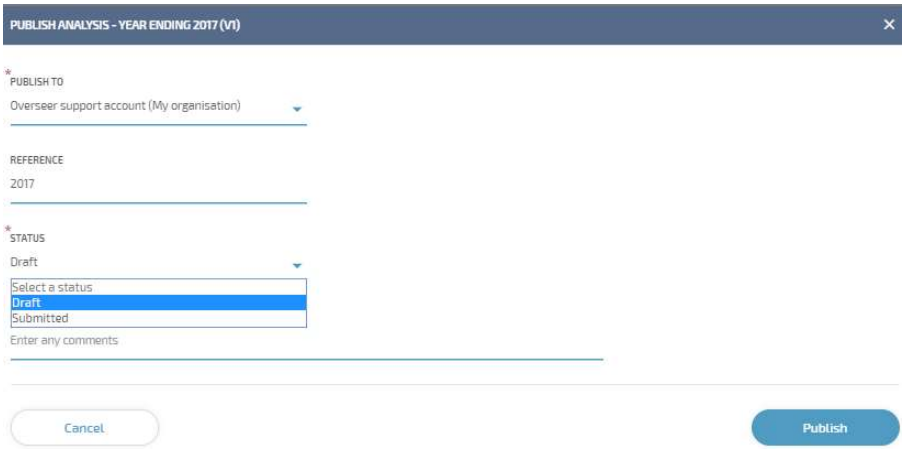
When an analysis is created, the farm description and results are stored within the farm account.

The organisation or council can view the published details as a read-only version of the analysis at the time it was published.

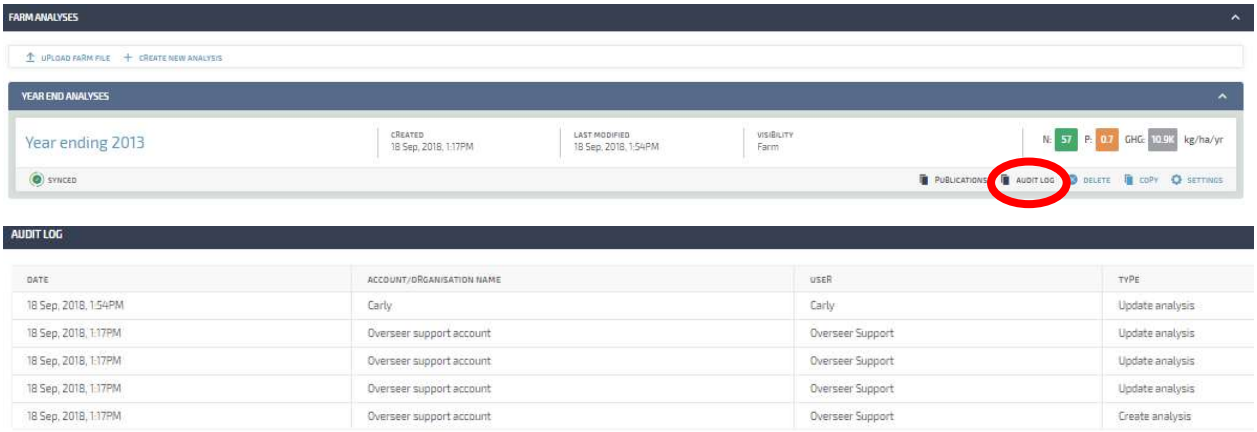
To publish an analysis from the farm account dashboard follow the steps below.



Select ***Publish*** to publish an analysis.



A reference identifier and comments can be included with each publication.



6.6 Audit log

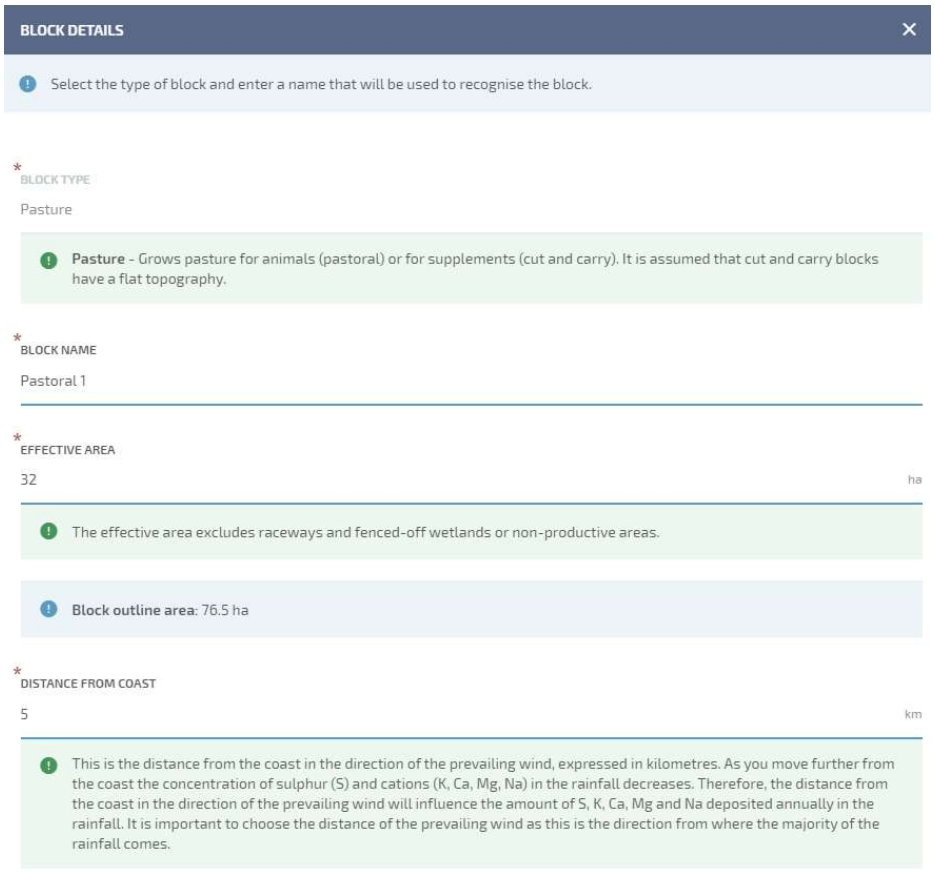
Each time a change is made to an analysis, the data is replaced, and an **audit log** is written to record who made the change and when it was made. When the analysis published to an organisation or to a regional authority (council). This creates a stamped version of the analysis and the results.

To see who has made changes and when changes have been made to the farm analysis click Audit Log located next to **Publication** on the Analysis. This will show date and time of when changes were made, by which User in an Organisation and whether they created or updated the budget.

6.7 Help functions

Throughout the software there are help sections to provide guidance on data entry. This can be turned on by selecting Help from the title bar (right hand) will turn on additional help, indicated by the green circle shown below.

When additional help is turned on extra information in green boxes is provided on the input screens to describe each of the fields and the data required. For example:



Throughout OverseerFM there is guidance information available.

If you see a red '!' it means you that on that page further data needs to be entered to generate results.

If you see an orange '!' it means data that is not compulsory has not been entered and you may want to check that it is not needed. The orange warning messages can be suppressed.

7 Entering farm data

This section covers how and where to enter farm data. There are several key differences in the way data is entered into OverseerFM compared to the legacy OVERSEER Nutrient Budgets software. OverseerFM requires blocks to be created before farm production and management data is entered. Farm management data is then entered and applied to blocks. Further specific information about blocking and animal data entry can be found in factsheets. This User Guide provides *directions on how to enter the information and combines the Overseer Best Practice Data Input Standard to provide guidance on what data should be entered.*

7.1 First Steps to create an analysis

OverseerFM organises information in a different way to the legacy Overseer software. Because of this, the following order is recommended when creating a new analysis.

All blocks need to be created first. This is to allow blocks to be combined when applying management activities such as fertiliser and irrigation. Details for creating blocks are described in this document.

Once the blocks have been defined, use the climate, soil and drainage tabs to add soil tests, snowfall and drainage/wetlands to each block.

If you have pastural or cut and carry blocks, add pasture details under the Pasture/crops tab. Be sure to select whether animals are present when adding pasture.

If you have animals, add these next. Select the animals tab and add each enterprise.

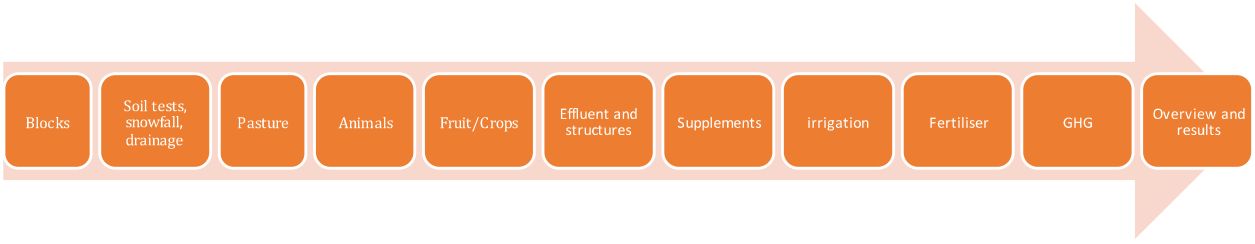
If you have fruit and/or crops, add these under the pasture/crops tab. Be sure to identify any animals that are grazing these blocks.

If you have created a dairy enterprise, open the structures tab to add a dairy effluent system for the farm. Add any additional structures that are on the farm.

If the farm produces/imports supplements, open the supplements tab, setup the supplements and distribute them appropriately.

You can now setup irrigation systems and fertilisers that were applied during the year.

Finally review the farm system and results under the Overview tab.

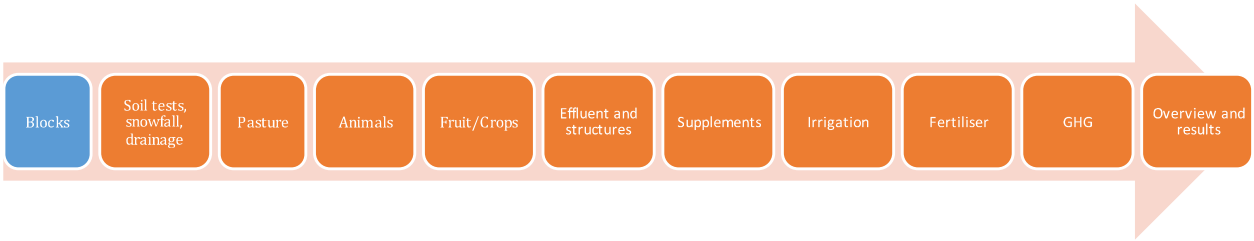


7.2 Blocks

The first step to producing the farm analysis is to create the physical blocks on the farm. The map location is based on the address of the farm. The blocks will need to be drawn on the map shown. The blocks drawn can approximate the farm – the lines on the map do not need to be completely accurate. It is important to focus

on correctly inputting the area and soils data of the block, rather than a accurate visual map. OverseerFM relies on the areas, and the soils to run.

On pastural farms, stock grazing management is complex. To simplify this, a blocking arrangement was developed so that the model did not require detailed inputs of where the animals were.



OverseerFM models the nutrient flows of blocks within a farming system. This information can be used to check for potential pathways of nutrient loss below the ground and into the air.

OverseerFM allows for up to three soils and two or more irrigation systems per management block. Calculations for the identified soils types and irrigation systems are calculated by the software in the background.

Blocks should resemble areas of similar farm management. In the background, OverseerFM will divide the blocks into the soils and irrigation for predicting nutrient flows and budgets.

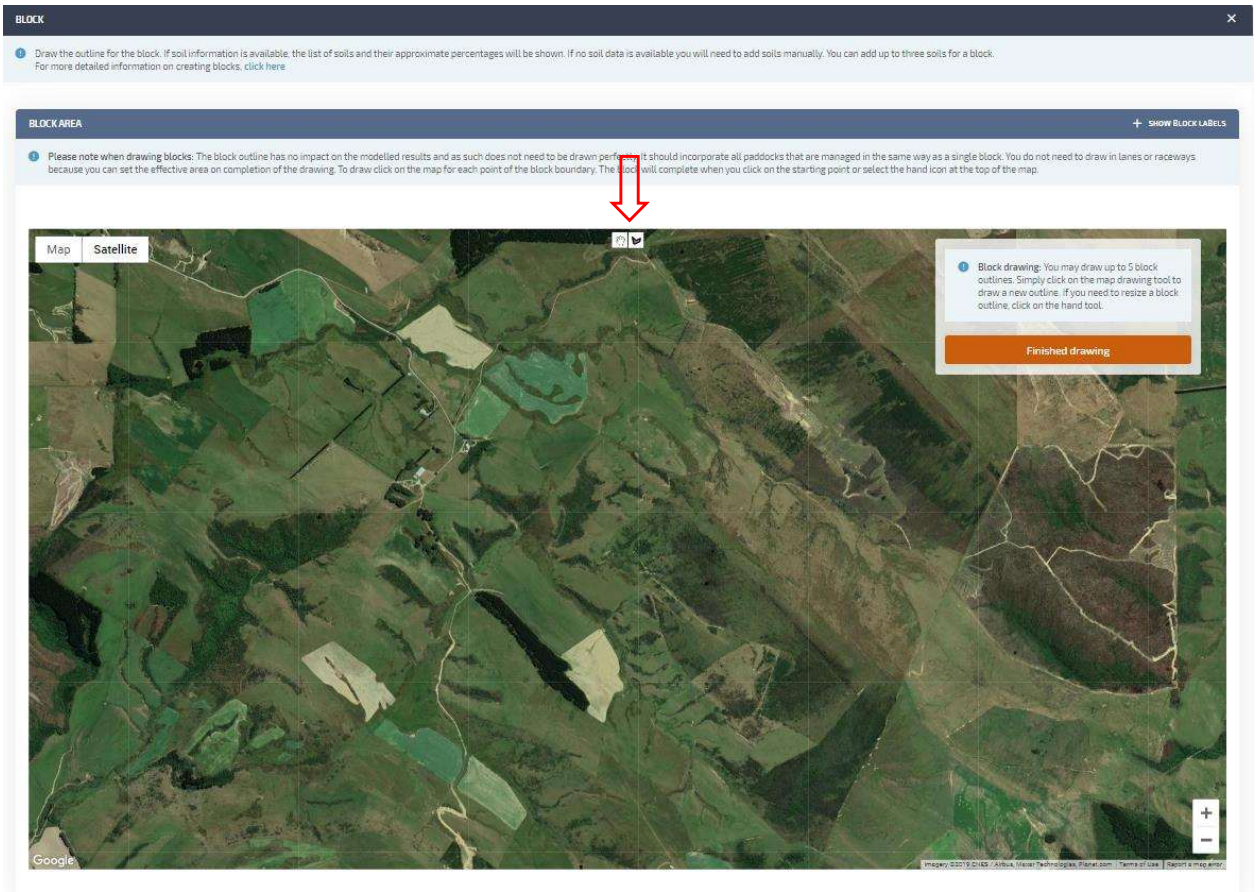
If you import a farm file where the blocks have been divided by soil/irrigation, these will be imported as is. You have the choice of combining the blocks into management blocks or leaving them separated. We would suggest leaving older analyses and only applying the new blocking structure to future analyses.

Creating blocks

After creating a new analysis, the next action is to setup your blocks. Clicking on Add Block launches a map on which you can draw the outline of your blocks. The map shown is based on the address entered for the farm.

The block outlines drawn on the map allows OverseerFM to determine the size of the block, the soils, and the climate – no other spatial information is used. You can create a block that has up to 5 different non-contiguous land areas for both pasture and tree and scrub blocks.

You do not need to draw the blocks perfectly, it should simply be representative of the block such that users can understand which blocks are on the farm. All the information can be changed. It is important to understand the drawing of blocks is mostly cosmetic.



The zoom in and out of the map using the + and – icon ()on the bottom left corner.

The drawing tools ()at the top of the map change the effect of clicking on the map.

The hand icon  enables the position of the map to be dragged by holding the mouse button down.

The shape icon  , puts it into drawing mode.

If you are creating a block with multiple land areas, create a polygon by clicking on the map, outlining the area of a single land area, and finish drawing the polygon by clicking on the starting point. To draw the next land area, click on another part of the map and draw another polygon. You can do this for up to 5 polygons. Once you have finished – click on Finished Drawing.

Confirming the block details

Once the block has been drawn it will launch a screen where you can enter:

Block type - from the drop-down menu.

There are 7 types of block that can be created in OverseerFM. These are:

- Pasture (which can include a fodder crop rotation)

- Crop
- Fruit
- Trees and scrub
- House
- Fenced Wetland
- Riparian

House blocks should be entered on small properties (< 20 ha), unless specific Regional Council guidelines require a different approach. House blocks are important on lifestyle properties in sensitive catchments.

Information on wetland blocks is provided in Section 7.5.

Effective area (Hectares) - The effective area is calculated based on the area of the drawn block. This may be an approximation depending on the drawing and topography of the land. If you know the actual area this should be changed to that value. The calculated area will remain in the blue box for reference.

When total area is entered, the difference between total area and sum of effective area is deemed non-productive area.

What to include in calculating the effective area for all blocks (except fodder crop blocks) is listed below;

- For pastoral blocks the effective area should include grazed areas but exclude raceways and lanes.
- For crop blocks, the effective area should include headlands, tracks within the block, or other areas defined as not cultivated but plants growing, e.g. pasture around fence lines. These can be further redefined under the crop input options. However, farm tracks should be part of the non-productive area.
- Fenced off areas of trees within another block (e.g. trees, scrub within a pastoral block) should be amalgamated and entered as tree blocks.
- Fenced off areas of wetlands should be separated out and entered as a wetland block

Distance from the coast (Kilometres) - Estimate distance from the coast in the direction of the prevailing wind. If prevailing wind direction is unknown assume westerly winds occur. Distance from the coast drives nutrient inputs from rainfall, which has the biggest effect on the sulphur model.

Adding soils to the block

Up to three soils can be added to a block. Each soil is defined as representing a percentage of the block area. Only add dominant soils, within OverseerFM the smallest area which may be allocated to a soil is 10% of the block. OverseerFM defaults to S-Map where it is available and provides S-map soil sibling data based on the locations of the blocks. But other soil data can be entered. Please use the guidance below when choosing your blocks soils.

Please be aware that **OverseerFM does not support soil series data**. If you have an xml file with soil by series, it will need to be changed to upload in OverseerFM.

The Best Practice Data Input Standards – Soil:

1. If available use farm-specific soil map (enter specific soil moisture values or a sibling name) as identified by a trained soil pedologist. http://nzsss.science.org.nz/professional.html . This can be done by first selecting the appropriate Soil order and then adding further definition within the Soil Detail and Advanced Soil Properties section.

2. S-map data - OverseerFM obtains the S-map Online information for the area mapped. Soils can be added to the block as described below.

4. Soil Order – sourced from national scale soil map (Fundamental Soil Layer (FSL).

5. Soil Group – choose from drop-down menu.

Advanced Soil data hierarchy

If your soils is not mapped by S-map, or you are able to access information as stated above in step 1. You can enter soil details, by clicking +add new soil. There are two different areas in which you can enter data – Soil Profile and Soil Properties. Unless stated otherwise use the following hierarchy for Drainage class, Topsoil Texture, Maximum rooting depth and depth to impeded drainage layer, Depth to non-standard layer

1. Use farm-specific soil map, produced by a trained soil pedologist to determine profile drainage class.
2. Obtain this information from S-map Online.
3. Obtain from the Fundamental Soil Layers.
4. Obtain from farmer knowledge.
5. OVERSEER default (this will be determined from soil information).

Is stony

1. Use farm-specific soil map, produced by a trained soil pedologist to determine if top soil is stony (if the stone content in 0–10cm layer is >35% stones).
2. Obtain this information from S-map Online.
3. Obtain from legacy maps and accompanying bulletins.
4. Obtain from the Fundamental Soil Layers.

User discretion is required because even 35% stones will affect PAW. 35% stones aligns with soils identified as very stony soils on soil maps.

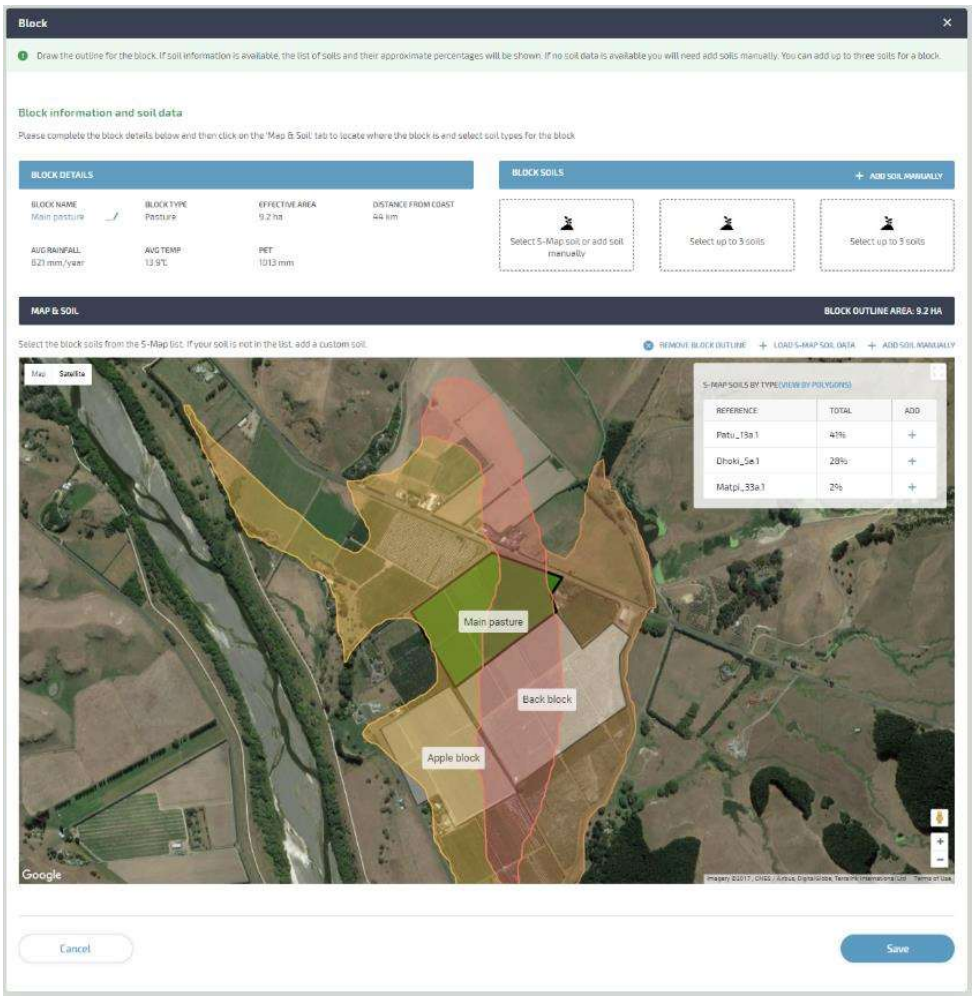
Lower profile (10–60 cm pasture and cropping)

Choices will critically affect PAW and therefore drainage, and hence nutrient losses

1. Use farm-specific soil map, produced by a trained soil pedologist to determine soil texture group of the lower profile.
2. Obtain from legacy maps and accompanying bulletins.
3. Obtain from farmer knowledge.

Using S-map soils

Where available, the S-map soils that intersect the block are shown on the map. The soils (siblings) are listed in a box at the top right of the map.



You can switch between viewing by S-map soils by type or viewing by polygon (soil outline).

S-map soils by type is the default view. This calculates the percentage of the block which is covered by each soil. Up to three soils can be allocated to a block, as described below.

Selecting the "S-map by polygon" view allows you to see details S-map siblings which intersect with your block. The soil areas within S-map are called polygons. Each polygon may contain one or more soil siblings as

defined by Manaaki Whenua Landcare Research. Where there is more than one soil sibling present within a polygon, each soil sibling is given a proportion (percentage of the polygon that is likely to be in that sibling).

Within this view, you can see which polygons intersect with your block (colour coded); what proportion of the polygon each sibling covers (Proportion) and what proportion of the block each S-map polygon covers (Intersection). This view allows you to visualise all soil siblings in the area of your block. You can then use your professional judgement to select which soil types to allocate to your block.

Currently OverseerFM does not return polygons that are less than 5% of the block. Therefore, the total intersecting percentage may not add to 100%.

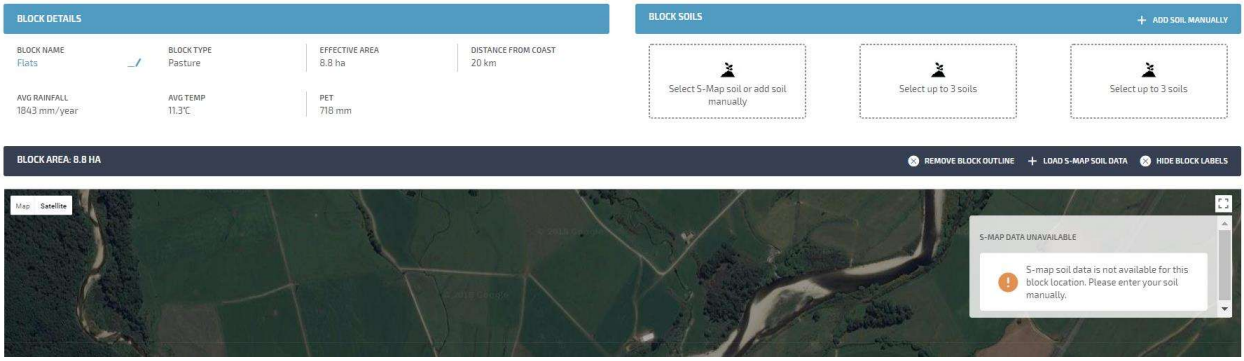
Select '+' for the soils that you wish to add to the block.

Using Advance soil properties

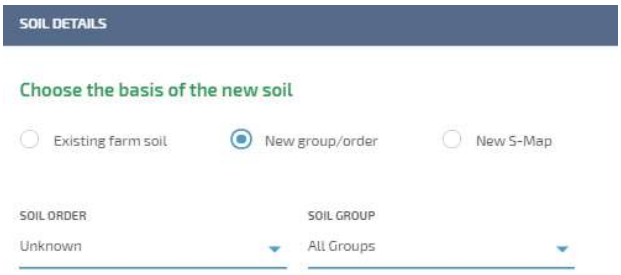
This can be used to alter S-map soils data, if there is a justifiable reason to do so. And when there is no S-map data available. This is where you can enter details on the Soil profile and soil properties.

Using soil order/group

If there is no S-map data available or it is not deemed appropriate, soils can be added manually.

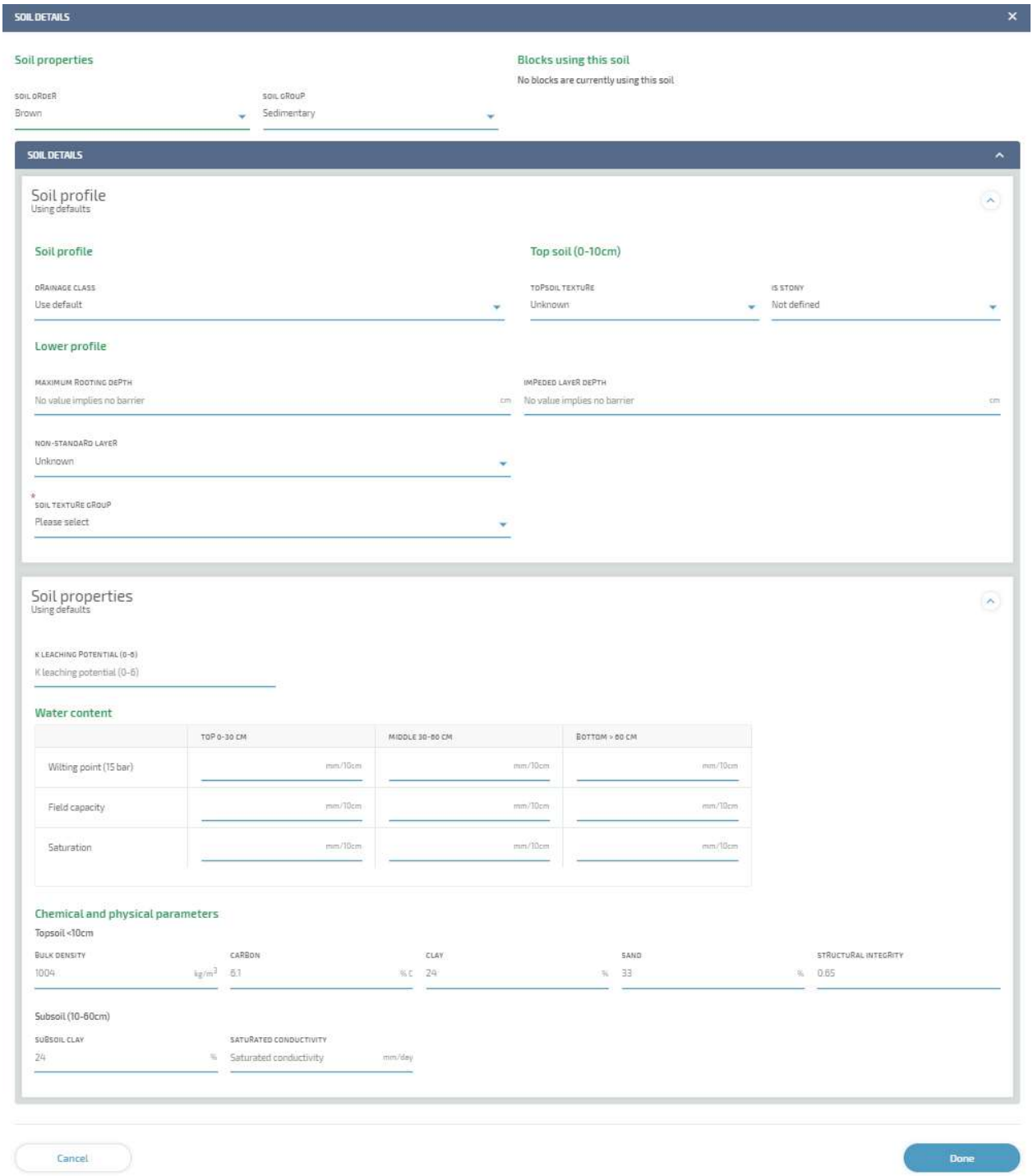


Selecting 'Add soil manually' will launch the following. You can select an existing soil (one that has been used on another block), enter an S-map reference or select soil order and/or group.



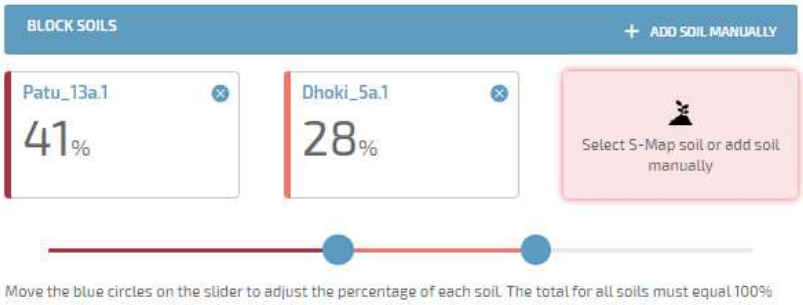
You will see three options available – Existing farm soil, New group/order or new S-Map.

For new group/order, you will need to enter the soil order and soil group from the drop-down menu. This will bring up the soil profile and soil properties. Please refer to the soil data standards when entering this data.



Adjusting soil percentages

Adding soils will populate the block soils section (shown below). You can adjust the percentages of each soil by selecting and dragging the blue circles on the slider. No single soil can be under 10% and the total of all soils must equal 100%.



Use existing farm soil

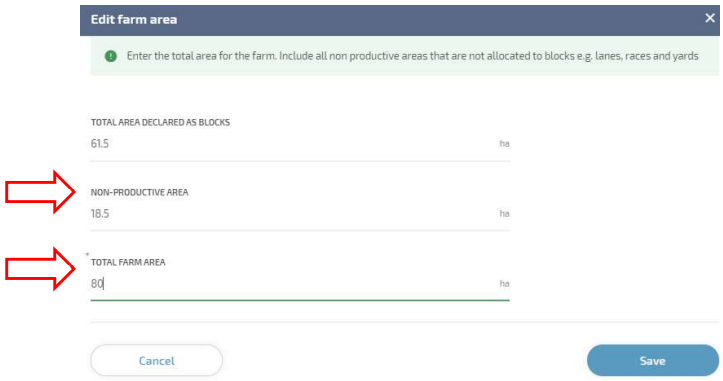
If you have altered the soil properties, there is the option to continue using that soil for other blocks that are created. Once the details are entered, they can be used for multiple blocks, without the need to re-enter the data.

In the soil details dialogue, you will have the option to choose the basis of the new soil. The options are Exiting farm soil, New group/order and New S-Map. In the table below, will show the soils that have already been used in other blocks. By checking the box next to the soil, will bring through all information entered in the advanced soil properties.

Completing block set up

Use the button “Finished Drawing” and then “Save and Create new” to create new blocks. When all block creation has finished, select save and then from the main screen select “I have completed all my blocks”.

The total farm area needs to be entered. The non-productive area is shown.



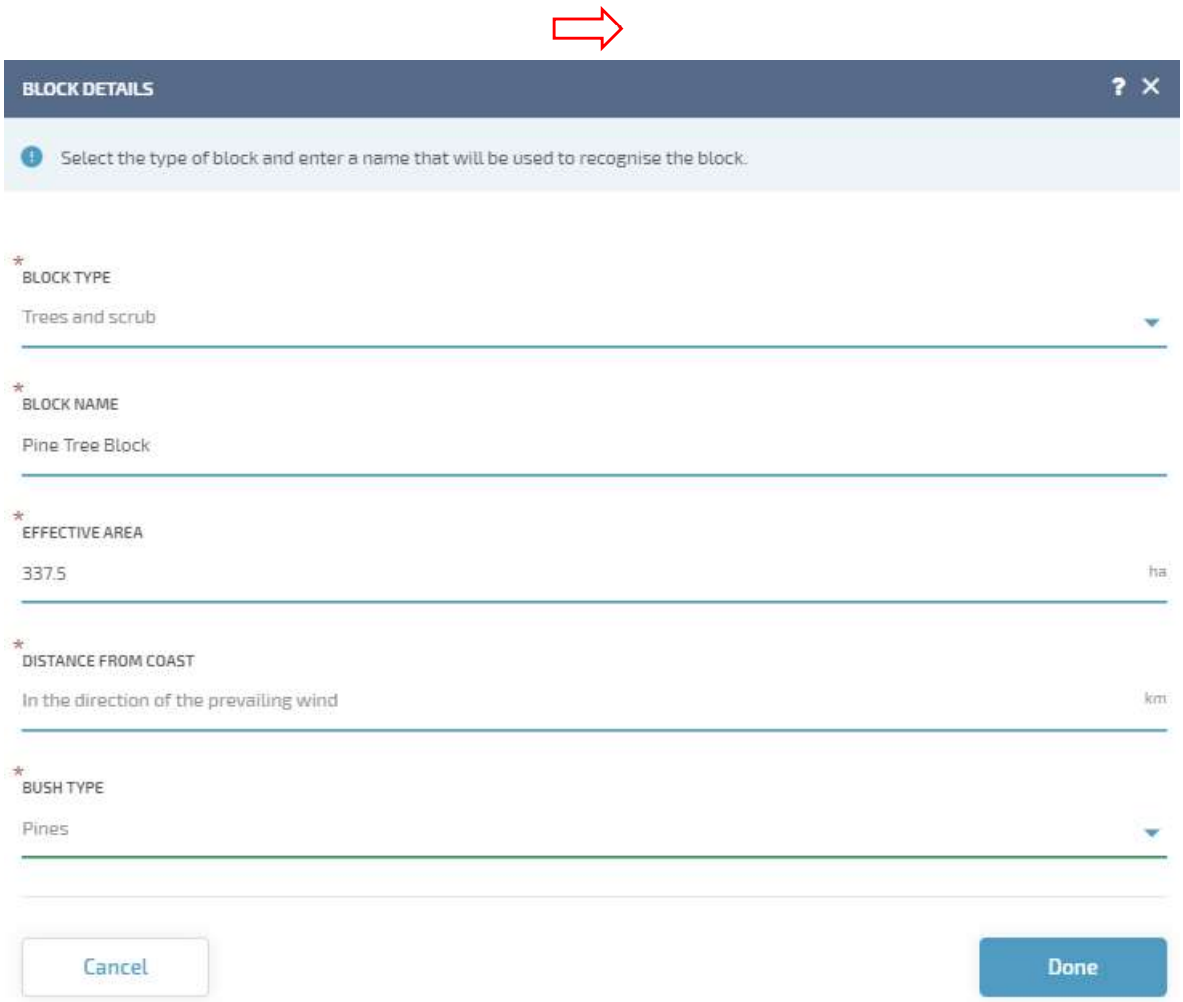
Once this is saved all the tabs to enter the remaining details for this analysis will now be shown.

On completion of the block details, the software will return to the map. The climate details are automatically populated based on location. The ability to enter climate date manually is not available in OverseerFM.

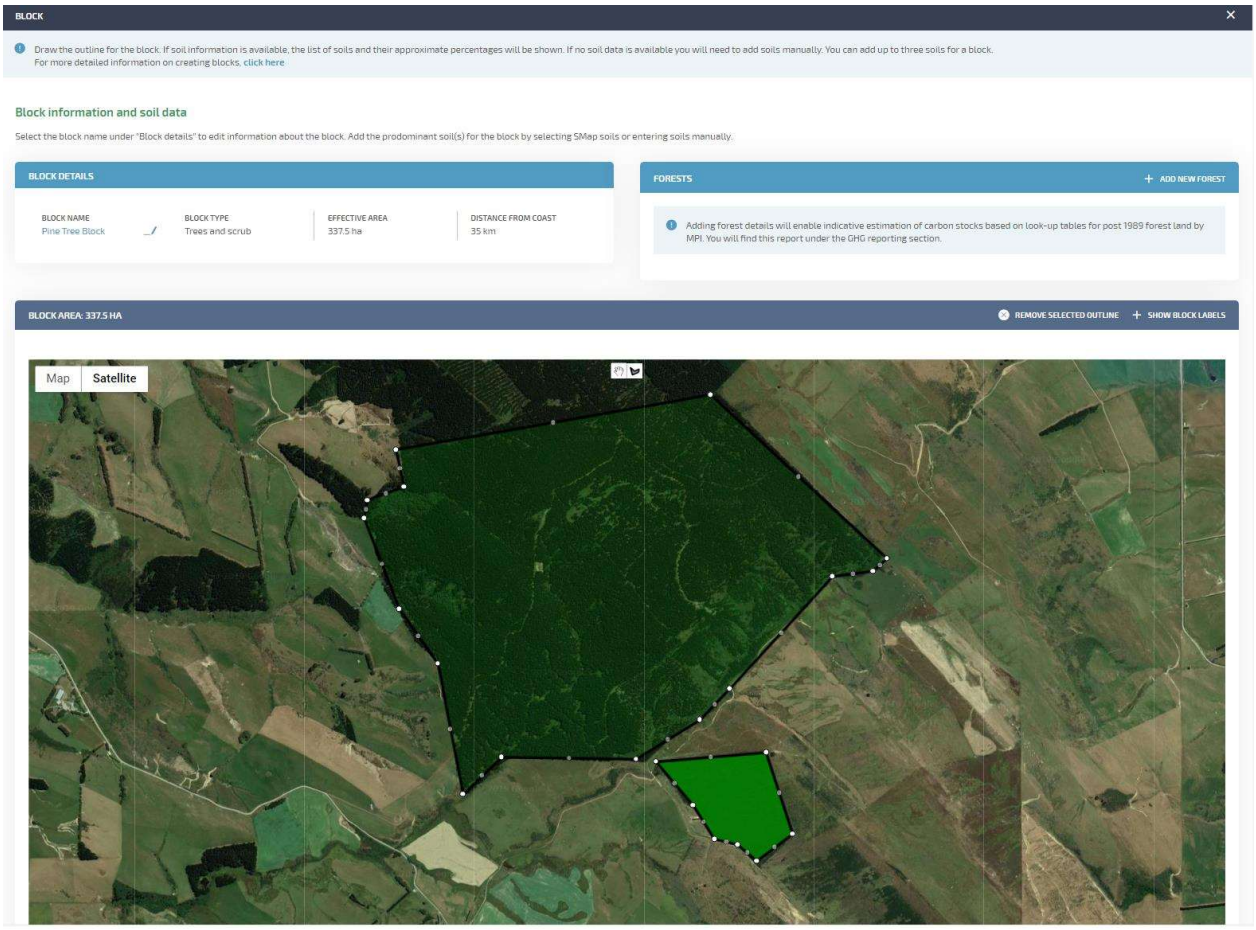
Creating Tree Blocks

Users can now estimate how much carbon the tree blocks are sequestering. The carbon stock tool uses data from the Ministry for Primary Industries Carbon Look-Up tables to estimate the carbon sequestration potential for existing and planned tree blocks. To note, this cannot be used in ETS reporting.

When the Block details shows – select either Pines or Native from BUSH TYPE

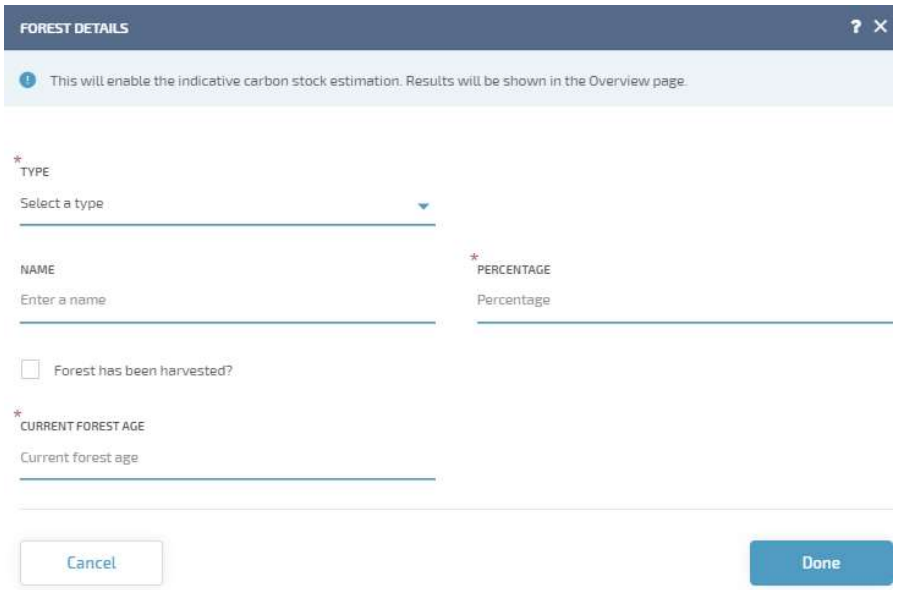


Click on +ADD NEW FOREST on the Block page . You do not need to complete this step if you are not interested in your carbon stock.



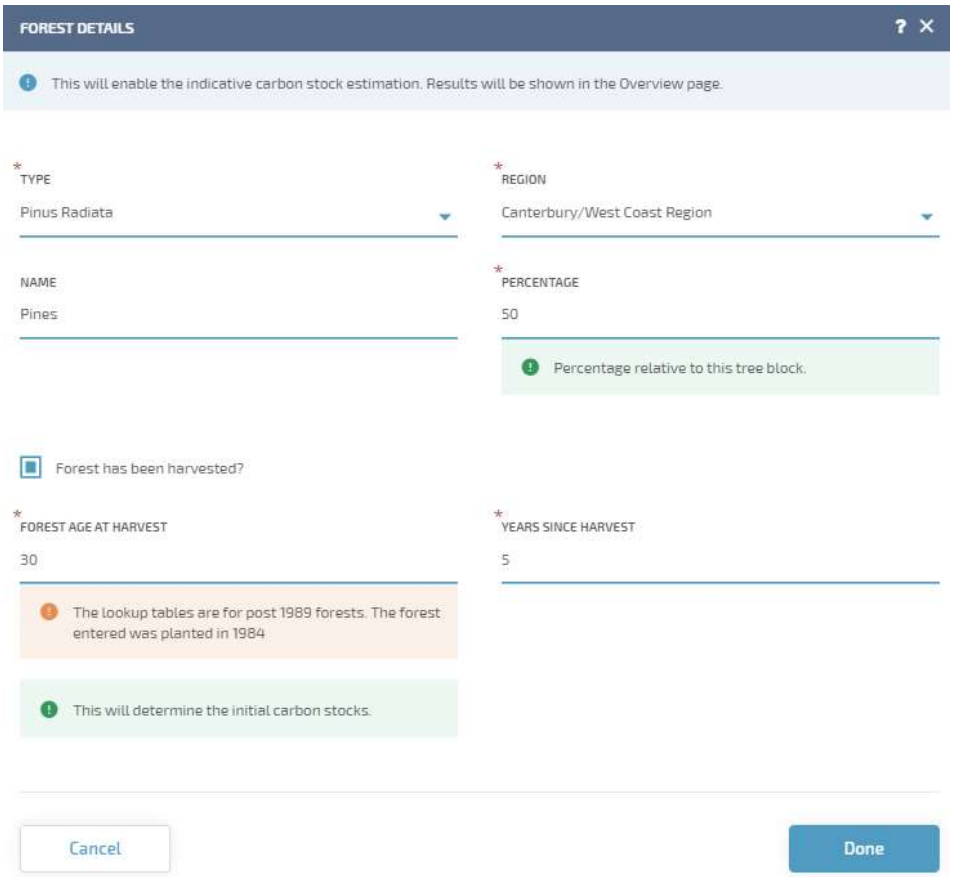
Forest Details will show, depending on what you select, other data entry fields will show. The forest types you can choose from are;

- Pinus Radiata,
- Douglas Fir,
- Exotic hardwoods,
- Exotic softwoods and
- Indigenous Forest.

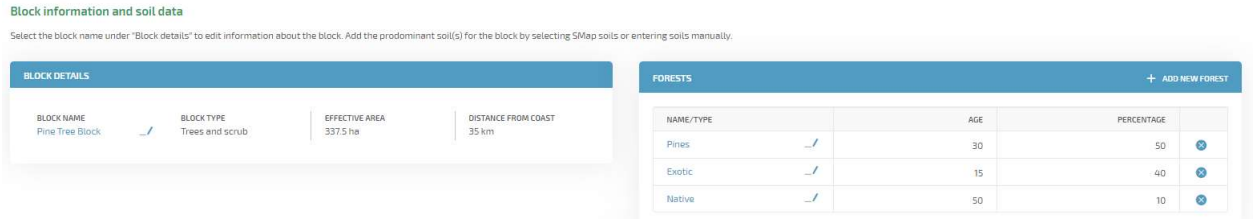


When Pinus Radiata is selected you will be required to select a region where the block is situated.

If the forest has been harvested? Has been checked; extra details will show.



You can add different types of forest by clicking on ADD NEW FOREST. The percentage of each forest will show.



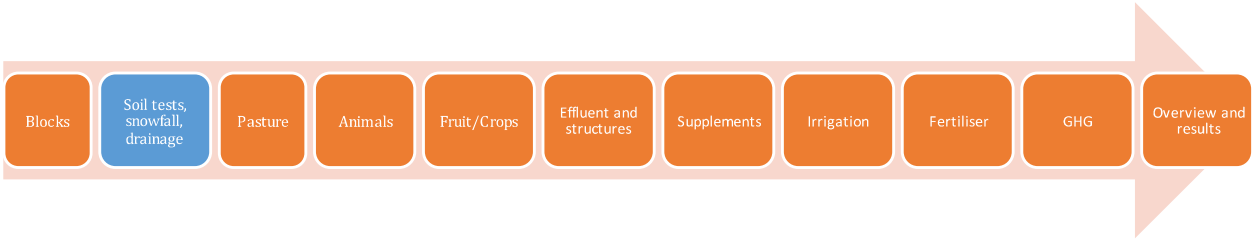
Once finished – Click Save

7.3 Climate

Overseer uses two categories of climate data, namely annual input data and climate distribution patterns. The methodology is described in detail in the Technical Manual Chapter on Climate (Wheeler, 2017). As the model has evolved, the use and importance of climate data within the model has changed. This is because Overseer now uses a monthly time step in the N model, and a daily time step in the hydrology model.

Annual climate data inputs include annual rainfall (mm/year), annual potential evapotranspiration (PET, mm/year) and annual average[1] temperature (°C). Annual rainfall is an important driver of drainage and N cycling, and it is generally known. OverseerFM links to data derived from the virtual climate network (VCN) which provides annual climate data inputs for a given reference point on a 1 km grid. Annual PET (mm/year) and annual average temperature have default values based average monthly temperature over 30-years (1981-2010) data for the region or nearest town on long-term data for the region or nearest town.

Rainfall distribution is based on the pattern of average rainfall over 30-years (1981-2010) data for the region or nearest town. For rainfall, a daily pattern is also determined based on a 'typical' year for fifteen annual intensities and seasonal pattern categories, with the daily pattern within a category based on rainfall for a typical mid-range site in the VCN. Monthly and daily PET distribution is based on a Fourier series for wet or dry days. Monthly temperature is based on the pattern of average monthly temperature over 30-years (1981-2010) data for the region or nearest town. Daily temperatures are not used in Overseer.

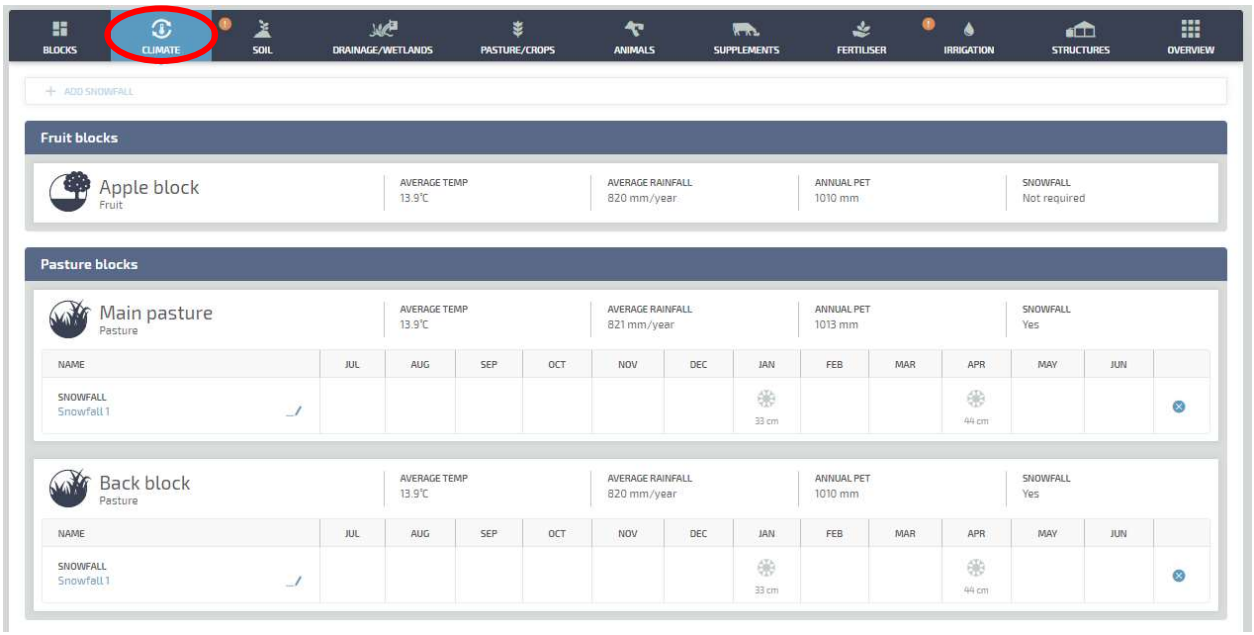


Climate, including snowfall

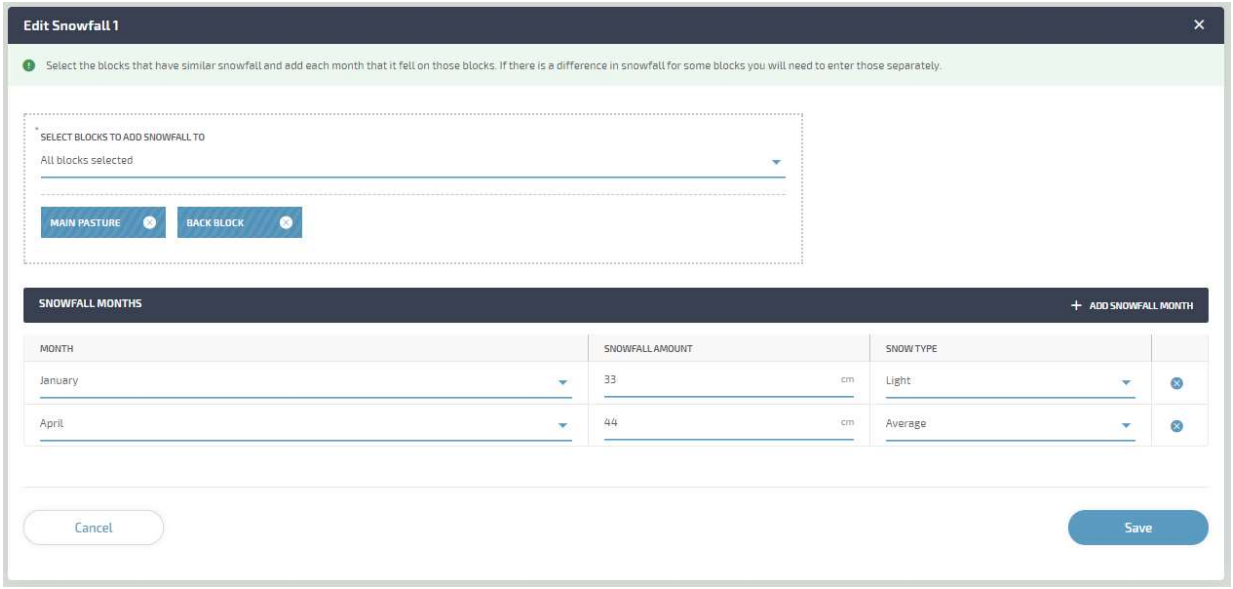
This section covers how climate data is shown in OverseerFM. There is a key difference to Legacy Overseer is the ability to input annual or monthly climate data inputs in no longer available. However, you able to enter snowfall data.

In the climate tab, it displays the climate data for each block that is automatically assigned based on the block locations in the map. This will show the Average temp, Average rainfall, annual PET and snowfall for each block.

[1] In this document, annual average temperature refers to the daily 9 am air temperature averaged over 365 days of the year, and the average annual temperature' is the annual average temperature averaged over several years.



To add snowfall to each block, select +add snowfall.



Select all the blocks with the same snowfall, then add the details for each month. If blocks have different snowfall, add snowfall to each block (from the climate tab main page).

7.4 Soil

This section shows the soil data that has been entered in the blocking of your farm. The ability to add your any soil tests that you have available.

The soil tab shows the soils for each block. This is the data that was retrieved from S-map when the blocks were created. The data shown here is not able to be changed. To edit soil data, go to the Blocks tab. This is where you able to enter soil test information.

Best Practice Data Input standards - Soil tests

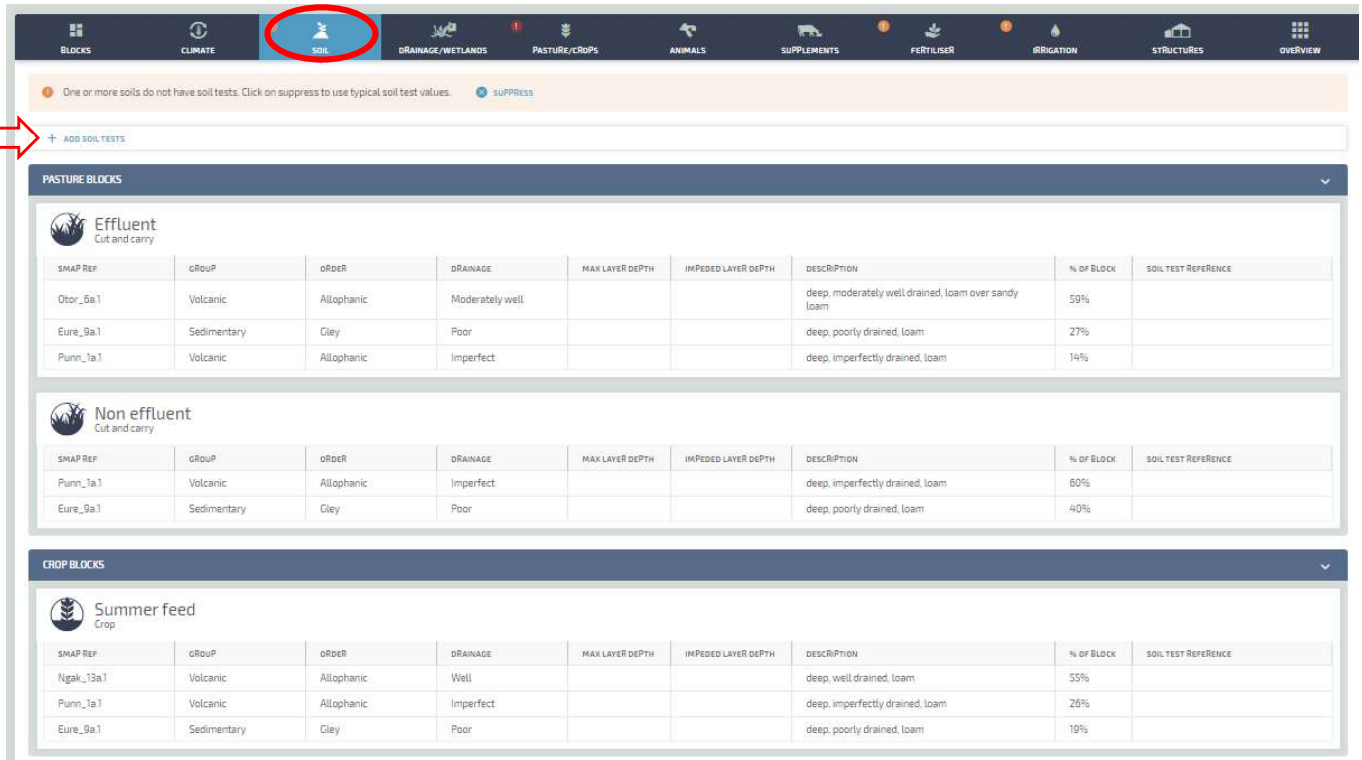
1. Use the most recent soil test results (depth 0–7.5 cm).
2. Where available, enter long-term average (e.g. rolling 3-year average) soil test data.
3. Default soil test values should ONLY be used if the interest is solely on N or greenhouse gas emissions.

Add soil test data

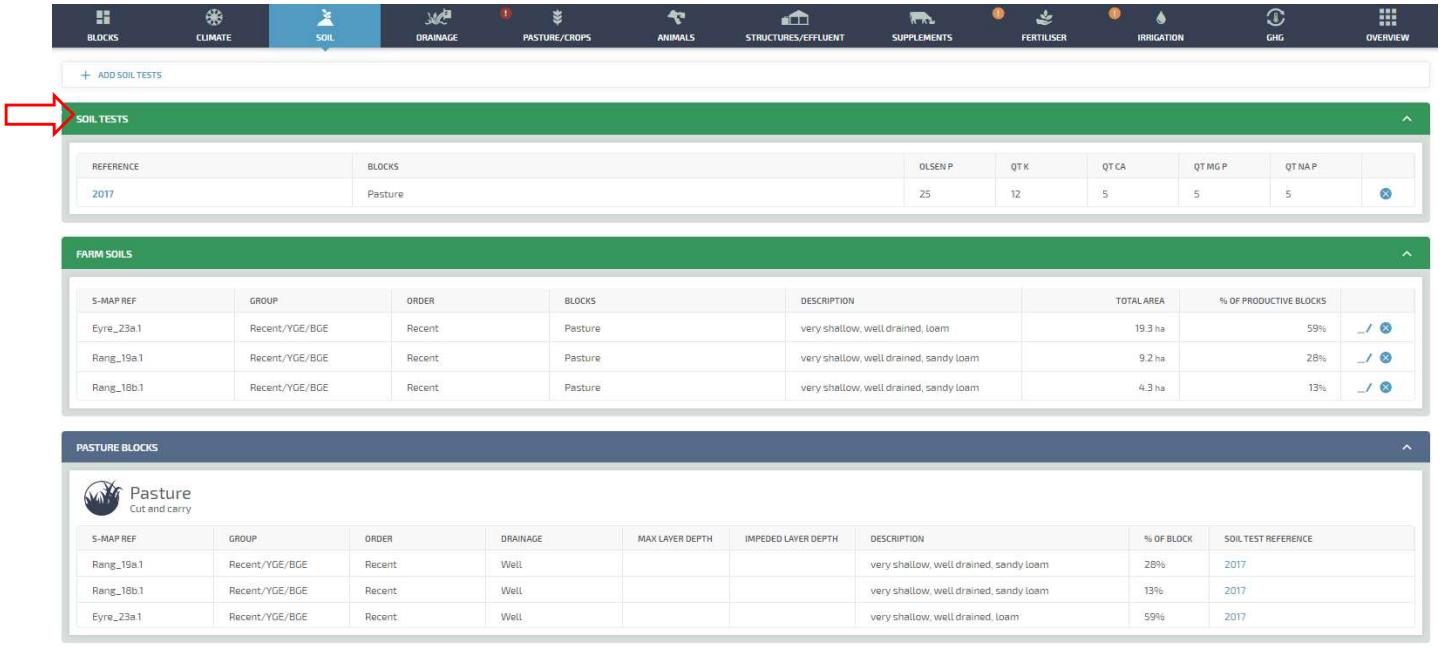
To add soil tests, click on + add soils tests. You can apply soil test results to one or more blocks at a time.

An identifier for the soil test results must be added in the *Reference field.

If there are no soil test results to enter, OverseerFM will automatically use the default values for that block.



The green box at the top of the page will show each soil test entered with the reference and the blocks to which it applies.

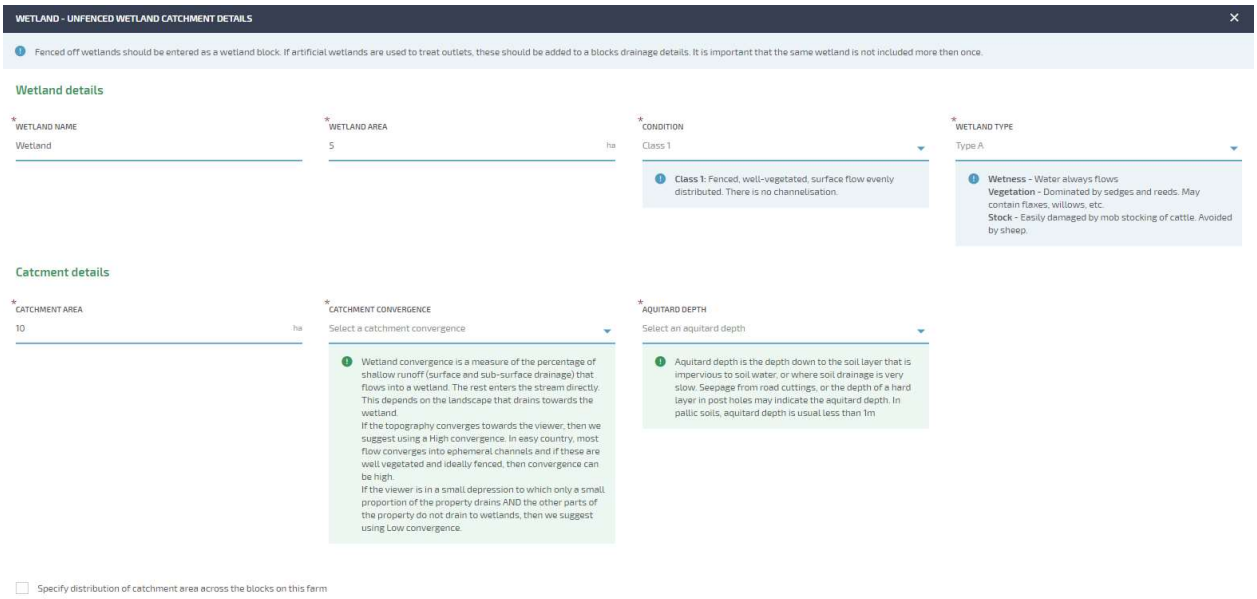

BLOCKS
CLIMATE
SOIL
DRAINAGE
PASTURE/CROPS
ANIMALS
STRUCTURES/EFFLUENT
SUPPLEMENTS
FERTILISER
IRRIGATION
GHG
OVERVIEW
ADD SOIL TESTS
SOIL TESTS
REFERENCE
BLOCKS
OLSEN P
QT K
QT CA
QT MG P
QT NA P
2017
Pasture
25
12
5
5
5
FARM SOILS
S-MAP REF
GROUP
ORDER
BLOCKS
DESCRIPTION
TOTAL AREA
% OF PRODUCTIVE BLOCKS
Eyre_23a.1
Recent/YGE/BGE
Recent
Pasture
very shallow, well drained, loam
19.3 ha
59%
Rang_19a.1
Recent/YGE/BGE
Recent
Pasture
very shallow, well drained, sandy loam
9.2 ha
28%
Rang_18b.1
Recent/YGE/BGE
Recent
Pasture
very shallow, well drained, sandy loam
4.3 ha
13%
PASTURE BLOCKS
Pasture
Cut and carry
S-MAP REF
GROUP
ORDER
DRAINAGE
MAX LAYER DEPTH
IMPEDED LAYER DEPTH
DESCRIPTION
% OF BLOCK
SOIL TEST REFERENCE
Rang_19a.1
Recent/YGE/BGE
Recent
Well
very shallow, well drained, sandy loam
28%
2017
Rang_18b.1
Recent/YGE/BGE
Recent
Well
very shallow, well drained, sandy loam
13%
2017
Eyre_23a.1
Recent/YGE/BGE
Recent
Well
very shallow, well drained, loam
59%
2017

7.5 Drainage and Wetlands

Artificial drainage and wetlands are important features in OverseerFM. Some types of artificial drainage will have a significant impact on nutrient loss. Wetlands are well known sinks. You will have to make some judgement calls on the data entry fields. Riparian strips can be entered as can Grass filter strips. The ability to understand some of the data entry fields may require expert advice.

You can enter artificial drainage or wetlands in the Drainage/Wetlands tab.

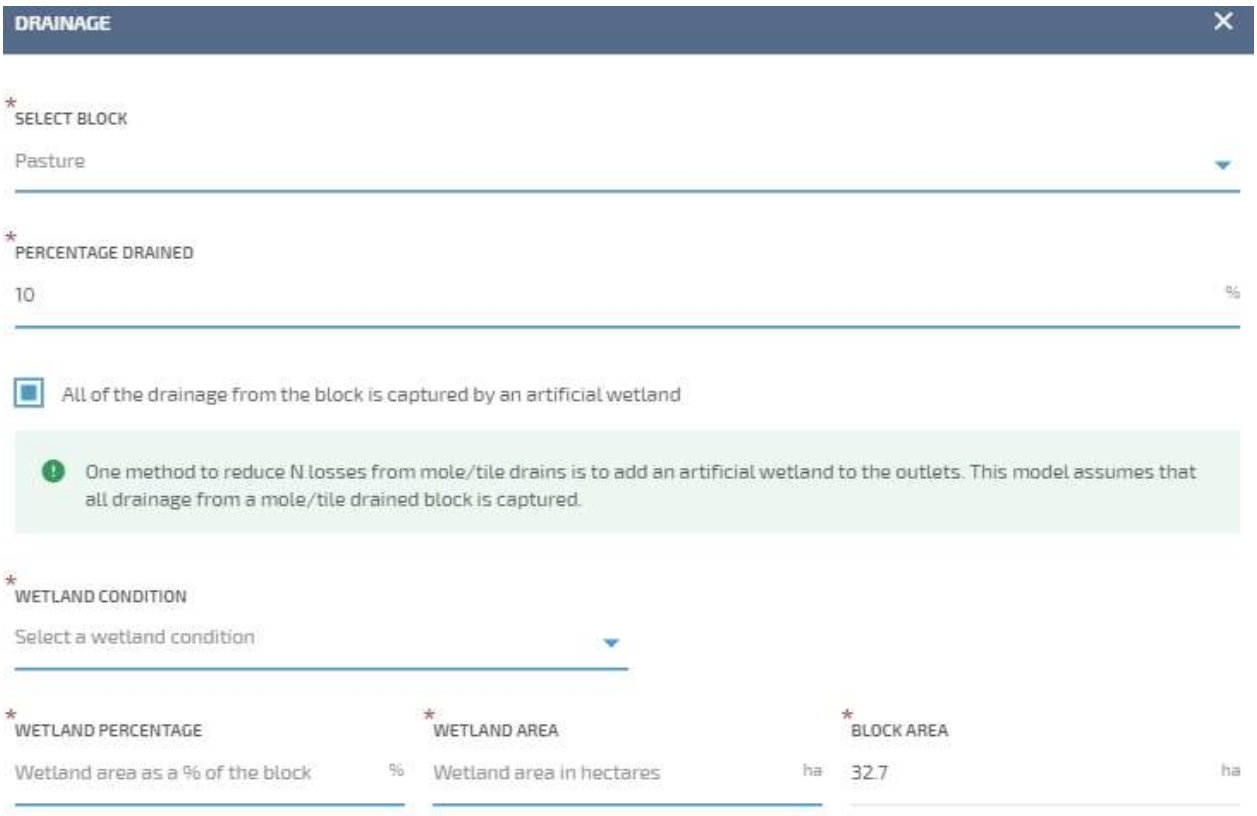
To create an unfenced wetland, click + Add unfenced wetland, and fill in the data required. There is guidance provided in the blue and green boxes.



To specify distrubtion of catchment area across the blocks on this farm, check the box at the bottom of the page. This will make aviable the ctahcment ditribution dialouge box.

To add Mole/Tile system drainage, click + Add drainage.

The following shows the data that needs to be entered for each block.



7.6 Pasture

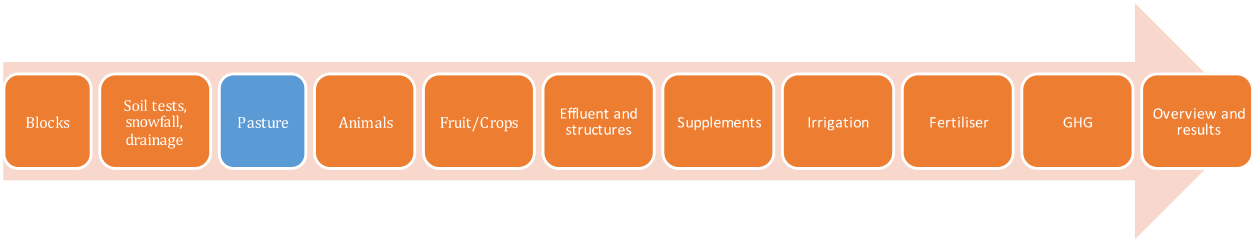
In the Pasture/Crops tab is where pasture data for the farm is entered. As recommended in the Overview, it is suggested that the pasture information is entered before animal and crop information.

This is where the block details for topography, pasture type, and if Animals are present on the block are entered.

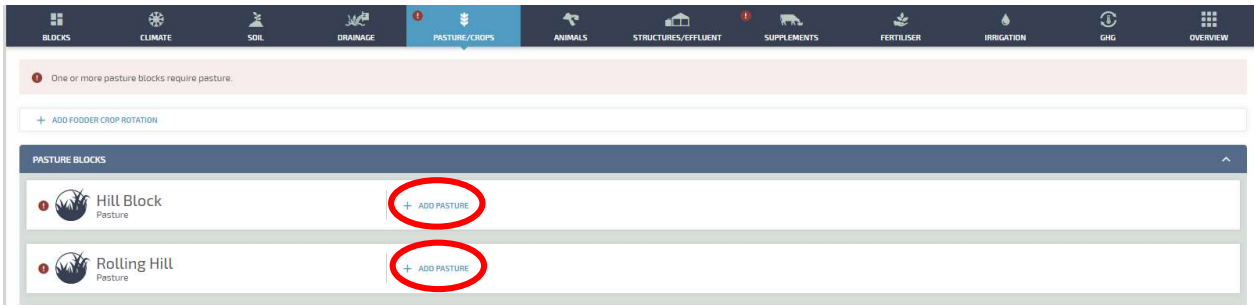
The pasture type affects both energy (metabolisable energy) and the nitrogen concentration, which will impact on nutrient losses. It is recommended that you chose the dominant pasture type in the block.

Not all pasture swards or mixes are available in OverseerFM. If your pasture sward is grazed and is not represented on the drop-down menu enter ryegrass/white clover.

In Overseer, pasture production modelling is driven by the animal's numbers. The type and amount of animals on-farm, their weight and the associated maintenance, growth, gestation, lactation and production has a direct influence on metabolisable energy requirements, which is used to determine pasture dry matter intake, which in turn directly influences nutrient cycling between animals and pasture. Which is why when you change pasture you will see similar pasture grown and intake (T/DM/YR) results for different pasture types, as the animal numbers stayed the same.



To begin entering pasture data for the block, click +add pasture for each of the blocks.



You will need to select the topography from flat, rolling hill, easy hill and steep from the Drop-down list. You can only have one topography assigned to each block. Topography should be entered based on the average slope for the block

Best Practice Data Input standards - Topography

Topography affects drainage, runoff and animal transfer, which will affect nutrient cycling and losses.

Topography should be entered based on the average slope for the block, based on the table below:

TOPOGRAPHY CLASS	ACCESS DESCRIPTION	SLOPE
Flat		0° – 7°
Rolling	Area mostly navigable by tractor	8° – 15°
Easy Hill	> 50% area navigable by tractor	16° – 25°
Steep Hill	< 50% area navigable by tractor	> 26°

You will need to select the dominants Pasture type for each block from the drop-down menu. The options are:

- Ryegrass/white clover
- Browntop
- Unimproved/tussock grasslands
- Summer C4 (paspaplum) pastures
- C4 (Kikuyu) pastures
- Lucerne
- Grass only

You will also need to select if the block has been Cultivated in last 5 years.

If this is a grazed pastural block select that Animals are present on the block. If it is a Cut and Carry block then leave this unchecked.

When the Animals are present box has been checked, the Runoff characteristics data entry box will appear.

For the Hydrophobic condition, use the default it will be practically impossible to determine in the field, and is mostly a within-paddock, rather than whole block, phenomenon.

For Susceptibly to pugging you will need to select from the drop-down menu.

Best Practice Data Input standards – Susceptibility to Pugging

1. Use rare for well-drained soils, and occasional on heavier soils (this is assuming drains are working very well), winter if heavy soils and drains are suspect and winter or rain on soils where pugging can occur after periods of prolonged rainfall throughout the year.

2. User or farmer knowledge of the susceptibility of pugging soils.

For the check box - Is compacted, leave unchecked as the major effect of compaction is usually a temporary within-year phenomenon, and will not be equal over entire blocks.

For Naturally high-water table, select if appropriate.

PASTURE DETAILS FOR BLOCK: PASTURE

* TOPOGRAPHY

Rolling

Description : Area mostly navigable by tractor
Slope : 8° to 15°
LRI1 class : C

* PASTURE TYPE

Select a pasture type

The pasture type affects ME and pasture N content hence N leaching. Therefore it is very important to select the correct pasture type for the block. It is important to differentiate between lucerne and other pasture types. Differences between other pasture types for N leaching is less pronounced as there is a rebalancing between lower quality pasture, low N content but higher intake.

☐ Cultivated in the last 5 years

☑ Animals are present on this block

Selecting animals present, makes this block a pastoral block otherwise it is a cut and carry block producing supplements.

Runoff characteristics

* HYDROPHOBIC CONDITION

Use default

Hydrophobicity is normally observed on dry soils and results in more run-off and surface ponding after rainfall than when soils are wet. The help pane defines the categories. The default value is based on the region and rainfall and the default may change if these are changed.

* SUSCEPTIBILITY TO PUGGING

Occasional

The susceptibility to pugging damage is used as an assessment of the soil's drainage characteristics and also affects N cycling calculations.

Occasional: Must be grazed with caution during winter to avoid pugging damage.

☐ Is compacted

Soil is compacted severely enough to reduce water holding capacity.

☐ Naturally high water table (<0.75m from surface in water, not perched)

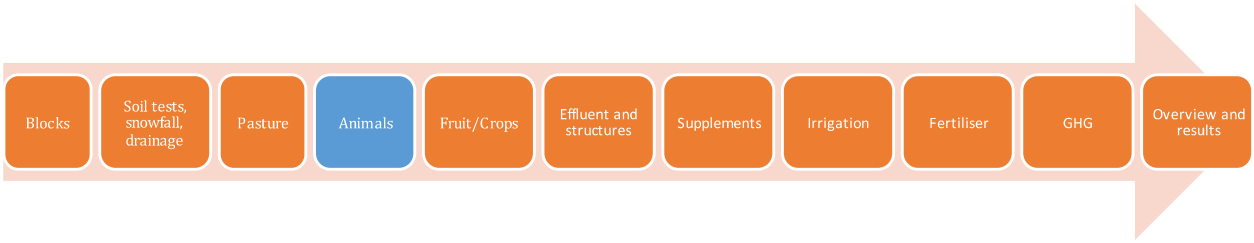
7.7 Animals

In the Animals tab the Livestock enterprise information for the farm is entered, this includes animal distribution and health supplements data. Enterprise refers to the different types of animals a that could be farmed. This includes dairy, sheep, beef/dairy grazing, dairy goats and other livestock.

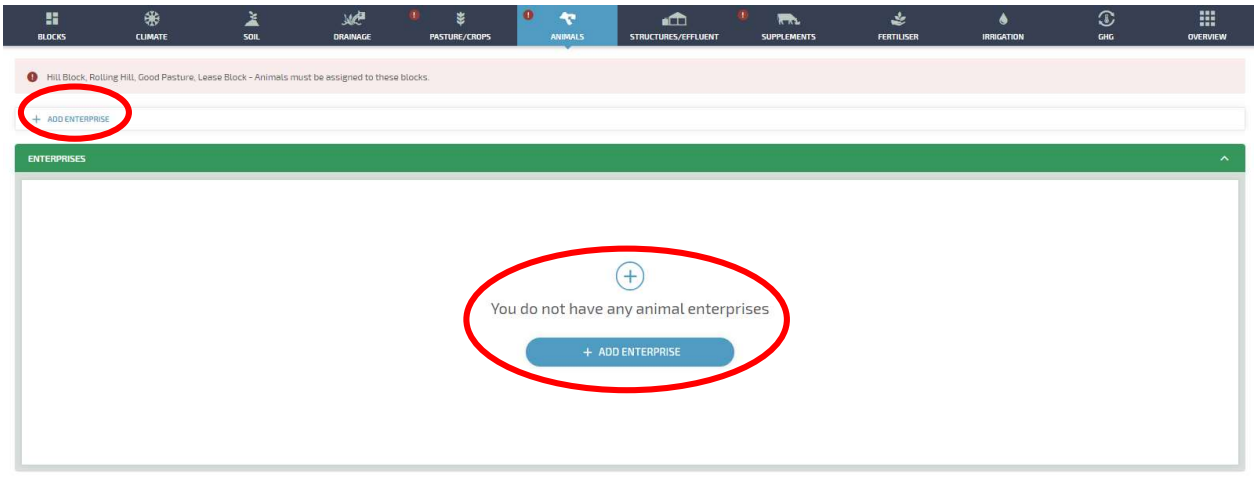
The type and amount of animals on-farm, their weight and the associated maintenance, growth, gestation, lactation and production has a direct influence on metabolisable energy requirements, which is used to determine pasture dry matter intake, which in turn directly influences nutrient cycling between animals and pasture.

If the there is an! showing at the top of the page stating "! You have animals on the farm but no blocks that can support animals. Select the pasture/crops tab to add pasture, fruit or crops to your blocks, it's because you haven't added Animals present in the pasture, and the following error will show.

It is recommended that the stock enterprises are entered by stock reconciliation. The entry of stock numbers must be as accurate as possible to ensure that a relevant nutrient budget is produced. Stock numbers are entered by event (purchase/bring on, Sale/take off, Sale to works). As you enter the data, OverseerFM calculates the monthly stock numbers and the grazing days. You are still able to enter stock numbers by peak cow and RSU, if required.



To add animals to the farm start by clicking +Add Enterprise. This will launch the enterprise details page.

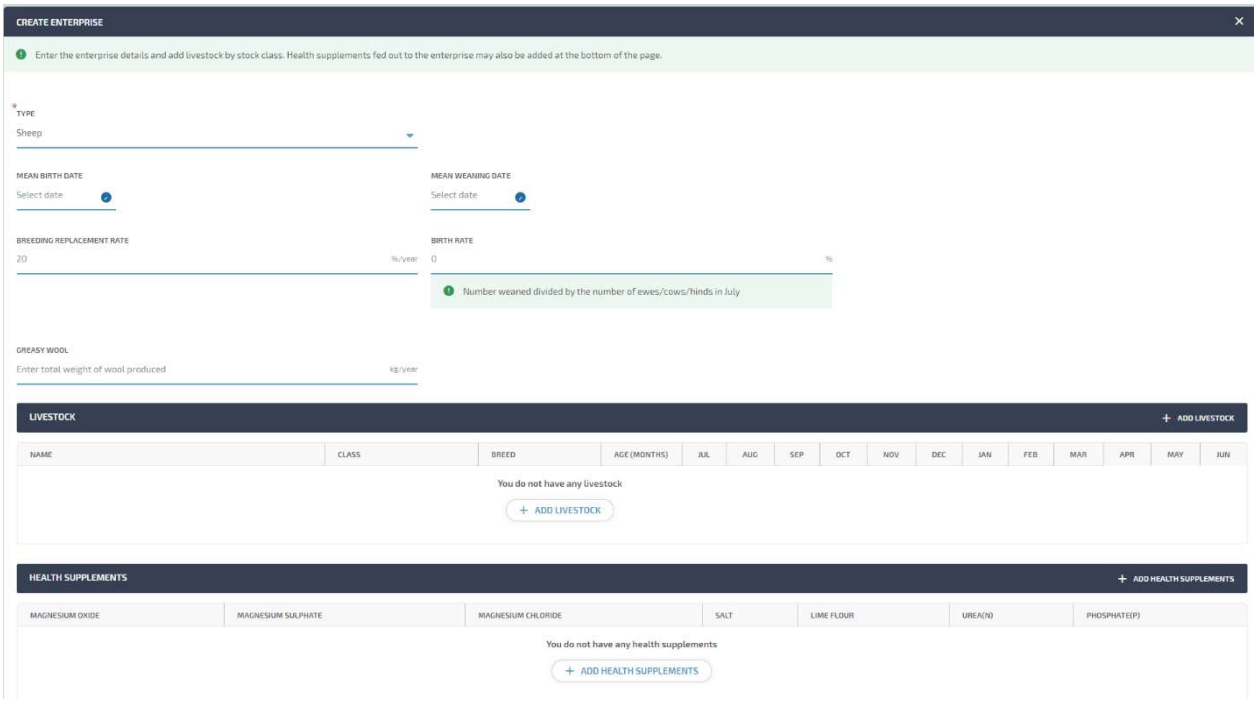


To create an Enterprise, select the type from the drop-down menu. These will be;

- Dairy,
- Dairy Replacements,
- Sheep,
- Beef/dairy grazing,

- Deer,
- Dairy goat,
- Other.

When the enterprise has been selected, the appropriate details for that livestock enterprise will become available e.g. Sheep will include greasy wool kg.



Adding Livestock

Select +add livestock to define stock classes and the number of animals. The box will have the appropriate details for each enterprise.

For Dairy animals, when stock numbers have been entered, milk production details become available

A name for a group of animals must be entered, this is where different herds/flock/mobs can be identified by a given name. Select the stock class, breed and mature weight.

Each livestock mob should define animals that are similar in age and starting weight; however, animals can be sold/removed from the farm at different times and weights. The system will separate these animals into multiple mobs at different sale weights. Monthly livestock numbers are calculated based on entering of events (starting, weaning, buying/selling and selling to works). The monthly numbers displayed represent the number of animals at the end of each month.

To enter the starting stock numbers, click + in July to record the stock number for the year. There is no ability to edit stock numbers in the month stock count tables, these numbers are generated as events are created.

Best Practice Data Input standards – Animals

A default replacement rate for breeding cows and goats is provided, adjust if differs from actual replacement rate.

Annual Replacement rate percentage is calculated by: number of cull breeding animals sold per year/number of breeding animals present at 30th June (including dry animals).

If calves are fed milk powder check box, otherwise OVERSEER assumes fed on whole milk to weaning.

Enter the most appropriate descriptor for class and breed.

Enter median calving date, drying off/lactation length and weight if known, or leave as OVERSEER defaults.

Overseer defaults are provided for mean lambing, calving, fawning and weaning dates; these can be adjusted if there is good information to justify the changes.

Actual breeding rates and replacement rates for ewes, cows and hinds must be entered.

Breeding rate is calculated by: weaned animals/number of breeding animals present at 30 June (including dry animals).

Replacement rate focusses on the breeding mob and refers to: number of cull breeding animals sold per year/number of breeding animals present at 30 June (including dry animals).

Enter average weaning weight for the stock class.

If the weaning weight is not known leave the pane blank – this will assign a national average weaning weight based on stock type and breed.

Check replacements are mated if they are mated within the 12-month (July–June) stock entry and are therefore differentiated from the original lamb and heifer mobs.

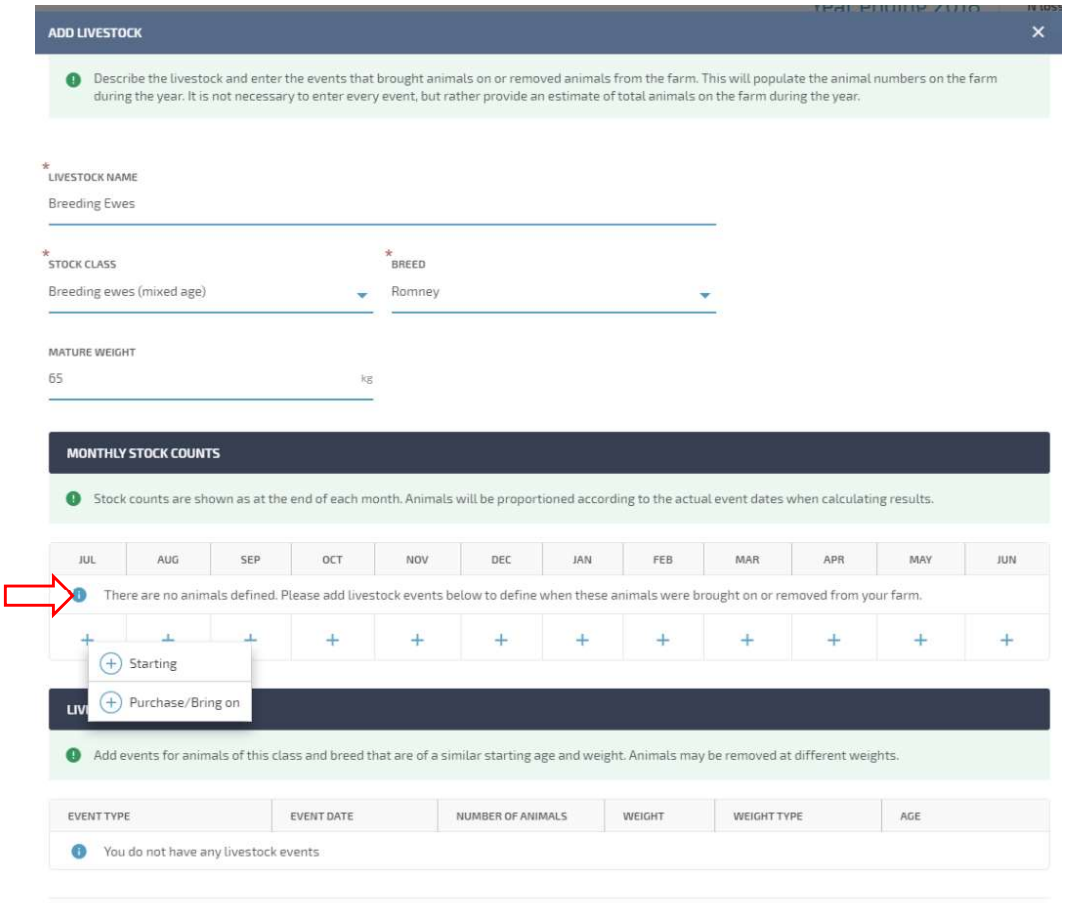
If there is a hogget or heifer mating mob, this must be entered as a separate breeding replacement mob to allow for them to be mated within the 12 months (period above),and are therefore differentiated from the lamb or heifer mob.

Other (e.g. Goats, Horses, Alpacas, Llamas)

1. To enter in other animals such as goats, horses, alpacas or llamas, select the correct stock class under each tab and enter the number of stock present on-farm.

This is an annual stock number entry. If stock are present for only a portion of the year then calculate an annual average figure using the following formula: Number of stock ÷ 52 weeks x number of weeks on-farm.

2. If the stock type is not listed, the operator will need to identify an appropriate RSU. These animals are treated similarly to sheep.



Enter the starting stock numbers by filling in the Livestock Events table. There will be a blue line under the required data fields.

Best Practice Data Input standards – Animals

Breeding stock - All mixed age breeding stock and dairy cows only have a selection for maximum weight. If this weight is unknown leave blank and a national average default weight will be assigned based on breed and class.

Breeding replacements are assumed to enter the breeding mob, although some may be sold (indicated by a decrease in numbers). For sheep or beef, if hoggets or heifers are mated ensure the replacements are mated tick box is checked.

Trading Stock - Trading stock should be entered as lambs, calves, fawns, hogget's, heifers, hinds, wethers, bulls, steers, stags with an appropriate start and end weight if there are records or use age at start.

Lambs, calves, fawns: source = weaned imply (weaners have been weaned directly from the breeding stock on-farm). They are treated as trading stock (sold for store or to the works).

Weaners (lambs, calves, and fawns) are to be entered starting (the first monthly entry) from their weaning date (entered above).

The correct type of dairy grazing stock must be entered (dairy grazing milking cows are pregnant; dairy grazing replacements are dry yearlings or autumn-born heifers).

Dairy grazers – this animal class can be specifically selected under Beef animals to cover dairy cows wintered on or dairy replacements grazed off-farm. The model assumes that the energy intake required for pregnancy is included, but that any lactation occurs on the main (parent) farm.

Cryptorchid lambs are entered as Ram Lambs (Lincoln University Farm Technical Manual states that they grow almost as fast as entire Rams).

Entering animal weights

The entry of animal weights and weight gain is preferred as it will more accurately reflect what is happening on-farm in terms of maintenance and production requirements from pasture metabolisable energy, and any associated nutrient losses.

1. If mature weight or weight gain (start and end weights) are known, enter these weights in preference to age at start.

2. If only the mature weight is known, enter this with age at start (this will provide you with a more accurate growth curve compared with age at start only).

3. If mature weight is not known, enter age at start only.

Mature weight

For mixed aged animals, the mature weight is the average mob weight throughout the year (excluding conceptus* if applicable). Mature weight will differ between breeds and classes during different times of the year. If weight is entered it must be fairly accurate and auditable to ensure that the resultant nutrient budget is accurate.

*Conceptus is the embryo, chorionic sac, placenta, and foetal membranes in the uterus

For growing (replacements) or trading animals the mature weight is the weight when fully grown, or weight at sale or slaughter.

1. Enter the mature weight if known.

2. If the mature weight is not known leave the data entry pane blank – this will assign a national average weight based on the breed and class.

For mixed aged animals, the average mob weight is important as this affects maintenance requirements. For growing or trading animals requirements for weight gain is important and mature weight sets the shape of the growth curve.

Start and end live weight

This setting determines live weight gain that in turn affects the flow of nutrients. Greater weight gain will require more metabolisable energy uptake and result in greater N cycling. This will impact on N leaching. If weights are entered they have to be correct to ensure that the resultant nutrient budget is accurate.

1. Enter live weight at the start (for the month when the mob first appears on the stock reconciliation), and end live weight (for the month when the mob ends on the stock reconciliation (are sold) or at the end of the year in June). End live weights (or carcase weight) for mobs sold to the works are usually available on the sales docket (kill sheet).

2. If end live-weight is known but not the start weight, then enter both age at start and liveweight at end. If start weight is known but not the end live-weight, then enter both age at start and start weight.

3. If the weights are unknown or unreliable enter age at start only (see below).

Carcass weight

If the end weight is not known, carcass weight may be entered (only for some stock classes).

This is not relevant to breeding mobs and replacements. It is only relevant to trading stock. This is only visible when Fate = sold to works.

Source

Source describes the origin of the mob – Bought, Weaned, or On-farm (i.e. already present from last year). If on-farm or bought is selected a live weight or age at start must be entered.

Because of the possible impacts and variables of setting weight or age, this input may change predicted N leaching. The accurate setting of source is useful when reviewing the nutrient budget inputs or parameter report with the farmer.

Source does not directly affect N leaching. It is directly concerned with greenhouse gas emissions. However, it is important because it indicates the type of information that should be used when determining the weight or age of the mob, both of which are critical to accurate estimation of nutrient losses.

1. Enter source and enter weights or age as required.

2. For lambs, fawns, calves, if the animals originate from the breeding stock, enter weaned.

Age at start

Where accurate or reliable weights are not available the age at start data entry must be used. This will assign stock in the mob being entered to national average weights and weight gain rates based on their age, class and breed.

Enter in the age at start for the month when the mob first appears on the stock reconciliation.

Age at start is usually calculated from the date entered in Mean Lambing, Calving, and Fawning date.

The age entered is the age at their next monthly birthday i.e. 0–30 days old = 1 month, 30–60 days old = 2 months etc. See the age at start table in Appendix 3 for further guidance.

Sex

This setting applies to weaners (lambs, calves and fawns).

1. Select mixed sex for weaners born on-farm.

In most cases in an on-farm breeding situation, mixed sex is selected. Here OVERSEER assumes equal numbers of male and female present in the monthly stock reconciliation. If the weaners are still on-farm after the end of June they should be entered as their stock class – i.e. hogget, heifer, steer, hind, etc.

2. Select male or female if weaner animals of a particular sex are bought onto the farm for breeding or finishing.

Only enter as weaners if under 1 year old – i.e. before the end of June. After this they will be entered as hogget's, wethers, heifers, steers, hinds, stags, etc.

Fate

This setting is available for finishing mobs (trading animals) only. The accurate setting of fate is useful when reviewing the nutrient budget inputs or parameter report with the farmer.

Select the most appropriate option for the mob being entered.

Remain on-farm: for mobs that will remain on-farm after the end of the year (stock reconciliation).

Sold to works: for mobs being sold for slaughter at the point of their last entry on the monthly stock reconciliation.

Sold to store/removed: for mobs being sold to store or leaving the farm to be grazed on another property owned by the same landowner.

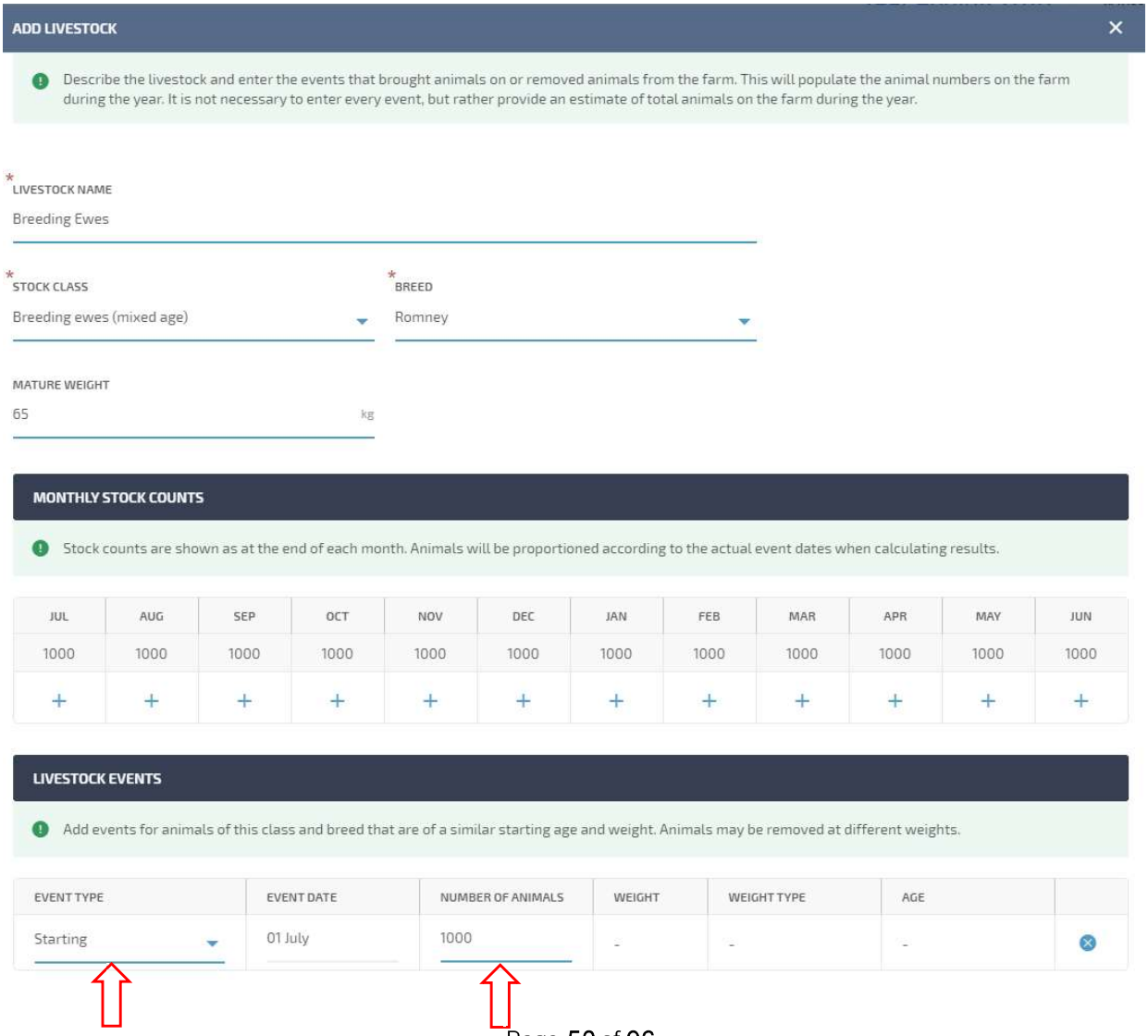
Replacements are mated

This setting affects predicted N leaching. When selected the model assumes increased metabolisable energy and dry-matter uptake for gestation resulting in increased nutrient cycling and possibly N leaching.

This check box is only available for replacement sheep or beef animals:

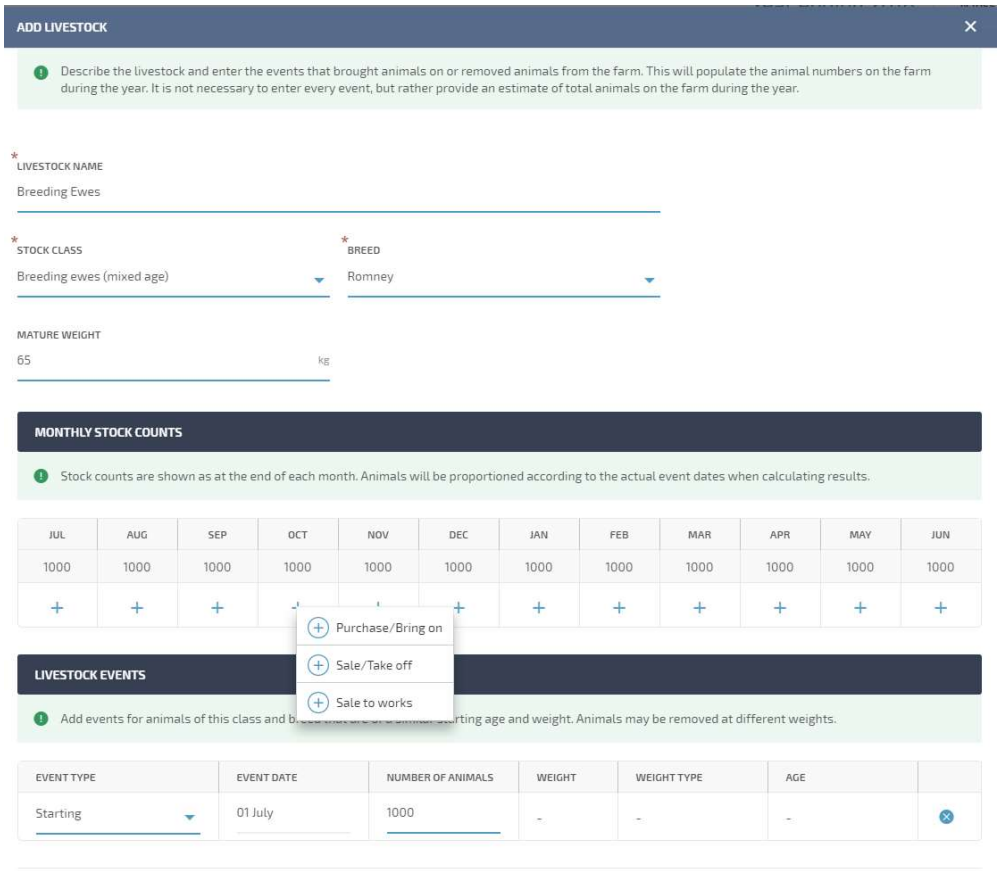
For sheep, only select for hogget mobs that will be mated or tupped before the last entry in the stock reconciliation (typically June).

For beef, only select for replacement mobs that are calved as R2 heifers. The animals become pregnant after 12 months of age.



Add any additional events by selecting the '+' under the month the event occurred. You do not need add all events, try to summarise major changes to the animal numbers over the year.

As events are entered, the number of animals change based on the event. The monthly numbers represent the number of animals at the end of each month.



As more events are added, the monthly stock numbers will change. Multiple events can take place in a month.

MONTHLY STOCK COUNTS

Stock counts are shown as at the end of each month. Animals will be proportioned according to the actual event dates when calculating results.

JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
500	500	500	500	500	480	480	480	480	480	480	480

LIVESTOCK EVENTS

Add events for animals of this class and breed that are of a similar starting age and weight. Animals may be removed at different weights.

EVENT TYPE	EVENT DATE	NUMBER OF ANIMALS	WEIGHT	WEIGHT TYPE	AGE
Starting	01 July	500	-	-	-
Sale to works	16 December	20	-	-	-

LIVESTOCK + ADD LIVESTOCK

NAME	CLASS	BREED	AGE (MONTHS)	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN
Breeding Ewes	Breeding ewes (mixed age)	Romney	-	1000	1000	1000	1000	1000	1000	1000	750	750	750	750	750
Ewe Lambs	Breeding replacements	Romney	-	-	-	-	200	200	200	200	200	200	200	200	200
Prime Lambs	Lambs	Romney	-	-	-	-	-	580	580	580	580	580	580	580	580
Ewe Hoggets	Breeding replacements	Romney	10	250	250	250	250	250	250	250	250	250	250	250	250
Breeding Rams	Breeding rams (mixed age)	Romney	-	20	20	20	20	20	20	20	20	20	20	20	20
Terminal Rams	Rams	Suffolk	24	20	20	20	20	20	20	20	20	20	20	20	20
			TOTALS	1290	1290	1290	1490	2070	2070	2070	1820	1820	1820	1820	1820

Livestock events

LIVESTOCK NAME	CLASS	BREED	EVENT TYPE	DATE	NUMBER OF ANIMALS
Breeding Ewes	Breeding ewes (mixed age)	Romney	Starting	01 July	1000
Breeding Ewes	Breeding ewes (mixed age)	Romney	Sale to works	01 February	250
Ewe Lambs	Breeding replacements	Romney	Weaning	01 October	200
Prime Lambs	Lambs	Romney	Purchase/Bring on	01 November	1000
Prime Lambs	Lambs	Romney	Sale to works	05 November	250
Prime Lambs	Lambs	Romney	Sale/Take off	17 November	150
Prime Lambs	Lambs	Romney	Sale/Take off	25 November	20
Ewe Hoggets	Breeding replacements	Romney	Starting	01 July	250
Breeding Rams	Breeding rams (mixed age)	Romney	Starting	01 July	20
Terminal Rams	Rams	Suffolk	Starting	01 July	20

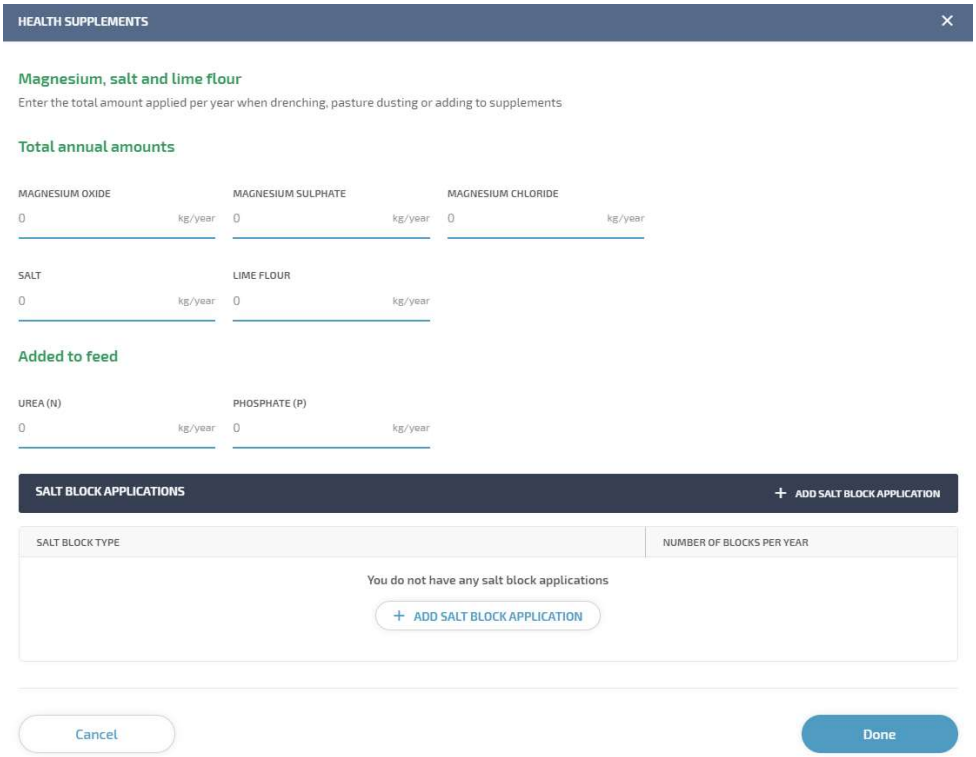
When the enterprise is saved, animal numbers are shown on the ANIMALS main page.

If the model can run, the RSU (revised stock units) are shown for each block and month. If it cannot run, there is an error present, and will need to be rectified.

Health Supplements

The Animals Enterprise page is also where the Health Supplements used on the farm are entered. To enter health supplements, click +add health supplements

Enter the required details. These are divided into total amounts, added to feed and salt block applications.



Animal Distribution

Differences in productivity (amount of pasture growth) and livestock type between blocks will influence the distribution of animal intake and excreta deposition between blocks and hence nutrient cycling and transfers between blocks. If characteristics such as soil, climate, development status or irrigation differ between blocks then this can result in different farm N leaching losses.

Best practice data input standards – Animal Distribution

Relative Productivity

1. Where differences in block productivity are unknown use the default no differences between blocks.

2. Where relative pasture productivity is likely to be different e.g. irrigated vs. dryland, flat country vs. hill country, relative productivity differences should be entered based on credible information (e.g. measured or farmer knowledge of pasture yield assessment, grazing days and/or stocking rate).

When using animal assessment, actual stocking rate differences can be used e.g. flats 14 su/ha and hills 7 su/ha.

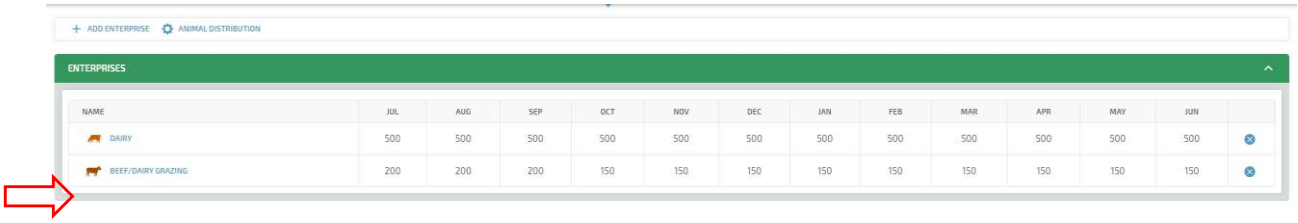
Distribution of animal classes within blocks

When there are obvious differences between block productivity it is important to try and represent that in the best way possible, otherwise nutrient uptake and deposition by grazing animals will not be properly represented.

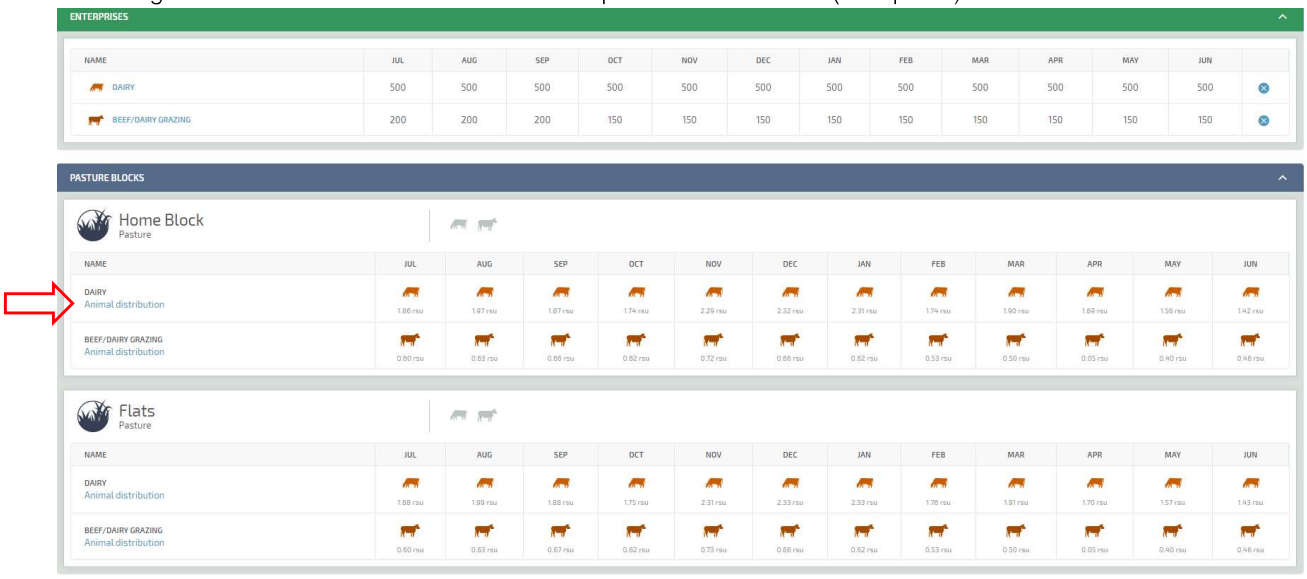
1. Select same as ratio of total animal intake if it can be assumed that, on pasture blocks, animals eat pasture in the same ratio as farm intake. (This is the same as previously selecting the box 'Assume all animals on block eat pasture at the same rate as farm intake').

2. If the proportion of pasture eaten by a given animal type differs between blocks select user defined for each block. (This is the same as previously leaving the box unchecked 'Assume all animals on block eat pasture at the same rate as farm intake').

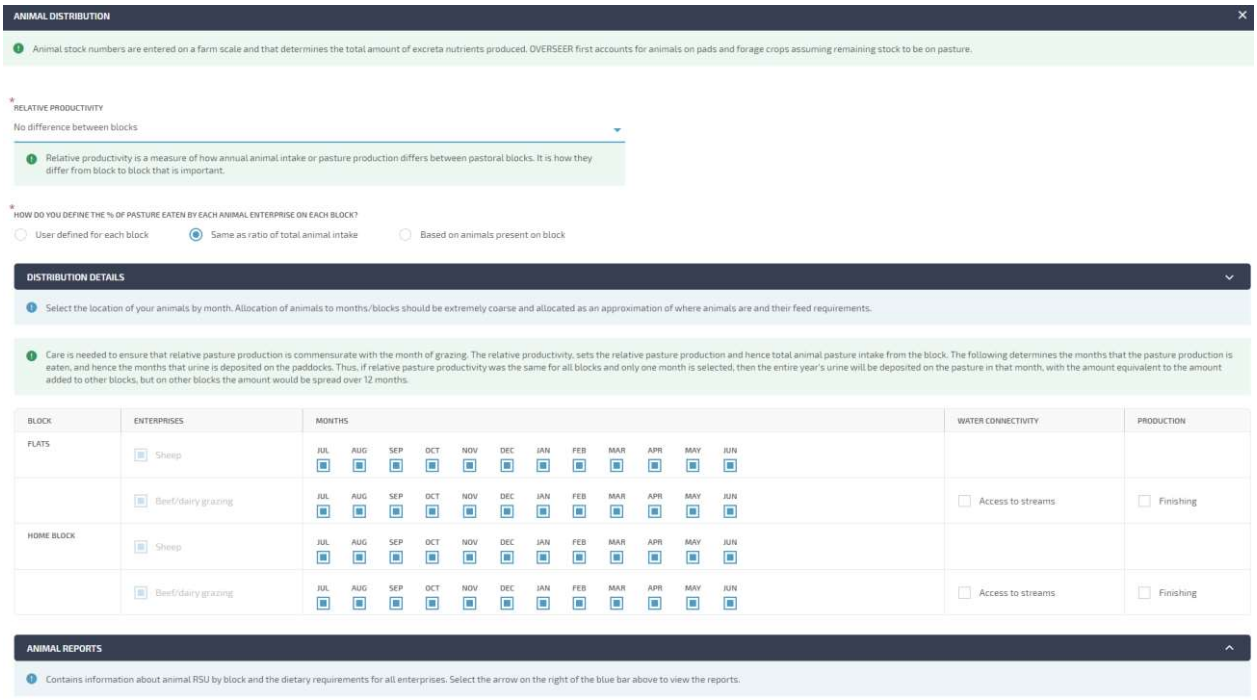
To see the total stock numbers per enterprise, click on the appropriate stock enterprise.



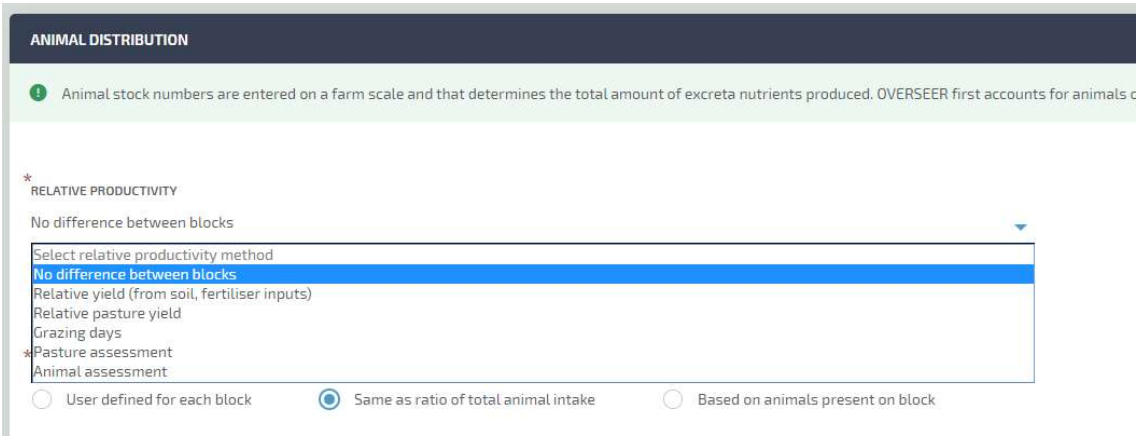
To change the animal distribution for each enterprise on each block (if required) click on Animal Distribution



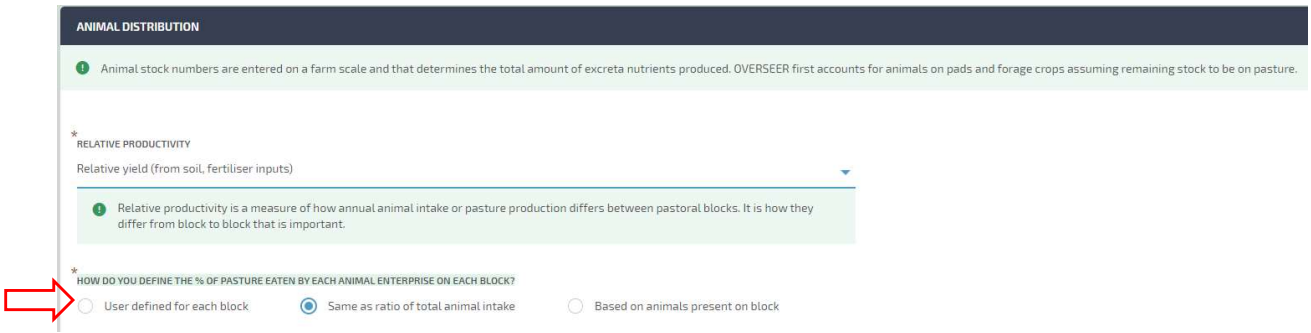
This will show the Animal Distribution page, the details for relative productivity and where *Define The % Of Pasture Eaten By Each Animal Enterprise On Each Block* is entered.



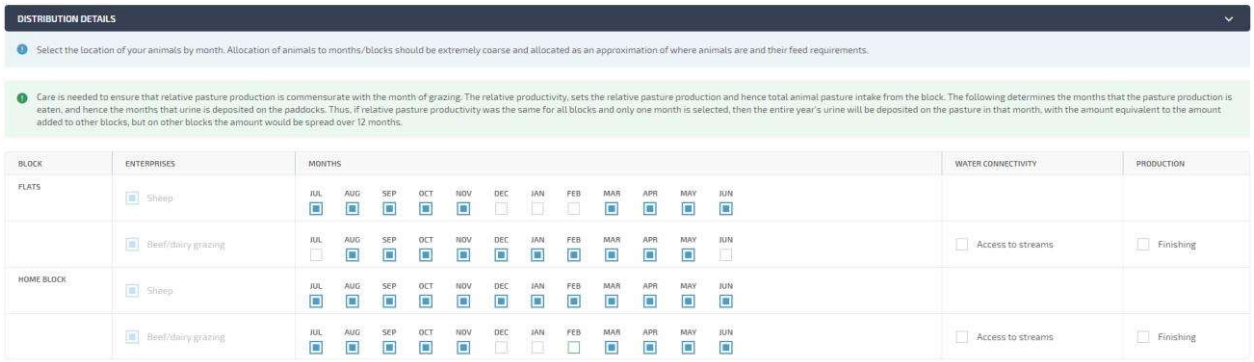
The different options for *Relative Productivity* will be available in a drop-down menu. The different options will result in different data entry fields becoming available.



There are three options for pasture eaten by animals this is under the title - *How Do You Define The % Of Pasture Eaten By Each Animal Enterprise On Each Block*? Choose the appropriate option for the farm.

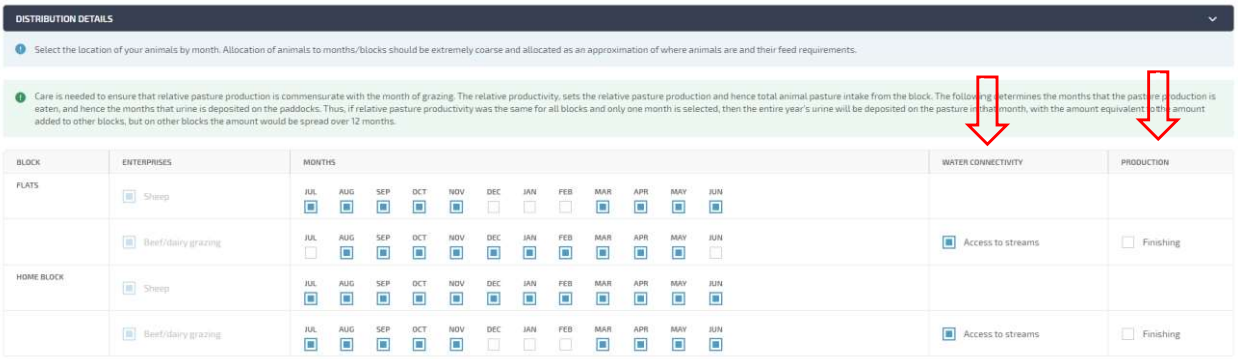


To change the animal distribution for the different Blocks deselect the boxes associated with the appropriate animal enterprise.



To show if Cattle have access to streams, check the box for the appropriate block in the water connectivity column.

To show if the Block is used for Finishing, check the appropriate block in the production column.



7.8 Structures and effluent systems

The structures tab is where information for effluent systems, in shed supplement feeding, fed pads, un/covered wintering pad and wintering stand-off pad is entered.

Effluents (liquids and solids) generated by enterprises on-farm represent a major recycling or export of nutrients within or off-farm. The treatment, storage, application and timing of effluent all impact on nutrient management.

When deciding which structure to use, there are as follows;

Definition of a feed pad

A feed pad is a hard surface area (usually concrete) normally sited adjacent to the farm dairy where stock can be held for some time (1-2 hours), either prior to, or after milking, and provided with supplementary feed. Feed pads are usually included in a farm system to improve the efficiency of supplementary feeding compared to paddock feeding.

Liquid effluent or scraped material added to the farm dairy system is applied to the same blocks to which farm dairy effluent is applied. Solid effluent applied on farm is applied to blocks where "solids from feed pad" are added, or if no block is specified, then spread evenly across the farm.

If the feed pad is used in such a manner that no extra time is spent on the milking platform, yards, or feed pad (i.e. there is no additional effluent generated other than that associated with milking) then use the separate in-shed feeding option.

Note: If the feed pad has a lining (e.g. sawdust, bark), then use options for a wintering pad. If animals use a feed pad on the way to, or as part of, a wintering pad or animal shelter, then it is better to set this up as a wintering pad/animal shelter and set time on concrete to the time spent on the feed pad.

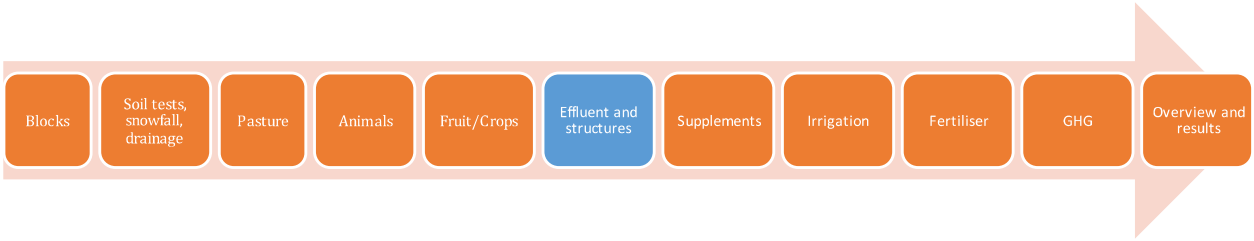
Definition of a wintering standoff pad or loafing pad

stand-off or loafing pad is a specially built area where stock can be withheld from grazing during wet periods to minimise damage to pasture. These pads are typically constructed of free-draining materials such as sawdust, bark, wood chips, lime, or a soft metal (rock) mix. Because cows may be withheld for extended periods (20 hours/day) they need 8-10 m2 per cow. There is no provision for stock feeding while the animals are on the pad.

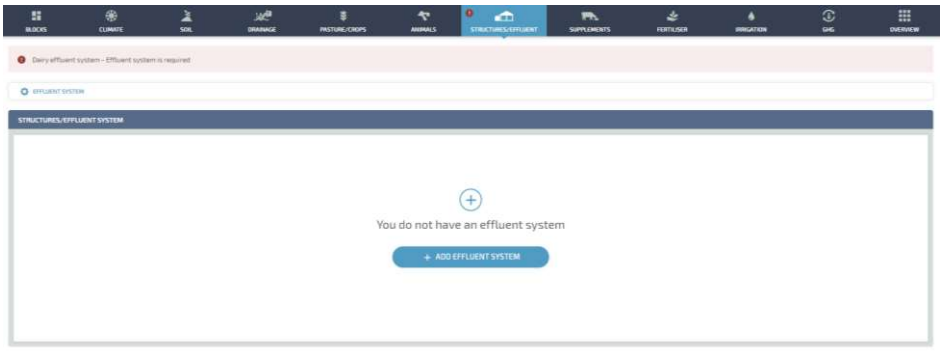
Note: A stand-off or loafing pad will only have an impact on the nutrient budget if it is used frequently.

Definition of a wintering pad

A wintering pad or animal shelter is a specially built area constructed where animals are withheld from pasture for extended periods and supplementary feeds are brought to them. As the animals may spend several months on the pad and/or in shelter, the animals require an area to lie down as in stand-off pads, as well as additional space for feeding (including separate concrete areas, known as a 'concrete feeding apron'). For some wintering pads, animals are allowed to graze pastures for a limited time (3-6 hours) each day. In this case they might not be fed supplements.



Click on the appropriate +ADD EFFLUENT SYSTEM to start and fill in the required data.



You will be required to add the effluent management system, liquid applications to blocks and/or pond solids.

Best Practice Data Input Standards - Liquid effluent applications

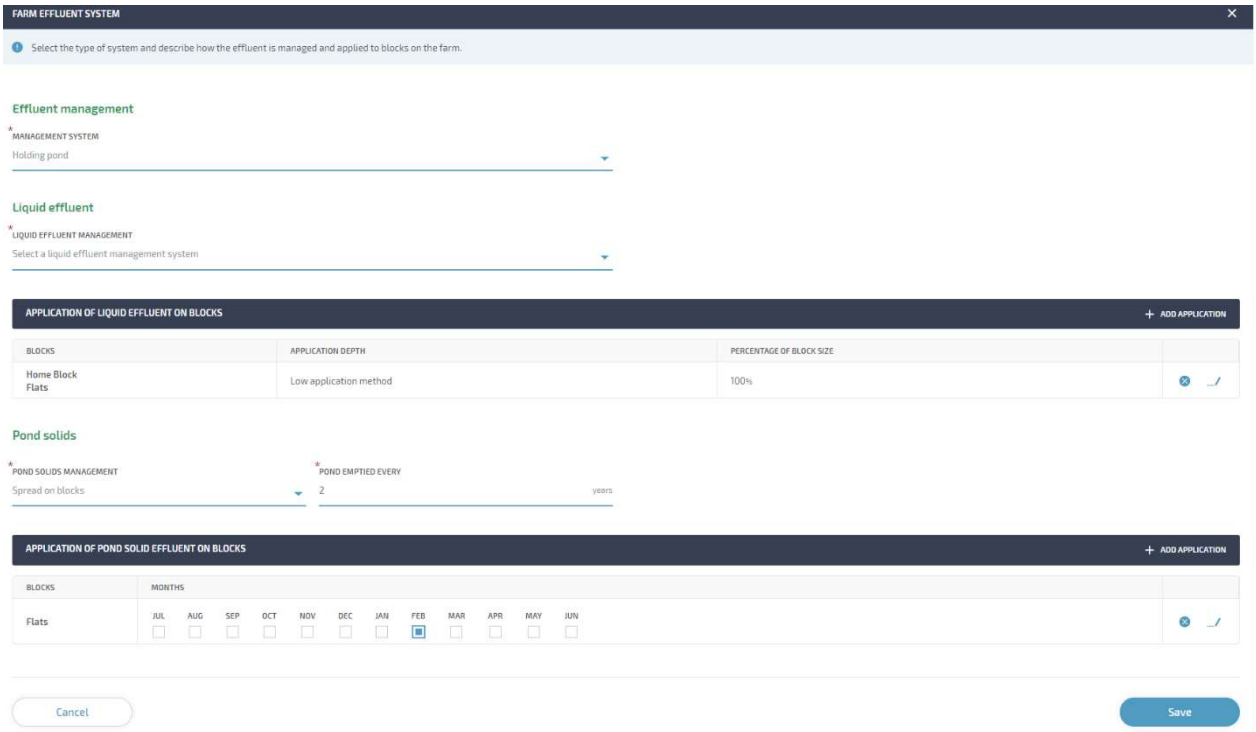
If liquid effluent is generated on the farm dairy, select the liquid effluent source(s) that is applied on the block. This may include effluent from structures such as feed pads, wintering pads/ animal shelters and housed pigs.

1. Actual measured application rates must be used where known.
2. If unavailable choose application depth based on information in the table below.

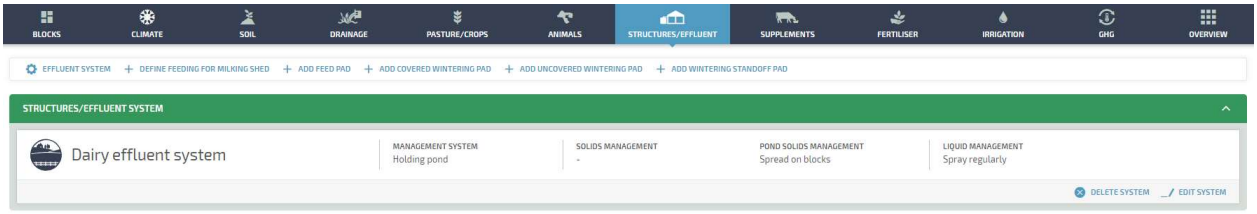
EFFLUENT TREATMENT METHOD	APPLICATION DEPTH
Low rate type systems (pods)	Low application method
Metered pivot application systems	< 12 mm
Travelling irrigators	12-24 mm
Stationary irrigators, canons or contractor pumping	> 24 mm

NOTE: DO NOT check the actively managed box (unless there is NO risk of effluent losses through runoff or by-pass flow), and there is no system losses due to ponding, overlap, or faulty equipment.

NOTE: On pastoral blocks, if spraying infrequently from a holding pond is specified, then the month effluent is applied can be specified (deferred irrigation method). The model assumes that the pond storage capacity is adequate.



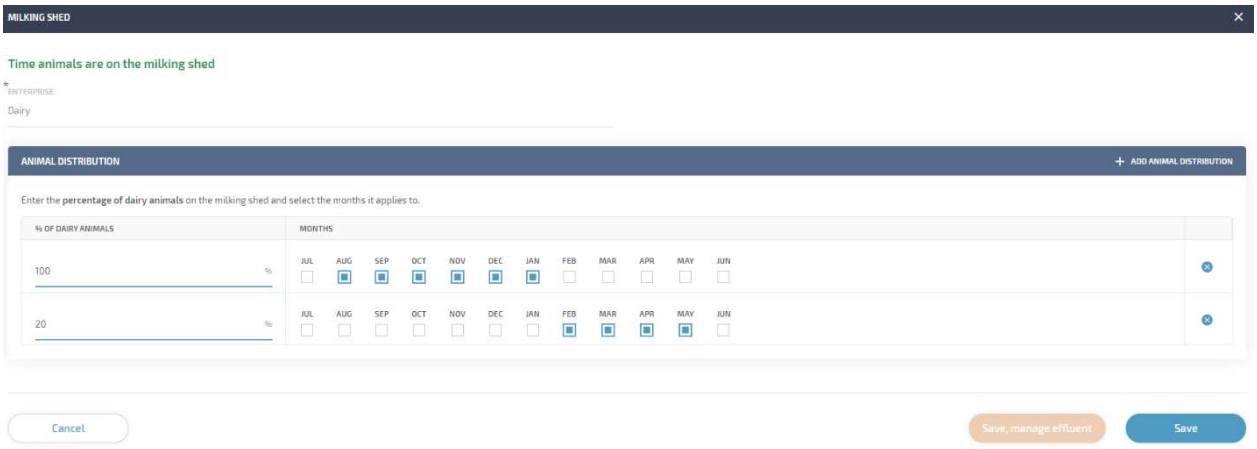
Once the effluent system has been added, other structure options become available.



This is where you can define feeing for milking shed, add feed pad, add covered wintering pad, add uncovered wintering pad and add wintering standoff pad.

Feeding for the milking shed

To add supplements fed in the milking shed click +define feeding for milking shed. You are able to represent how you feed your animals in the milking shed throughout the year. If only 20% of the herd are being fed throughout Autumn, click +ADD ANIMAL DISTRIBUITON, add the % of Dairy animals and select the appropriate months.



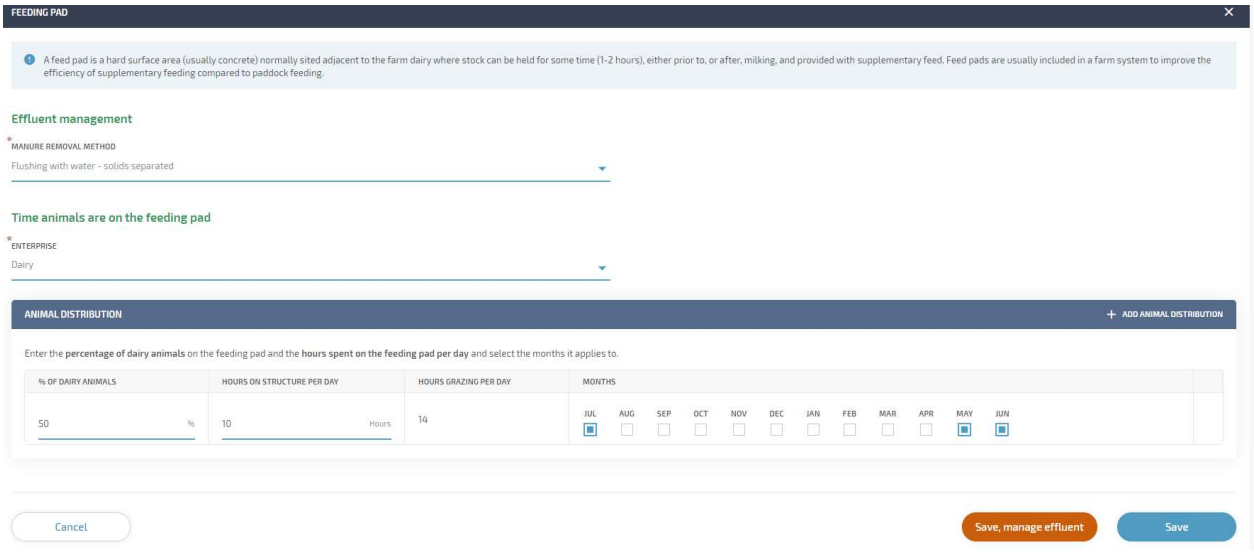
Feed Pad

Best Practice Data Input Standards – Feed Pads

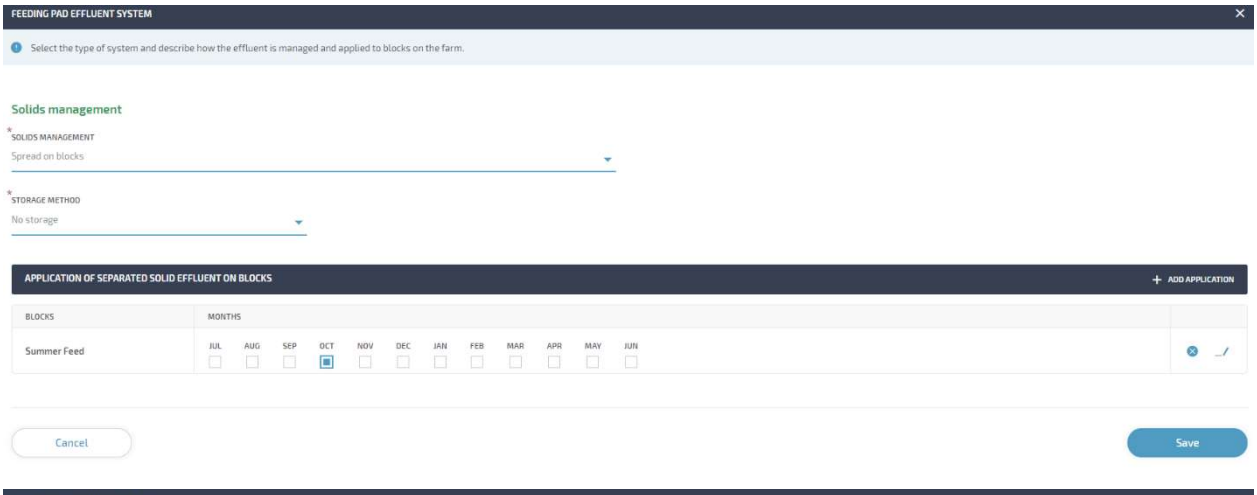
Solids management storage method before solids are disposed of

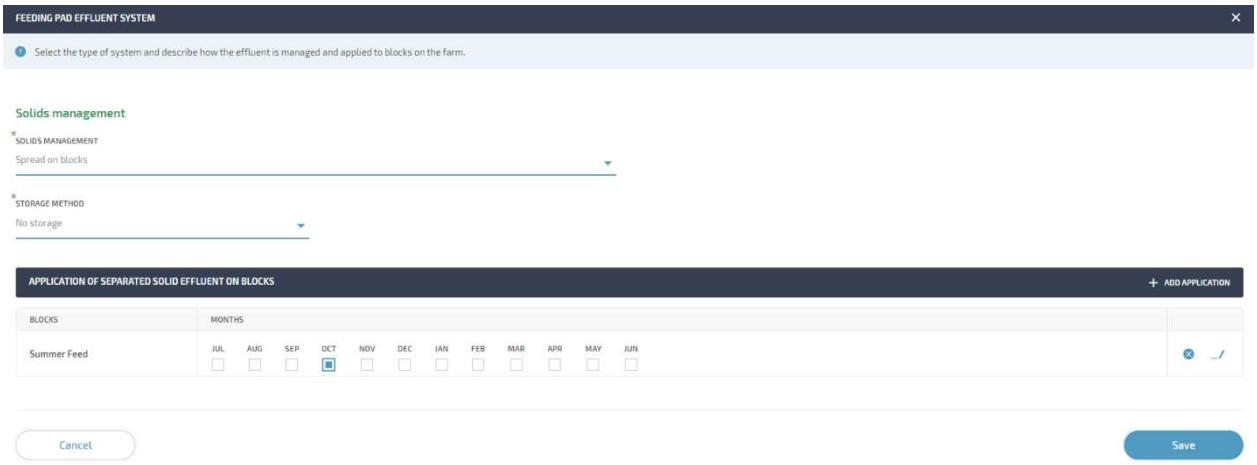
1. Select the best option from the drop-down menu.
2. Unless good information is provided, select open to rain and set the time in storage to 3 months.

To add a feed pad click +feed pad and add the required data.



You will need to describe how the effluent system for the feed pad how it is managed and what blocks it is applied to. This step will need to be replicated for all the other structures, if present on farm.





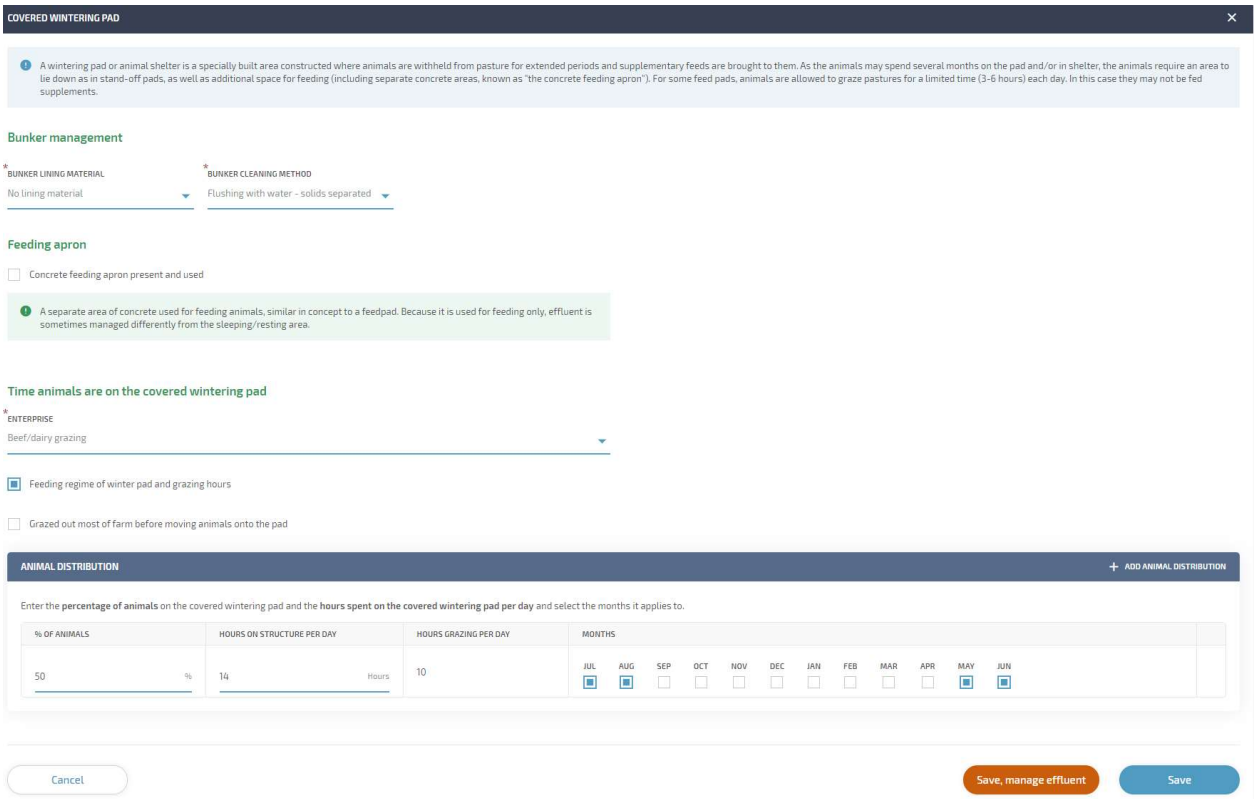
Wintering Pad

Best Practice Data Input Standards - Wintering Pads/Animal Shelter/Barn/Housing

Bedding pad

1. Select the best option for pad surface from the drop-down menu.
2. The optional default is inert.

To add a covered wintering pad click +COVERED WINTERING PAD and add the required information. This includes Bunker management, the feeding apron and the time animals are on the pad.



Covered Wintering Pad

Best Practice Data Input Standards – Wintering pads or standoff pads

General - Winter standoff pad construction and maintenance

1. Select the best option for pad surface from the drop-down menu.

2. The optional default is inert.

Management of scraped surface solids

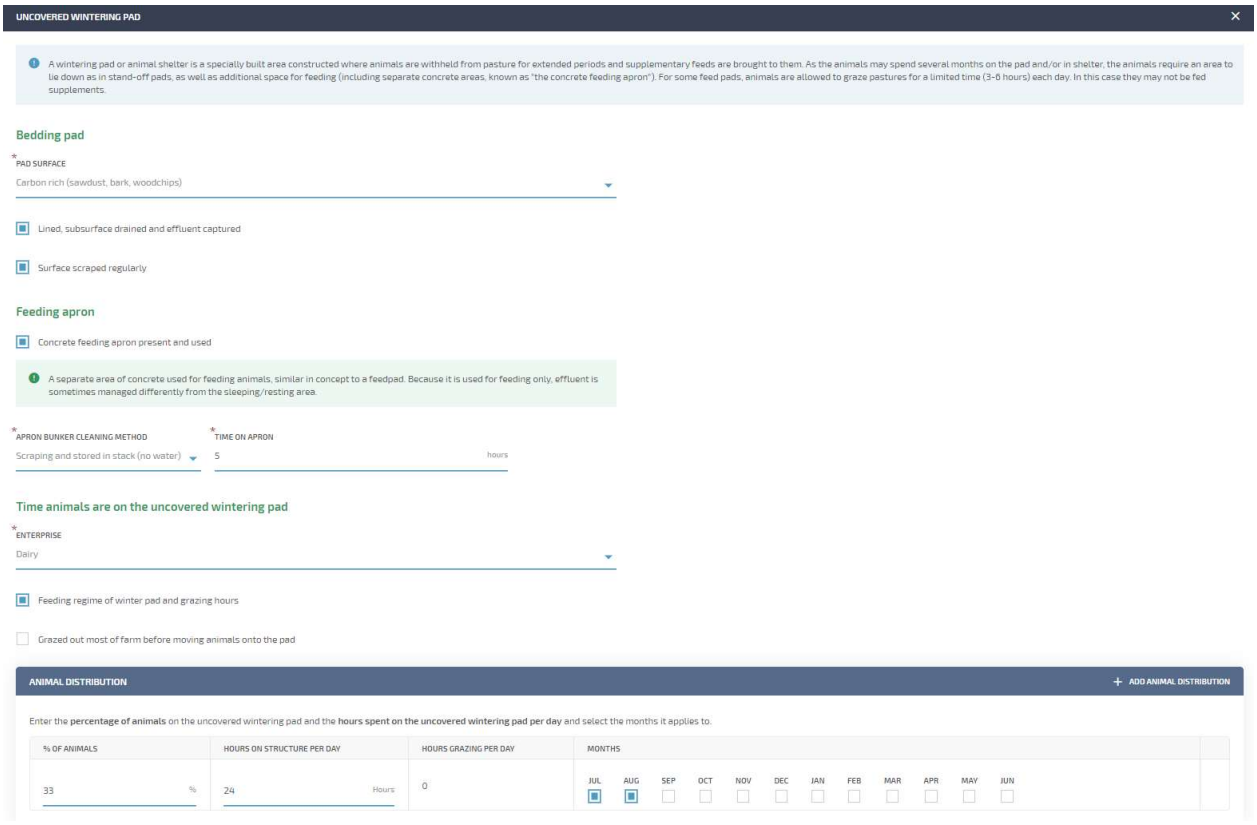
1. Select the best option from the drop-down menu.

Storage method before top layer is disposed of

1. Select the best option from the drop-down menu.

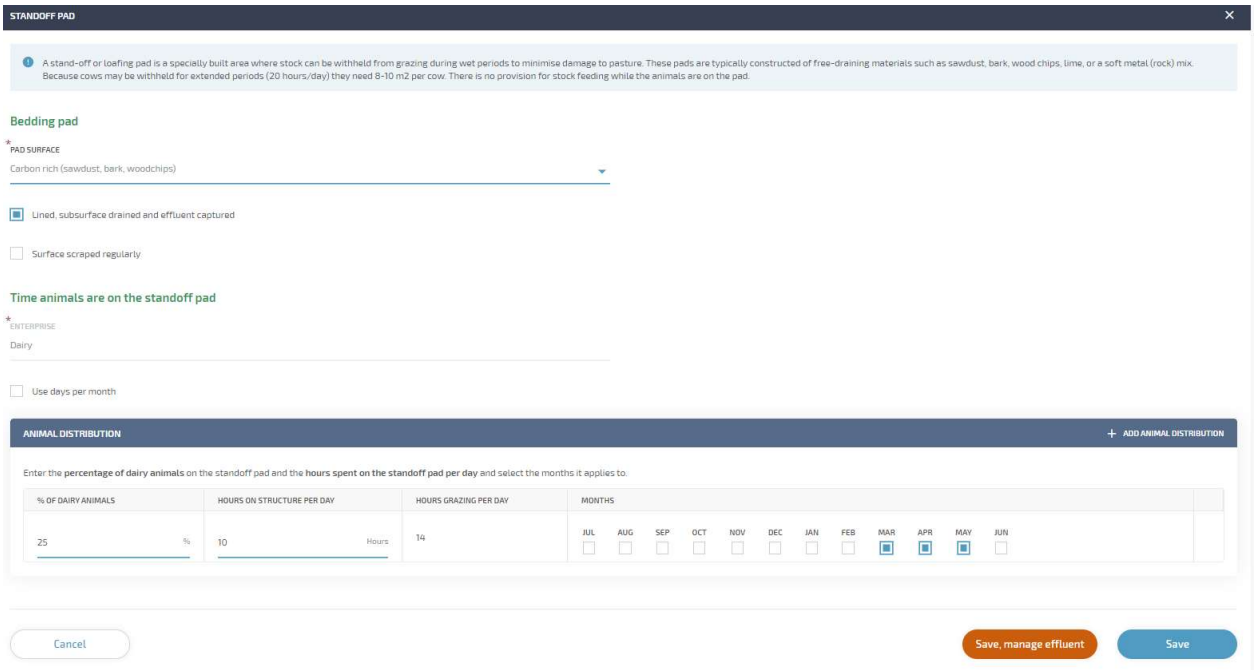
2. Select open to rain where no other information is available with the time in storage set to 3 months.

To add an uncovered wintering pad click +COVERED WINTERING PAD and add the required information. This includes Bedding pad; the feeding apron and the time animals are on the pad.



Standoff Pad

To add a standoff pad, click +STANDOFF PAD and add the required information. This includes Bedding pad; the feeding apron and the time animals are on the pad.



After the details of a structure have been completed, select “Save manage effluent” to be taken to the effluent management page. The options available on the effluent management page depend on the structure details and management methods selected.

7.9 Crops

In the Pastures/Crops tab is where crop details are added to the blocks. No data is retrieved from elsewhere in the model.

This is where the crop information is entered for fodder crop, crop rotation and fruit crop. There are several aspects to entering crop information and are consistent across all the different crop types available. The entire cropping practice needs to be captured. The key events that OverseerFM requires and will need to be added are crop type specific; harvest for a grain crop, defoliation for a fodder crop

To note that fertiliser will need to be added on the Fertiliser tab.

The green boxes at the top of the page summarises what has been grown across all blocks.

Cropping blocks are more difficult to define timescales than pastural blocks because:

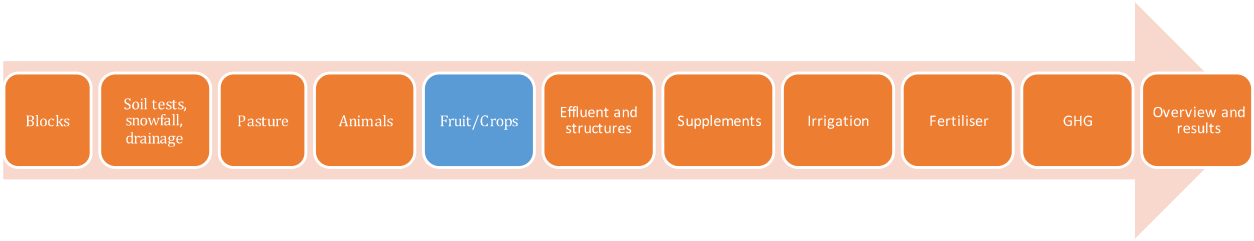
- Within a rotation, the previous crop can influence soil moisture levels, soil N pools and residues within the next crop (for example, accumulated soil N or residues).
- Rotations can vary over time, and in some cases are not necessarily known, for example, the vegetable crop sown may depend on the weather and expected prices at time of sowing.
- To be able to integrate into a farm model, there needs to be an end point to a rotation.
- On farms with both grazing and crops, and where crops are grazed, then animal intake and crop growth models need to be aligned.

Within the model, crop blocks have also been modelled using a 2-year rotation, assuming that climate is constant over those two years (Cichota et al., 2010). The crop's previous history is used to initialise the first year's data, and the first year is used to determine previous crop contributions to N pools, and to initialise soil water and soil N pools for the second year. The year reported in the analysis is the second year.

The model is linked to the animal model by assuming that crops that are fed to animals in a given month in the reporting year are consumed by animals in that month. Any feed supplied by crops defoliated in the first year is ignored, although the effect of this defoliation on growth, residues, etc., is captured. As the animal model assumes that management is constant, then it implies that the crops feed to animals is also constant.

The disadvantage of this approach is that it can require many blocks to give all the combinations of crops within a farm, crop rotations may need to be split between blocks and setting the end point to achieve a consistent result can be difficult to identify.

Fodder crops, by definition, rotate around pastural blocks. For fodder crops, the previous year and first year are assumed to be pasture, and the block is assumed to have site characteristics and management that is an area weighted average of the pastoral blocks the fodder crop blocks rotate through. Hence the timescales and site characteristics are determined by the scales in the pastoral blocks they rotate around. The construct does imply that the area in rotation is constant. Some of the issues with cropping blocks on pastoral farms may be better addressed by increasing the range of fodder crop blocks (e.g. 2 or 3 year rotation, adding additional crops) or integrating a pasture grazing system in the cropping model (e.g. seed crop approach) rather than relying on using cropping blocks to fill the gaps. A similar argument also applies to supplements, where allowing supplements removing as a rotation may better reflect practice.



Crop data inputs

Best Practice Data Input Standards – Crop and Fodder crop

It is important to capture the sequence of events, e.g. cultivation, sowing, harvesting, fertiliser applications and irrigation, as this will have an impact on nutrient cycling.

All management activities and events occurring during the reporting year and, if required, the year before, must be recorded month-by-month using the crop rotation table. This table uses icons to depict the sequence of events and the inferred crop status.

The type of the block used (Crop or Fodder crop) will depend on the crop(s) sown and the length of the crop rotation. See section 1.3 to determine which block type to use. For additional information on data entry into the crop rotation page, refer to Appendix 7 which provides examples of the data entry process. Specify crop type

1. All crops sown must be entered by selecting category, crop type, product yield and month and year sown.

• Additional information may be required around cultivation practice at sowing and residual disposal method depending on the crop.

• ONLY check modify growth curve and harvesting box if you have expert knowledge on crop physiology.

• Enter specify soil test values if known, otherwise leave box unchecked.

• Chicory (or similar): Where this is planted as a single species crop within the assessment year using cultivation, enter as rape in the fodder drop down list. If the chicory has been sown prior to the assessment year, or is sown in a pasture mix, leave out of fodder crop model, and allow the model to treat it as pasture.

• Sorghum: Enter sorghum into the model as maize with a default yield at "75" per cent of the model maize yield default.

2. The method used to defoliate seed crops, annual ryegrass and pasture crops for forage must be entered.

• Defoliation of pasture based crops have been integrated into the pasture based animal intake model. Monthly defoliations of these crops need not be entered on a monthly basis.

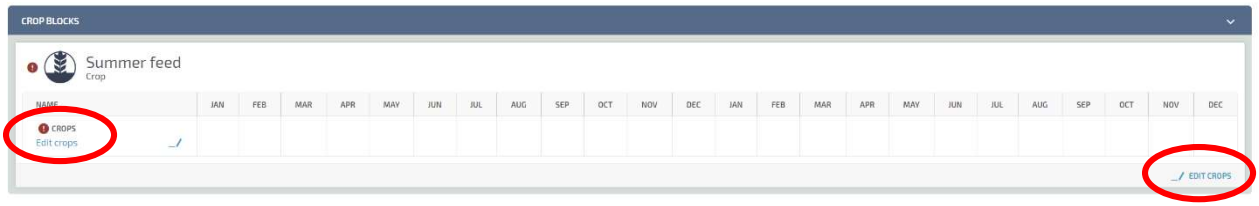
• Select the defoliation method(s) used.

• Enter the month of harvest of seed crops (if known) and the yield of annual ryegrass in the reporting year.

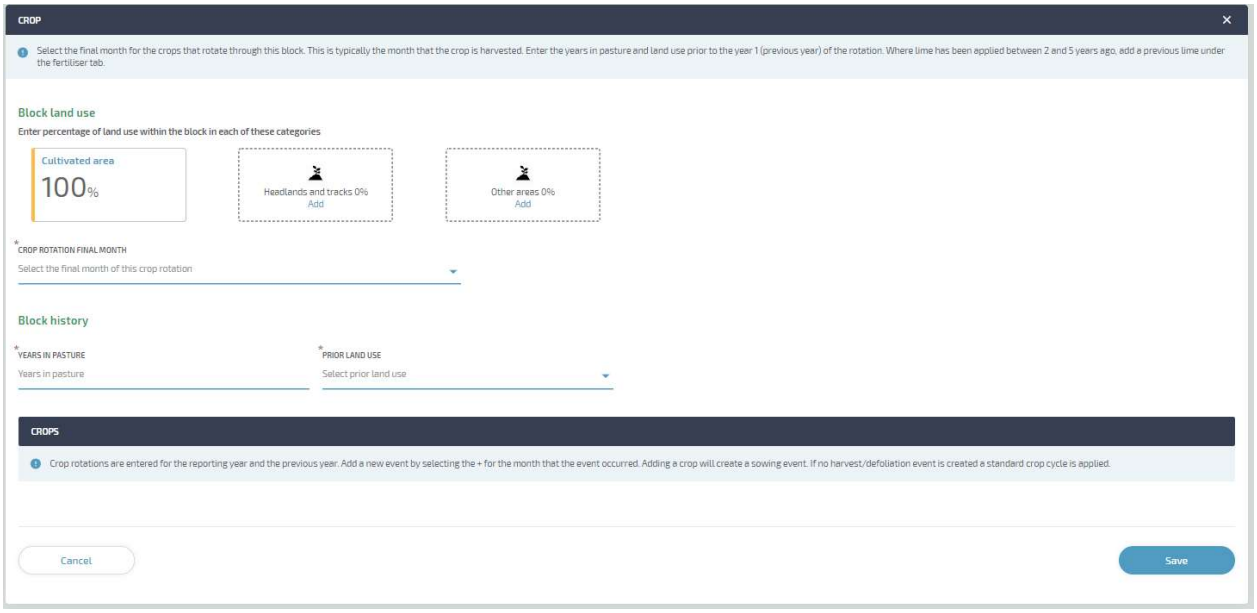
• If the crop is cut and carried for forage, enter supplements made during the reporting year on the block's Supplements made page (see section 4.9). If grazed in-situ, select the source of farm stock and enter the percentage of the crop eaten by each animal type.

When Crop blocks have been created, the associated crop information must be added. Enter the block history and then add crops to the block. Crops may be created in the reporting or previous year.

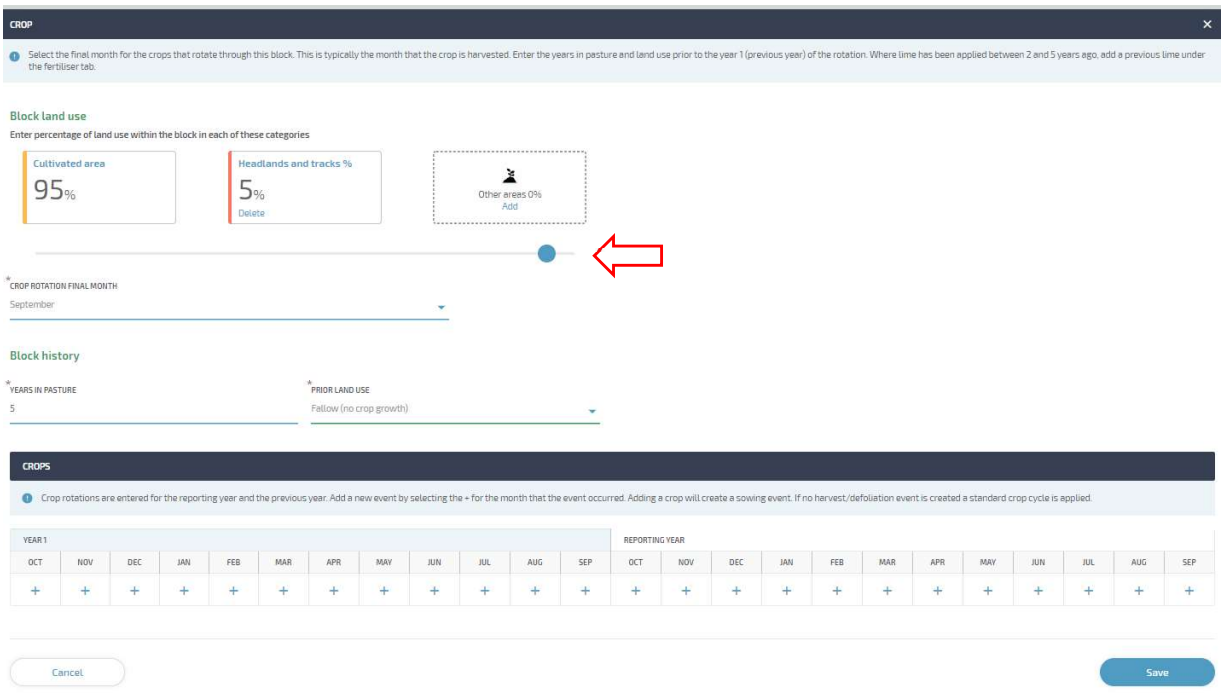
To add data to the crop, go to Edit crops (entered individually for each crop rotation).



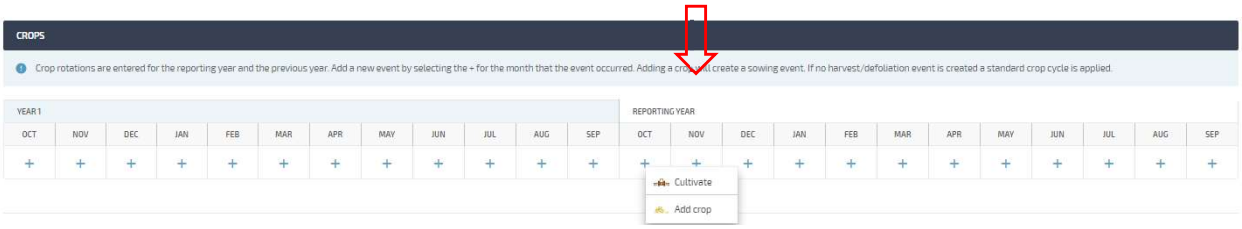
Add the crop details - As the details are entered, more sections will become available.



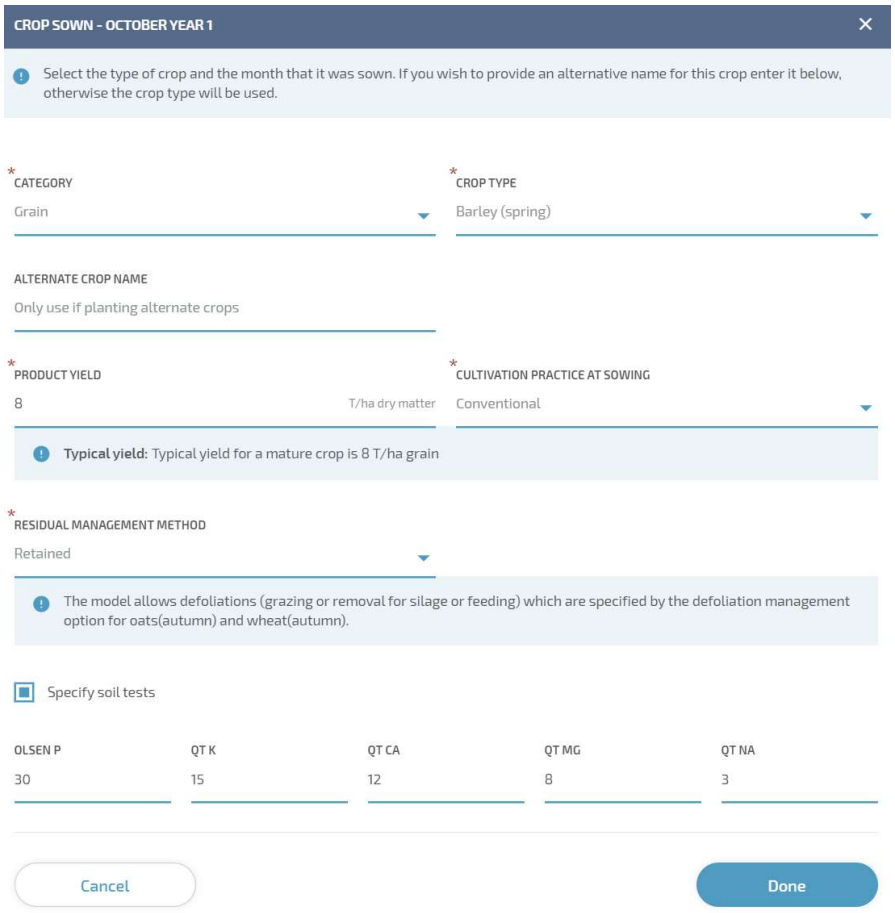
The percentage of area in cultivated area, Headlands and tracks or other is entered by clicking Add in the appropriate box. To display the area% use the slider located beneath the boxes. The percentage of land use within the block in each of these categories must equal 100%.



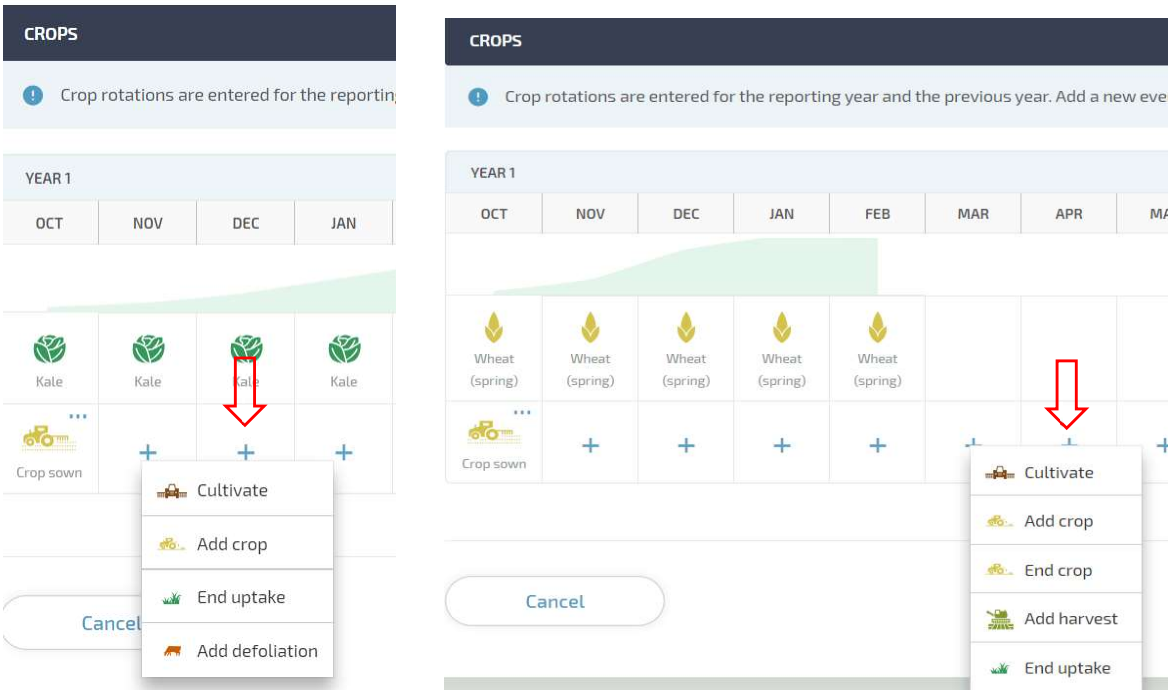
To add a crop or event, click on the "+" to select the month to add the event too. A pop-up menu will show the events that are possible for the month selected. A 'Cultivate' event will create a new crop.



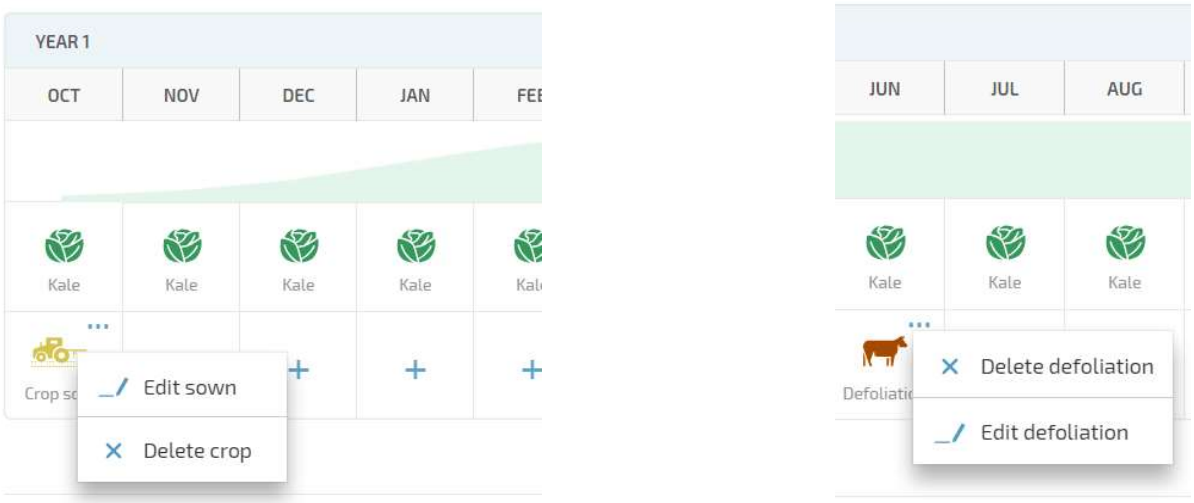
The crop details box will appear when a crop is added. This is where the crop details (category, crop type, product yield, cultivation practice at sowing, residual management method and crop soil test) need to be entered.



By adding a crop, additional events will become available. These are crop specific – add a harvest event to a grain crop, whereas the harvest event option will not show for a fodder crop.

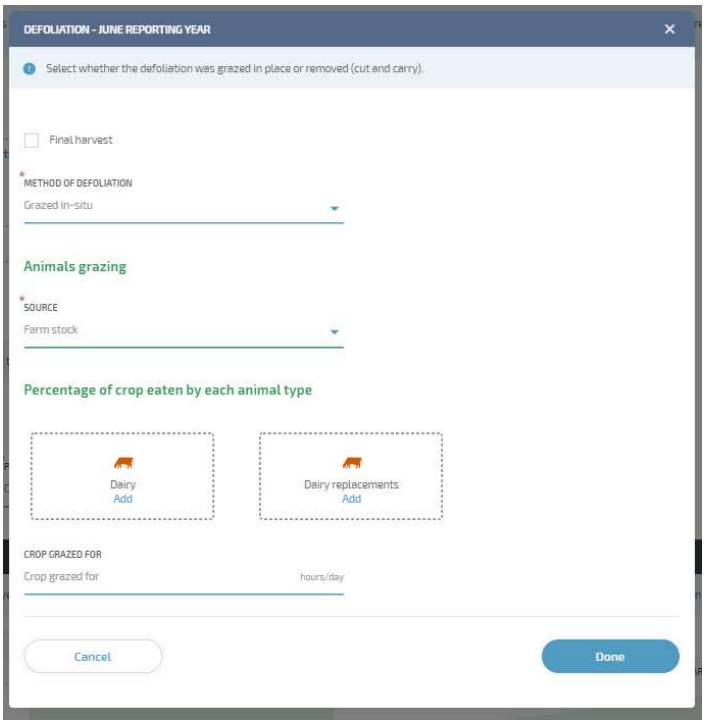


When an event is selected, there is option to edit or delete the event.

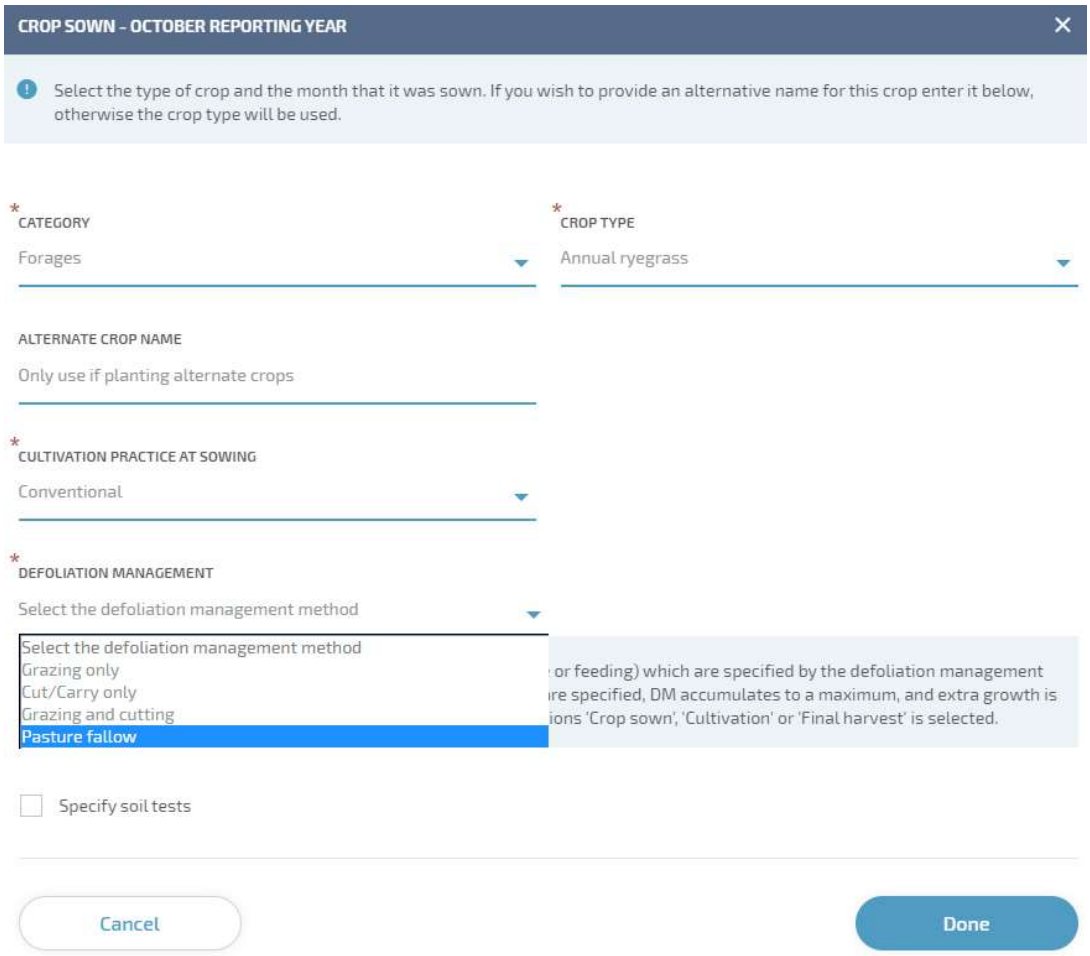


Each event added will require information to be entered. When a Crop is added, the specific crop information will need to be entered, this will be required for each event added. As information is added, more data fields will appear.

To add defoliations to the crops, click + in the appropriate month. This will bring up the defoliation information (shown below).



When defoliation management is added for crops. There are four options to chose from; Grazing only, cut/carry only, grazing and cutting, and pasture fallow. By choosing the grazing options, you will need to add animal information. By choosing the cutting options, you will need to add supplements information in the supplements tab. When selecting pasture fallow, it is for crops fallow as well.

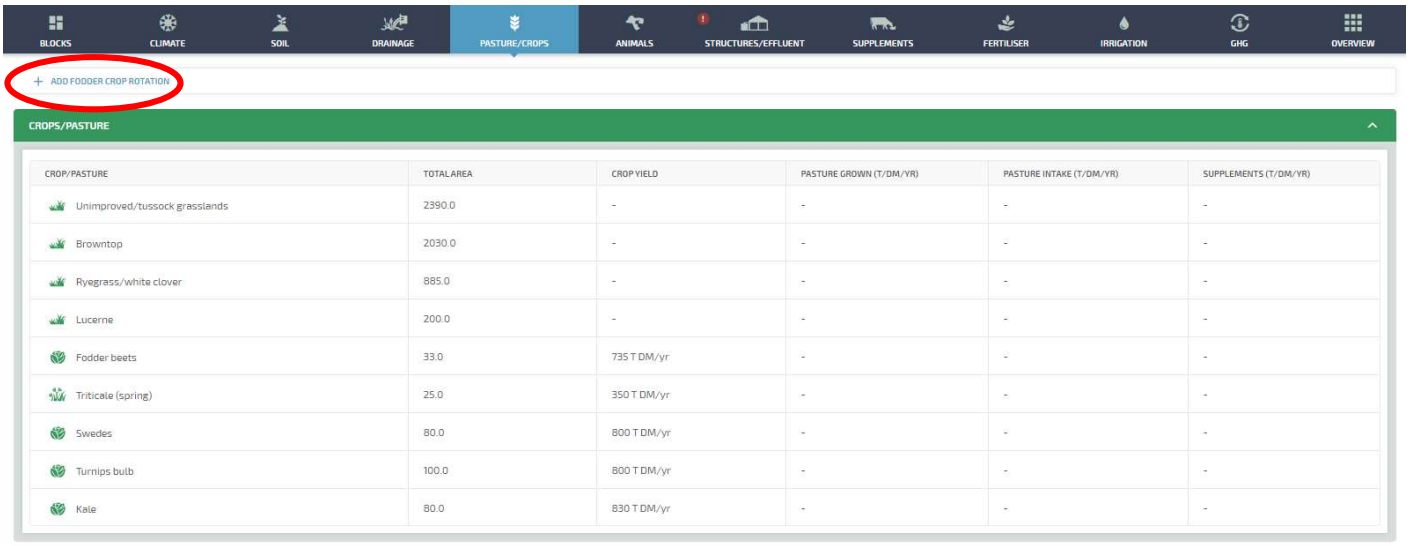


Fodder Crop

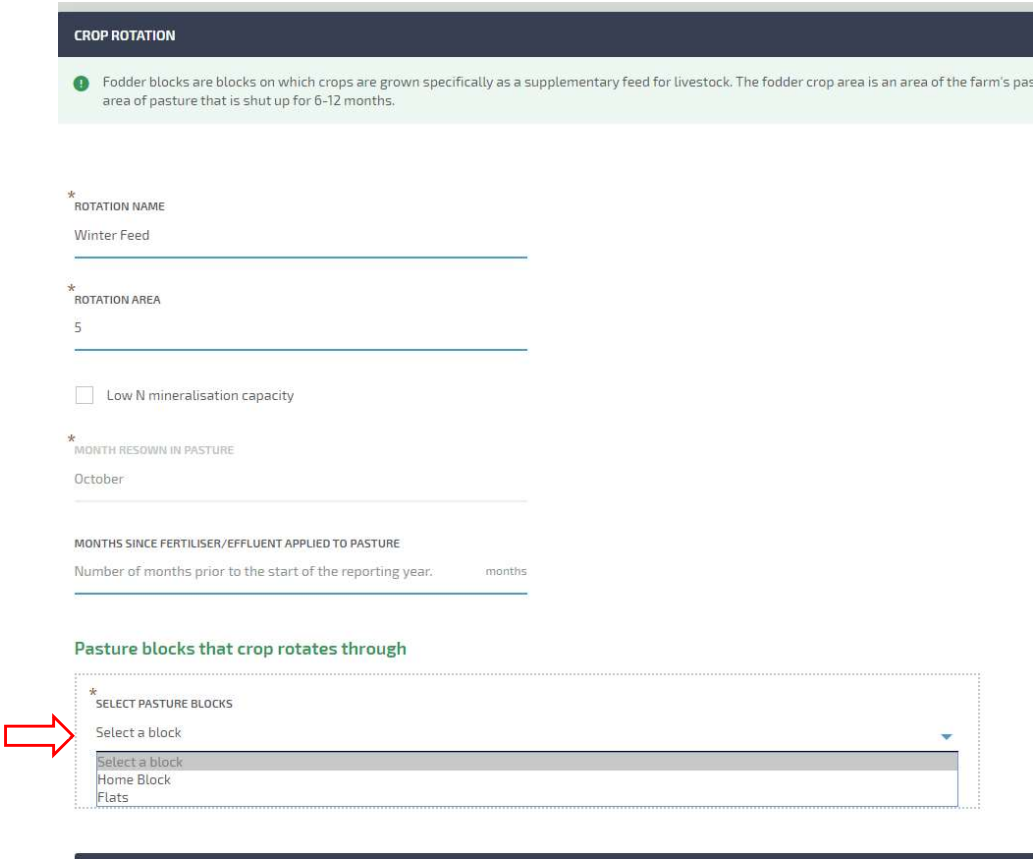
Best Practice Data Input Standards – Fodder crop

Use the fodder crop block type when fodder or forage crops rotate through selected pastoral blocks and are resown back into permanent pasture within 12 months. Only up to 25% of the area of pastoral blocks through which fodder crop blocks rotate can be cropped. If your fodder crop doesn't match this, enter as a crop block.

To add a fodder crop rotation to the pasture blocks, click +add fodder crop rotation on the Pasture/Crop page. This will need to be entered individually for each fodder crop rotation.

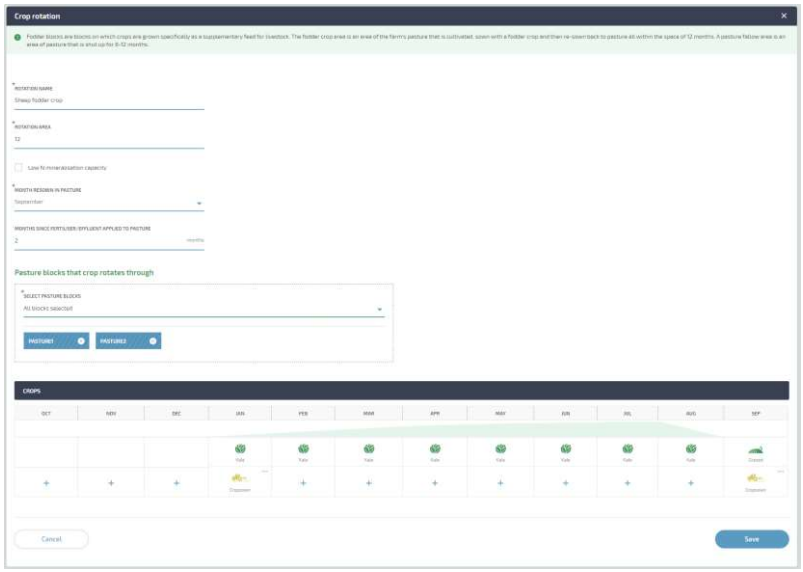


The rotation name, rotation area, Month resown in pasture and the months since fertiliser/effluent applied to pasture will need to be entered. The pasture block/s that the fodder crop rotates through can be chosen from a drop-down menu.



The pasture blocks that have been selected will become visible below the drop-down menu.

The fodder crop data inputs are entered following the Crop data steps in the preceding section.

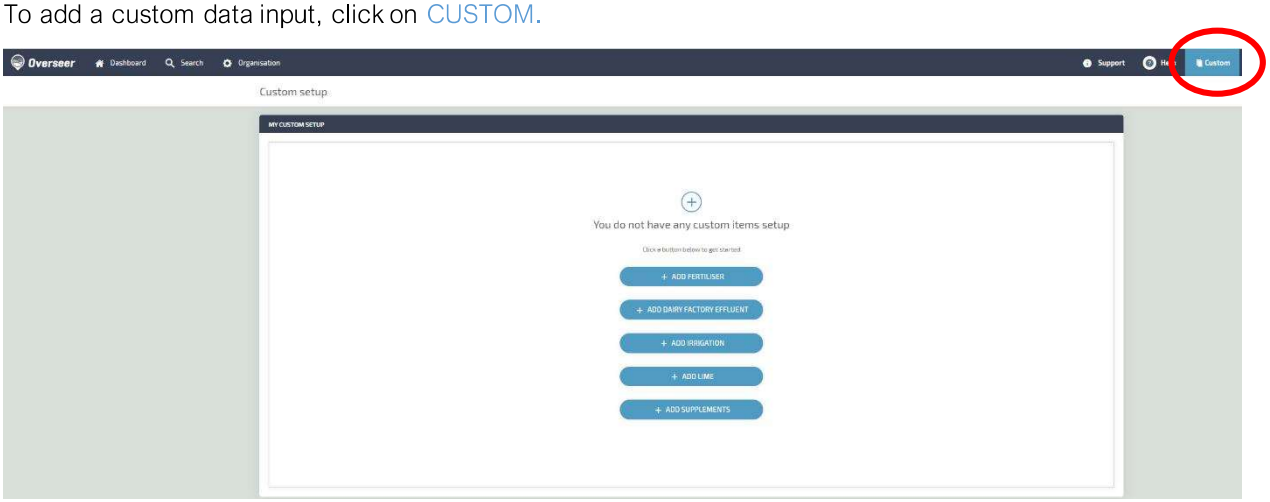


7.10 Custom Inputs

In OverseerFM you are able to add custom data inputs for fertiliser, dairy factory effluent, irrigation lime and supplements. For example, if you use a customised fertiliser mix, you are able to add this in the customer set up and add the fertiliser application data in the farm analysis.

Once the custom data is added, it can be used across all the farm analyses, without having to re-enter the specific data.

To add a custom data input, click on CUSTOM.



To add the data, click on the appropriate option, and the details will need to be entered.

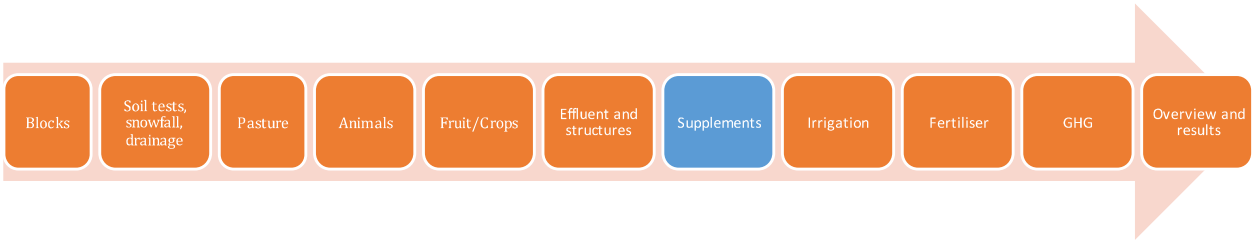
7.11 Supplements

In the Supplements tab, supplements harvested or imported details are entered. OverseerFM will collect together individual harvest events of the same type of supplement together to create a total for distribution.

Harvested and/or imported supplements can be added to the farm analysis. Supplements can be distributed by block or to an animal enterprise. They can be sent off farm or to storage. The same process for distribution applies to both.

Supplements are an important source of nutrients coming into a farm system and an accurate description of the type and amount of supplements brought in is critical to nutrient cycling assessments on-farm.

If you have imported a supplement and not distributed it on-farm, it does not need to be added to the Analysis.



Best Practice Data Input Standards – Fodder crop

Supplement description and source

1. Records (purchased or freight) of the types and quantities of the purchased feeds must be used to populate the fields required. Supplement source can be purchased or from storage.

• Where the nutrient budget is based on a one year assessment – feeds that were purchased or imported in the year of assessment but put in storage at the end of the year must NOT be included.

• If your supplement is not available from the drop down lists, select the supplement with the closest characteristics (crude protein or N content) or enter as user defined supplement.

2. When no records exist, farmer estimates will suffice, although it is unsatisfactory.

Weight

Enter actual weight (in tonnes) of supplement where known.

• Take care to check the box weight on dry weight basis if the weight is recorded on this basis.

• For bale feeds where actual weights are not known click use bale size. Where no information is given enter 12 for the number of standard bale equivalents/bale.

Storage

Leave as average, unless there is good evidence to alter this.

Destination

Select most appropriate destination where the supplement is fed, from the choices in the drop-down menu.

Select appropriate utilisation, or if unknown, use average, unless on a pad where the default is very good.

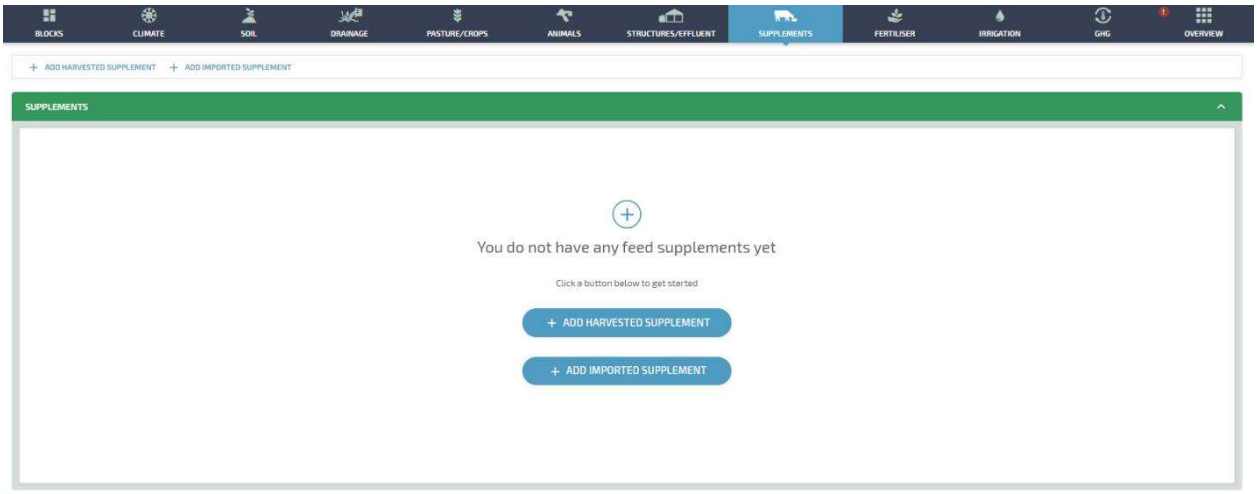
Select specify timing of feeding if timing is concentrated around certain times of the year e.g. maize silage in autumn. This should be based on on-farm records. Note that the feed balance needs to be more precise when timing is selected. If an error occurs around too much or too little feed, sometimes unchecking specify timing of feeding will resolve this.

Where the destination of the supplement is in shed feeding, this option will only become available after filling out the milking shed feeding section under the dairy enterprise feeding. The dairy enterprise inputs must be entered prior to entering supplement input page.

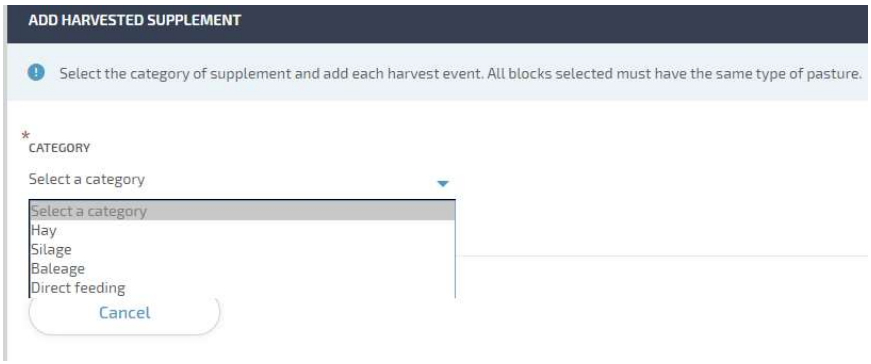
Because this is such a potentially important source of nutrients, farmers will need to be educated into obtaining and retaining accurate records of all supplementary feed purchased and fed.

• Utilisation and storage – inappropriate values entered are one reason why messages on insufficient or too much feed are generated.

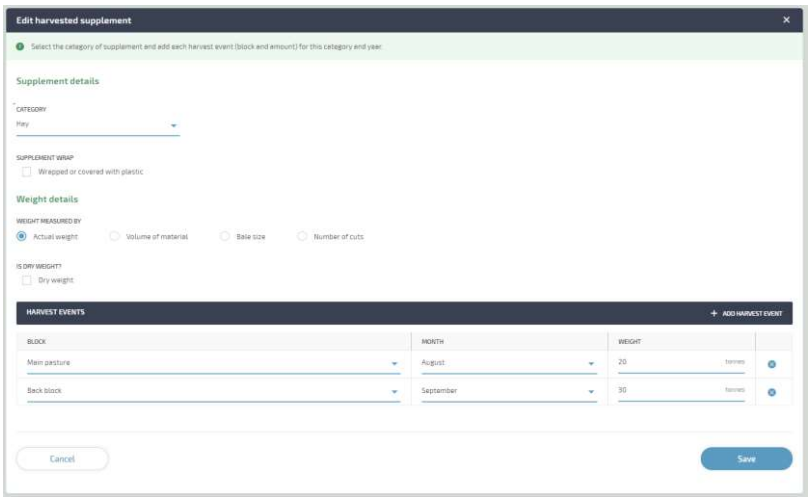
Click +add harvested supplement.



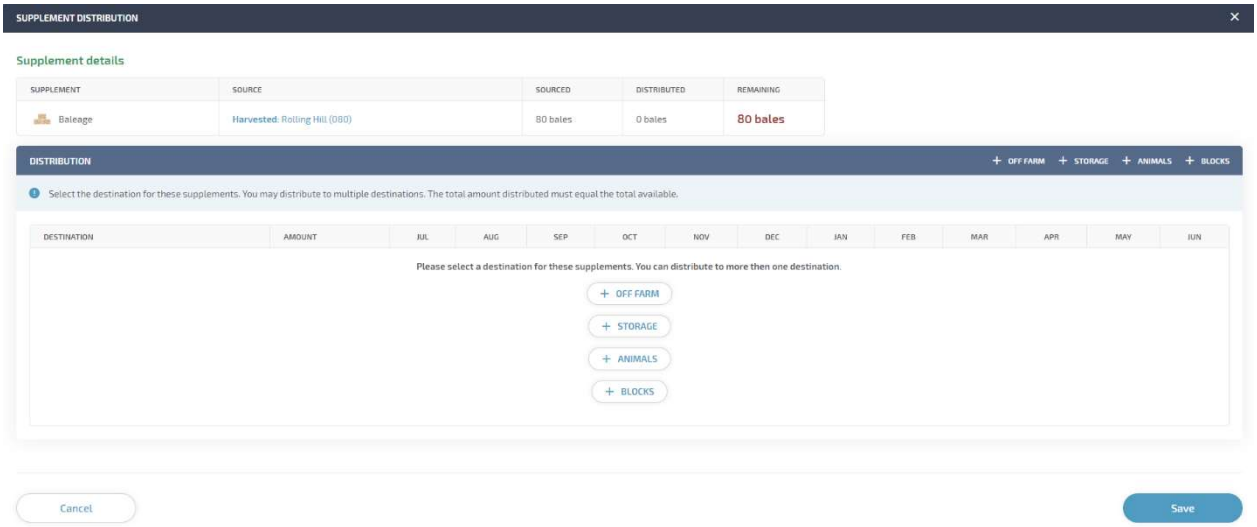
For harvested supplements select a category from the drop-down menu. These are hay, silage, baleage and direct feeding.



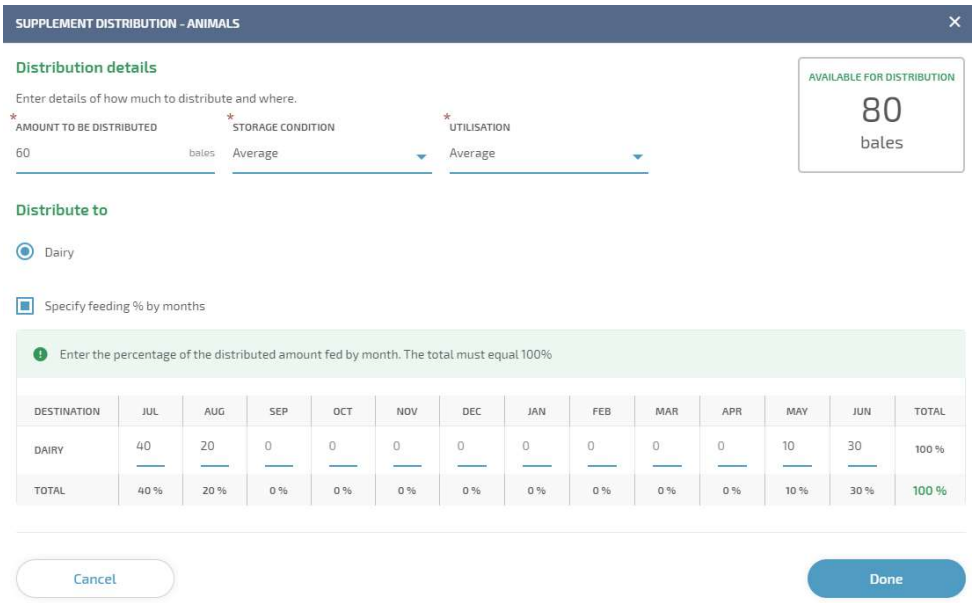
Once a category is selected, the appropriate data will need to be entered for that supplement.



Once harvested, the total harvest amount must be distributed to enterprises, blocks, off farm or into storage. Click on the appropriate + to distribute.



Depending on the distribution method selected, the data required will vary. For *Supplement Distribution - To Animals.*

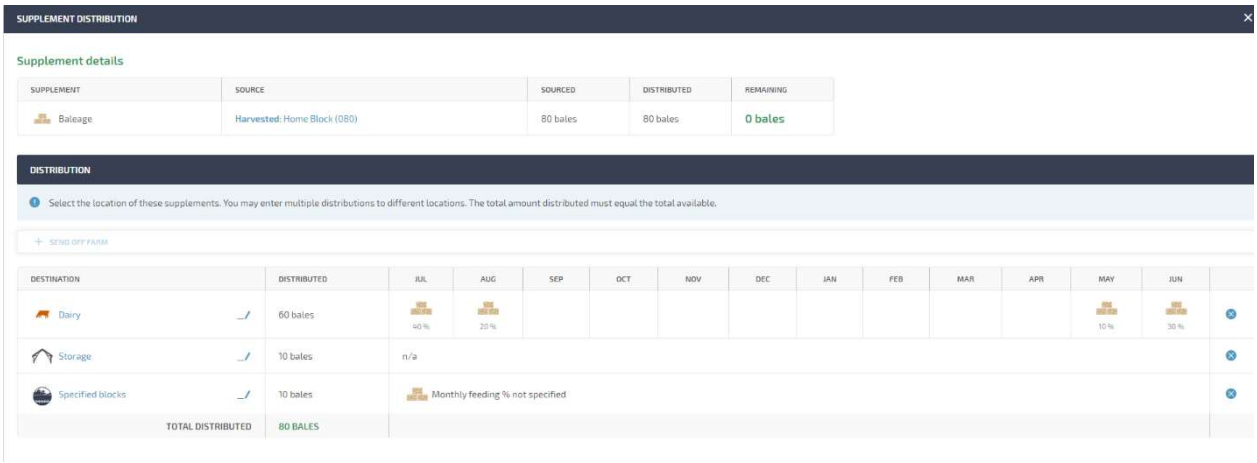


Supplement Distribution - All Pastural Blocks

Sending supplements to storage and off farm

The data entered can be reviewed on the SUPPLEMENTS overview page. At the top of the page, it will show if you have any supplements remaining to be distributed.

If data needs to be edited, click on the appropriate section.



For imported supplements click + imported supplements.

Follow the same process as harvested supplement to add information on how the supplement was distributed on farm.

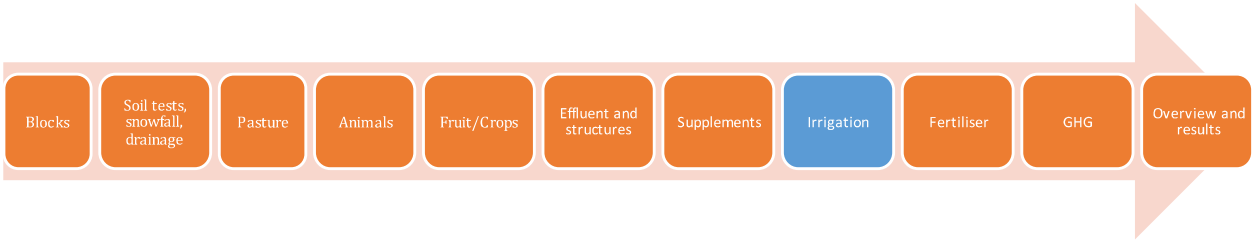
7.12 Irrigation

In the Irrigation tab is where irrigation data for the farm is entered. This is where the irrigation system is able o be drawn onto the blocks mapped.

It is important to note that if another irrigation type is added and applied it to the same blocks it will result in that type of irrigation being applied to the remainder of the block area (that is not covered by the first irrigator). They are not able to operate in the same area but are able to operate within the same block.

The green boxes at the top of the page summarises what has been irrigated across all blocks.

As the climate data does not recognise drought or wet years, it is important to enter irrigation data for a 'normal year'.



Best Practice Data Input Standards – Irrigation System type

Irrigation in addition to rainfall drives plant production but also affects soil drainage and thus has a critical influence on drainage (leaching) and runoff nutrient losses.

The selected order of inputs for the upgraded irrigation module better reflect actual long-term practices (Irrigation New Zealand has been involved in developing this module).

Appendix 12 provides an example of an optional irrigation questionnaire that could be used to help gather the information required for entering irrigation into OVERSEER.

The irrigation data to use is the long-term irrigation information relevant to a 'normal' year as opposed to within year tactics based on a drier or wetter than normal year.

Irrigation system type

1. Select irrigation system most applicable to your farm

• linear move and centre pivot

• travelling irrigator

• spraylines

• micro-irrigation (drip and sprinkler)

• solid set

• controlled flood

• border dyke

IRRIGATION MANAGEMENT SYSTEM DEFINITION

Centre pivot/ Linear move

Laterals (linears) and pivots have a main pipeline supported above the field by a series of A-frame towers, each having two driven wheels at the base that keep the machines travelling in a straight formation. Water is discharged under pressure from sprinklers or sprayers mounted along the pipeline.

Laterals traverse the field in a straight path creating a rectangular wetted area. Water is supplied from a drag hose connected to a series of hydrants off a mainline.

A centre pivot consists of a lateral circulating around a fixed pivot point. Depending on field layout, the pivot may complete a full circle or only part segments. The inside of the pivot covers less area than the outside of the pivot. The sprinkler package is tailored accordingly to ensure the same amount is applied along the length of the pivot.

Travelling irrigator

There are three categories of travellers; gun, fixed boom and rotating boom. Each consists of two parts:

a. winch mechanism and a reel or spool b. gun-cart carrying the water distribution system.

A travelling irrigator moves across a field sequentially, strip by strip drawing the gun-cart. They are connected to successive hydrants along a buried mainline. Travelling irrigators are characterised by either a soft hose or hard hose.

Soft hose travelling irrigators have a wire rope anchored at the end of the run. The water distribution system and a winch are mounted on the guncart. The winch pulls the guncart along by coiling the rope on to the reel. The hose, pulled by the guncart, drags behind. At the end of each run the hose is flattened and coiled onto a drum to move positions.

Hard hose travellers have a large stationary reel anchored at the run end. The reel acts as a winch, coiling a delivery tube that both supplies water to the distribution system and drags the gun-cart along the field.

Spraylines

A sprayline irrigation system irrigates a field by sequentially moving a static line of sprinklers to predetermined parallel locations across a field. Water is discharged under pressure from the sprinklers which are set at even intervals along a lateral pipeline. There are 4 basic types, Hand-move pipes, side-roll systems, towable systems (pods) and long lateral systems.

Hand-move pipes are typically aluminium lengths that clip together with quick couplings to fit field dimensions. Shifting is manual, with pipe sections separated, moved and rejoined at each position. A sprinkler is mounted on a riser at one end of each pipe section, so the sprinkler spacing is set.

Side-roll systems consist of sprinklers mounted on aluminium or steel pipeline sections. Each section acts as the spindle of a centrally fitted wheel. Repeating units are joined to form the sprayline to fit field dimensions. The sprinklers are mounted on rotating couplings to ensure horizontal alignment regardless of spindle position. Sprinklers are mounted at pipeline height, and spacing is essentially set. Shifting is done by rolling the complete line sideways to the next position in the irrigation sequence.

Towable spraylines (k-line) consist of smaller sized impact sprinklers fitted at set intervals on an alkathene pipe. The laterals are connected to hydrants off buried mainlines. The sprayline length is set. Shifting is by towing the complete sprayline by one end to the next position in the field. Each lateral is moved manually around 6–14 positions.

Long-lateral systems have medium sized impact sprinklers mounted on a moveable stand on the end of a length of alkathene pipe. The pipe is connected to hydrants off buried mainlines. The pipe length is typically 60–80 metres long and each sprinkler is moved manually usually by motorbike around 6–10 positions to cover an average 0.8 ha.

Sprayline irrigation systems are typically arranged so successive shifts create a grid pattern of sprinkler positions. The spacing between sprinklers may vary considerably. The sprinkler layout pattern that is achieved in practice may be either square, triangular or somewhere in between. Multiple shifts over time overlap to water all of the area.

Micro-irrigation (drip and microsprinkler)

A micro-irrigation system consists of a network of lateral pipelines fitted with low discharge emitters or sprinklers. It encompasses a number of methods; drip, subsurface, bubbler and micro-spray irrigation.

In a drip system, water is discharged under low pressure from emitters mounted on or built into the laterals which may lie on or above the soil surface, or be buried below the ground in the crop root zone. These systems are distinguished by the fact that water is delivered by the system to some point, for distribution laterally (and vertically) by the soil medium. Discharge rates are generally less than 8 litres/hour for point-source emitters and 12 litres/hour per metre for line-source emitters.

Micro-sprayer (micro-jet) and mini-sprinkler systems rely on aerial spread of water droplets to achieve significant lateral displacement before water enters the soil. There may be further lateral spread within the soil itself. Discharge rates are typically less than 60 L/h.

Solid set

Solid set irrigation systems are characterised by permanently fixed sprinklers on rigid supports. They are typically arranged in a triangular or rectangular grid pattern with spacing dependent on sprinkler throw capacity.

Solid set sprinkler systems are commonly used for over-head frost protection and undertree orchard irrigation. They are also used for nurseries and amenity irrigation including sports grounds and golf courses. Pastoral applications are increasing.

Controlled flood

Water is directed to areas of land via a network of channels and ditches. They utilise the natural contours and fall of the land to distribute the water. It is common only in older Central Otago schemes. Furrow irrigation is practically unknown in New Zealand but if practice it should be included under controlled flood.

Border dyke

Water is carried by canal and race networks to head-races on-farm. A series of gates in the head-race progressively hold water back, raising its level until it spills over a sill and on to graded land contained within borders. The gates are controlled by clocks connected to a release mechanism and they fall at set intervals along the race.

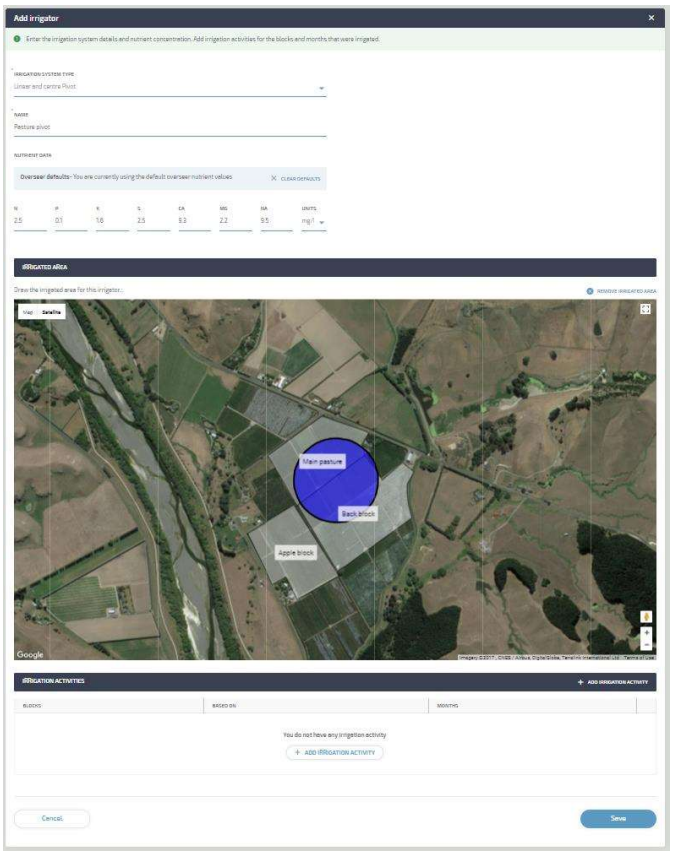
To define an irrigation system by drawing the irrigated area. This should be done where the irrigated area is fixed, such as a linear and centre pivot.

If the irrigated area is drawn on the map, then the blocks that the area overlaps are automatically selected for applications. If you do not draw the blocks that are irrigated, then you must select manually.

There are two options for drawing the irrigated area, using a circle or a polygon (in the same way blocks are drawn) or using the drawing tool selection () at the top of the map to switch between them.

When drawing a circle, select the middle of the circle on the map and hold down the mouse button while moving out to create the circle. Select “Remove irrigated area” to start again.

Below is a centre pivot with the irrigated area drawn.



Best Practice Data Input Standards - Nutrient concentrations in irrigation water

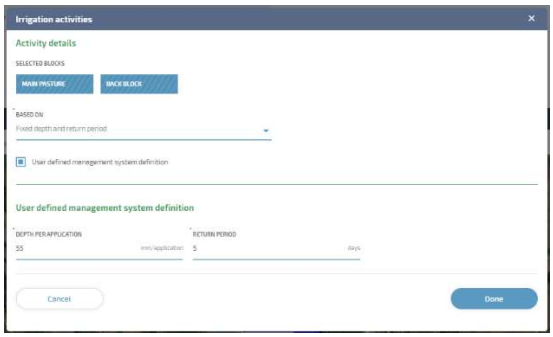
1. Use OVERSEER default values.

2. Only enter block specific data when you have accurate, long-term average nutrient concentrations for irrigation water. Consider water source:

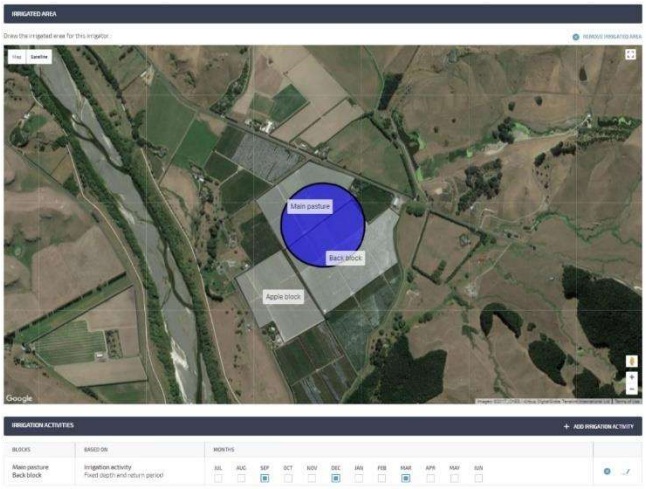
- Groundwater depth (water supply from deep bores typically has much lower nutrient concentration than shallow ones)
- Surface water type (alpine rivers typically have much lower concentration than lowland streams)

The OVERSEER default settings should be used as most people will not have accurate longterm average nutrient concentration data.

When adding an activity to an area, the blocks are already selected.



Saving the activity returns to the irrigation page, where the months that irrigation occurred can be selected.



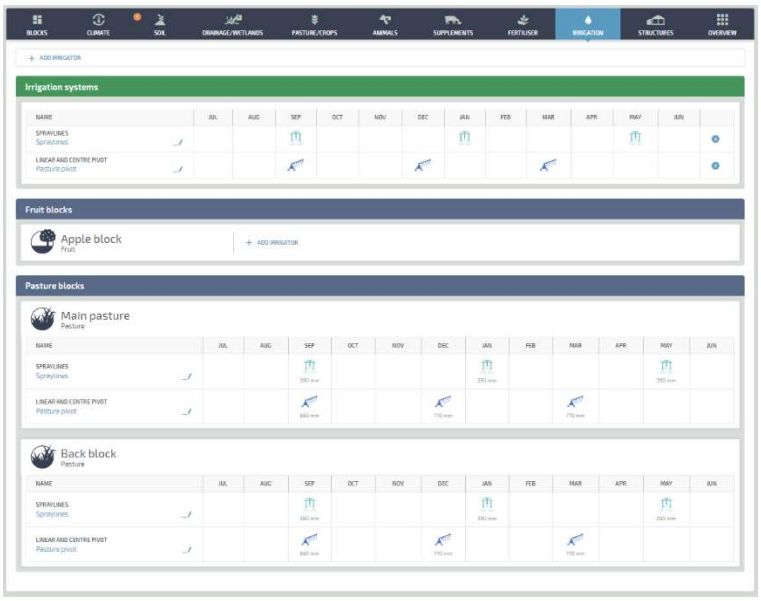
It is important to note that if another irrigation type is added and applied it to the same blocks it will result in that type of irrigation being applied to the remainder of the block area (that is not covered by the first irrigator). They are not able to operate in the same area but are able to operate within the same block.

Best Practice Data Input Standards – Application

Select the typical months in which irrigation is applied.

- Typical means in an average year not a drought or high rainfall season. Most often this is October to April but there are regional variations.
- It is also important water supply restrictions are considered when entering in irrigation months e.g., if the water supply is typically not available in February due to river flow restrictions this should be reflected.
- Irrigation management should be entered on a month by month basis.
- The days that you are irrigating in the shoulder months are critical to N loss. When you select the shoulder months the model assumes irrigation occurs for the whole month. If this does not reflect what happens on your farm, it is recommended for the shoulder months you following the steps outlined below:

1. Irrigation schedule to based on Soil moisture sensors (probes or tapes).
2. Strategy to Trigger point and fixed depth applied or the most suitable option.
3. Management system definition to default.


BLOCKS
CLIMATE
SOIL
DRAINAGE/WETLANDS
PASTURE/CROPS
ANIMALS
SUPPLEMENTS
FERTILISER
IRRIGATION
STRUCTURES
OVERVIEW
+ ADD IRRIGATOR
Irrigation systems
NAME
JUL
AUG
SEP
OCT
NOV
DEC
JAN
FEB
MAR
APR
MAY
JUN
SPRAYLINES
Sprayliines
LINEAR AND CENTRE PIVOT
Pasture pivot
Fruit blocks
Apple block
Fruit
+ ADD IRRIGATION
Pasture blocks
Main pasture
Pasture
Back block
Pasture

7.13 Fertiliser

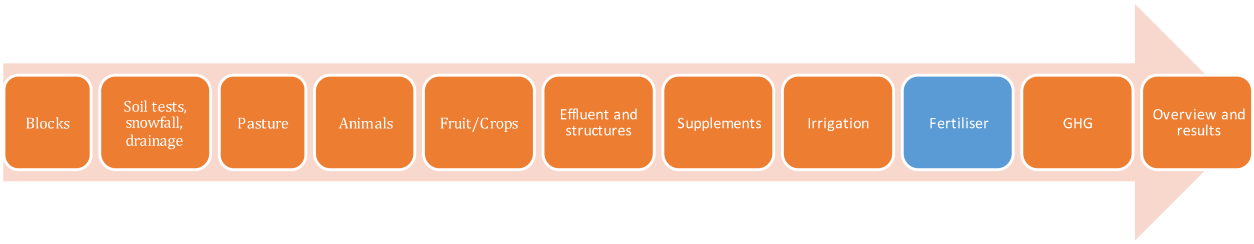
In the fertiliser tab, fertiliser products, lime, soluble or organic fertilisers are entered.

All the fertiliser data entry is found on one page, this includes for pasture and crops. Each product entered is applied to a block, or multiple blocks, by month.

If the fertiliser that is applied to the farm is not found in the OverseerFM database, it can be added by using the customer fertiliser tool where the specific nutrient data can be entered.

There is a warning message that will appear if fertiliser has not been applied. This able to be supressed.

You will need to include all nutrients that are applied on farm, this includes organic sources such as compost and pig/chicken manure.



Best Practice Data Input Standards – Fertiliser

Fertiliser nutrients are one of the major sources of nutrients coming into farm systems and consequently have a large impact on nutrient cycling and losses.

Fertiliser and lime information must be entered based on the month(s) of application. Overseer provides fertiliser and lime product lists from drop-down menus.

1. Enter the most recent fertiliser nutrient and lime data.

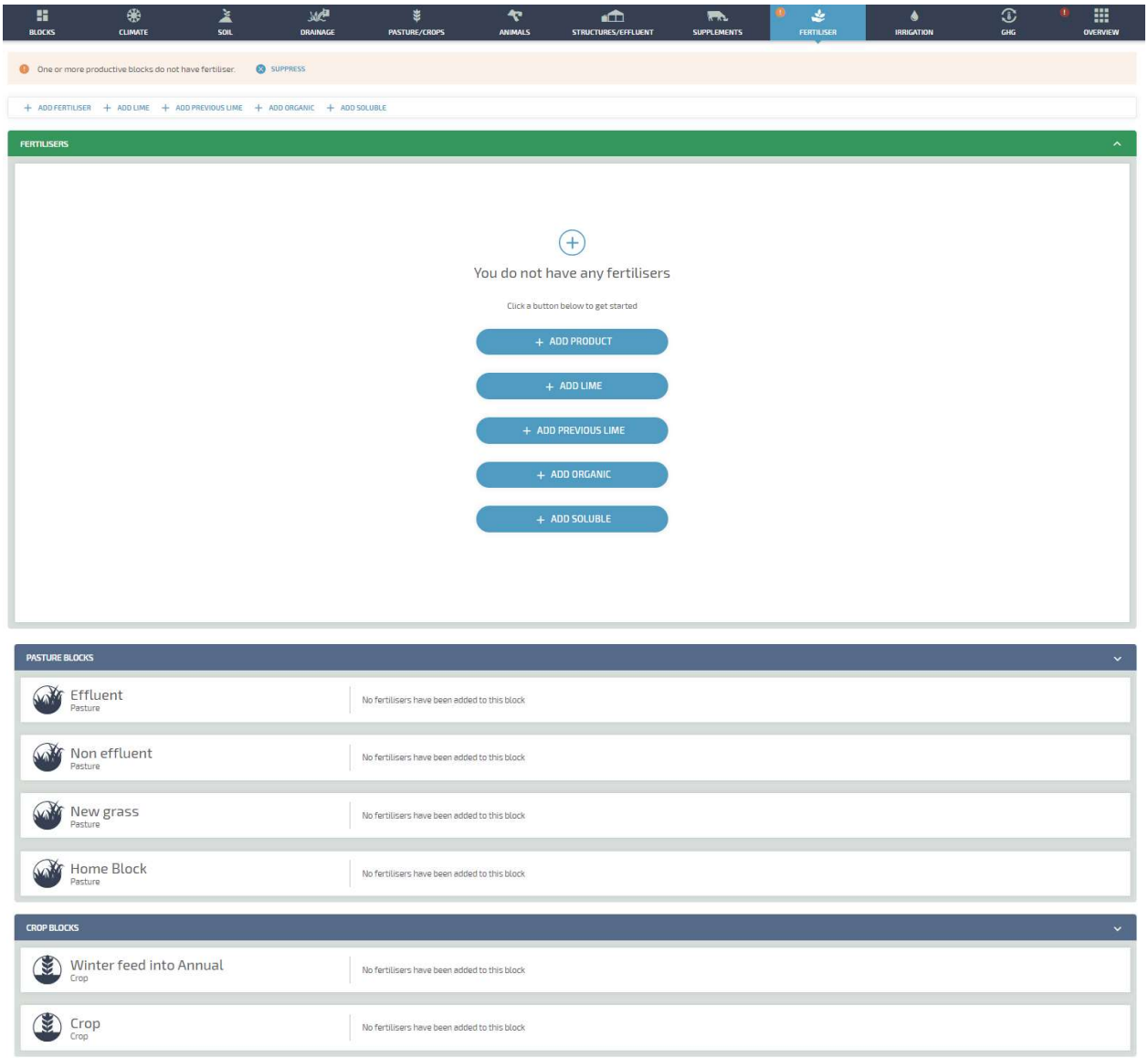
2. Enter long-term average (e.g. rolling 3-year average) fertiliser nutrient and lime data.

The 3 methods of entering fertiliser (soluble fertiliser, fertiliser product or fertiliser form) are equivalent – select the one that is most appropriate for your data. Take care to ensure that there is no double counting. This section covers inorganic fertiliser of all types, lime and organic materials, such as imported industrial effluent e.g. dairy factory waste and any fertiliser applied through fertigation.

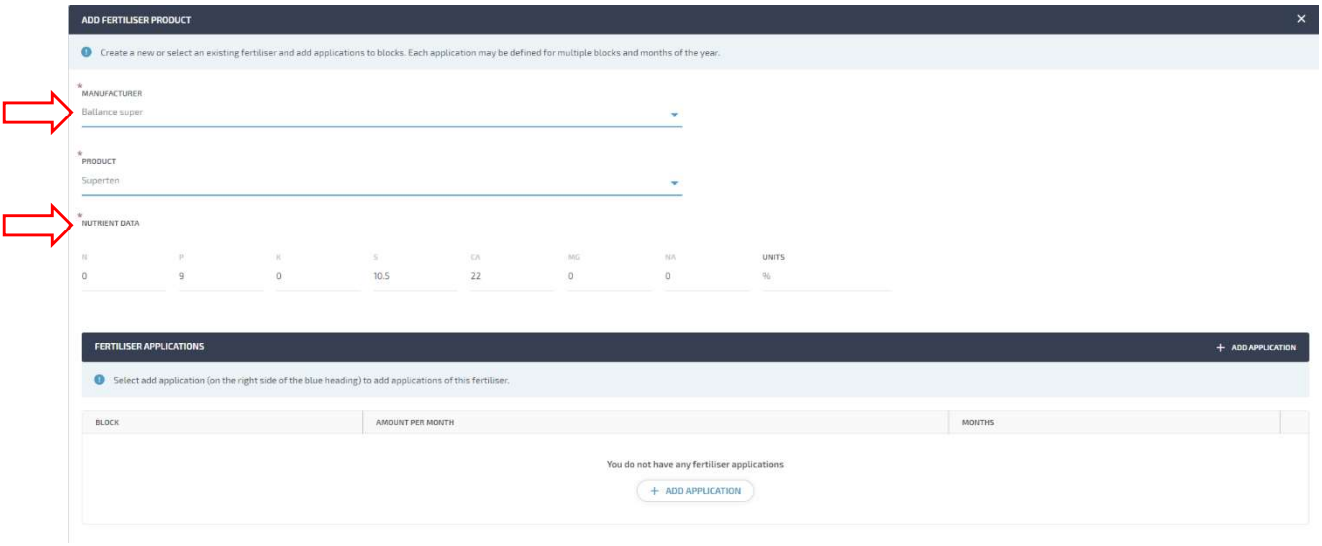
Fertiliser applied to the pastoral block that is also applied to the fodder crop block or crop block before it is sown into the crop and after it is resown to pasture should be entered in the fodder crop or crop block fertiliser page.

There are a range of sources of information from fertiliser and lime purchase orders, transport and spreading invoices to proof of placement information, so this section can be filled out accurately.

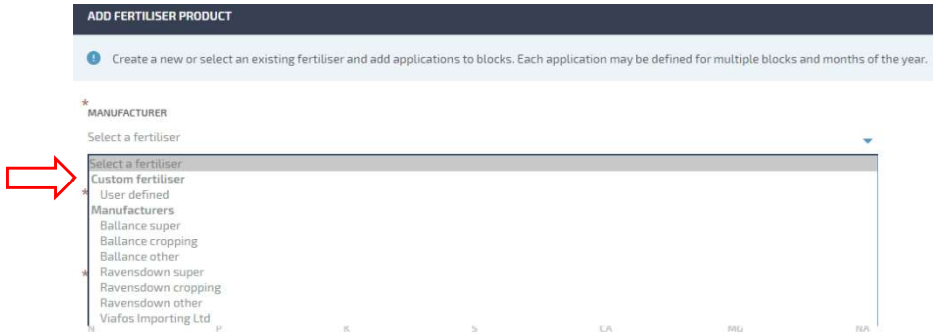
To add fertiliser, lime, organic or soluble fertiliser click +_____next to the appropriate category.



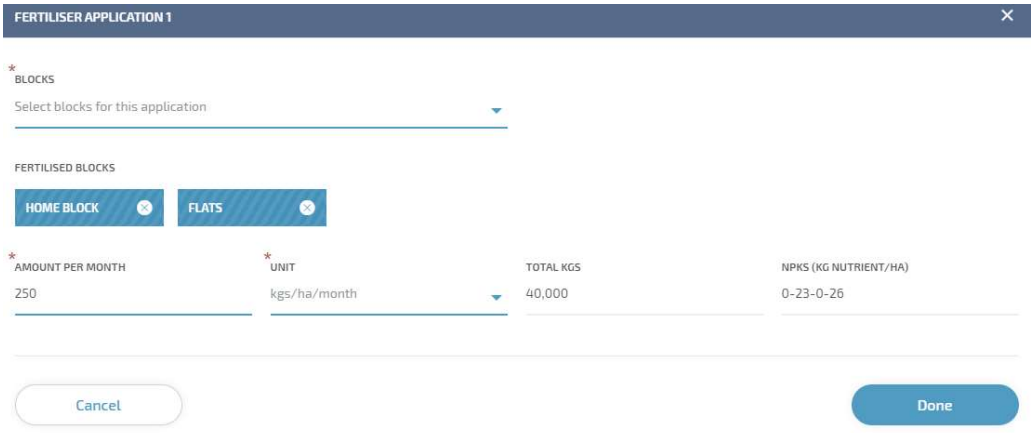
For a fertiliser product, select the manufacturer and the product from the drop-down menus. The nutrients are displayed for that product.



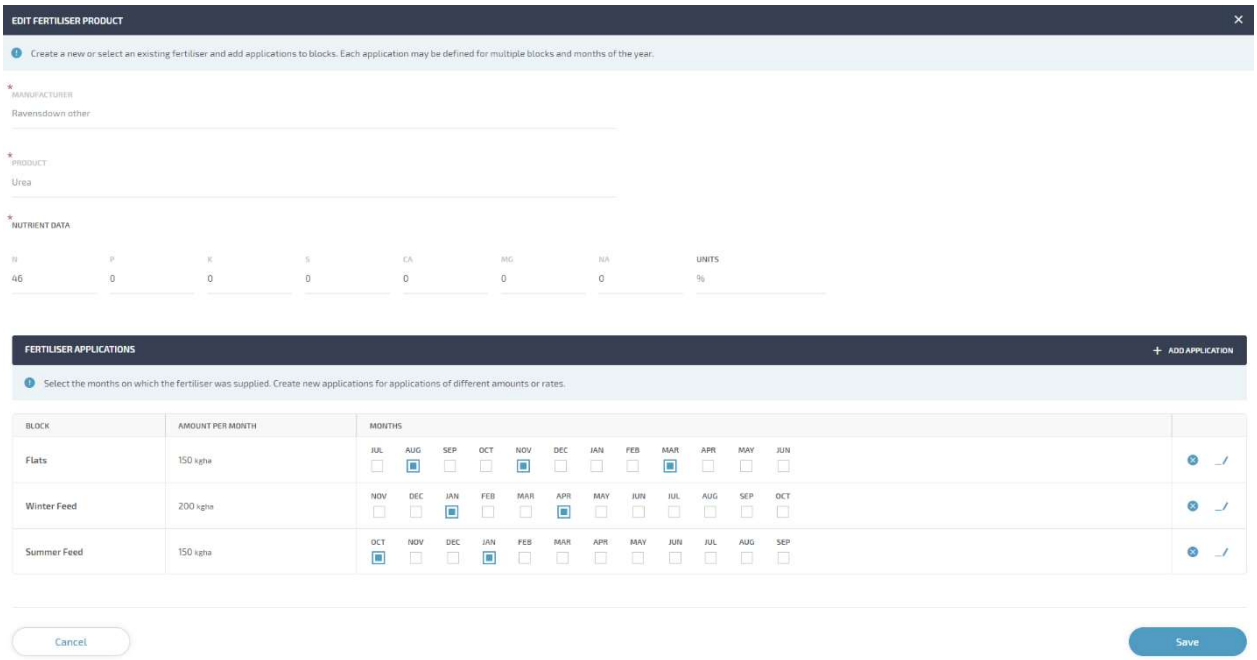
The products shown are from the companies; Ballance, Ravensdown and Viafos. If your product is not shown or from another company, use Custom Fertiliser – User defined from the drop down menu.



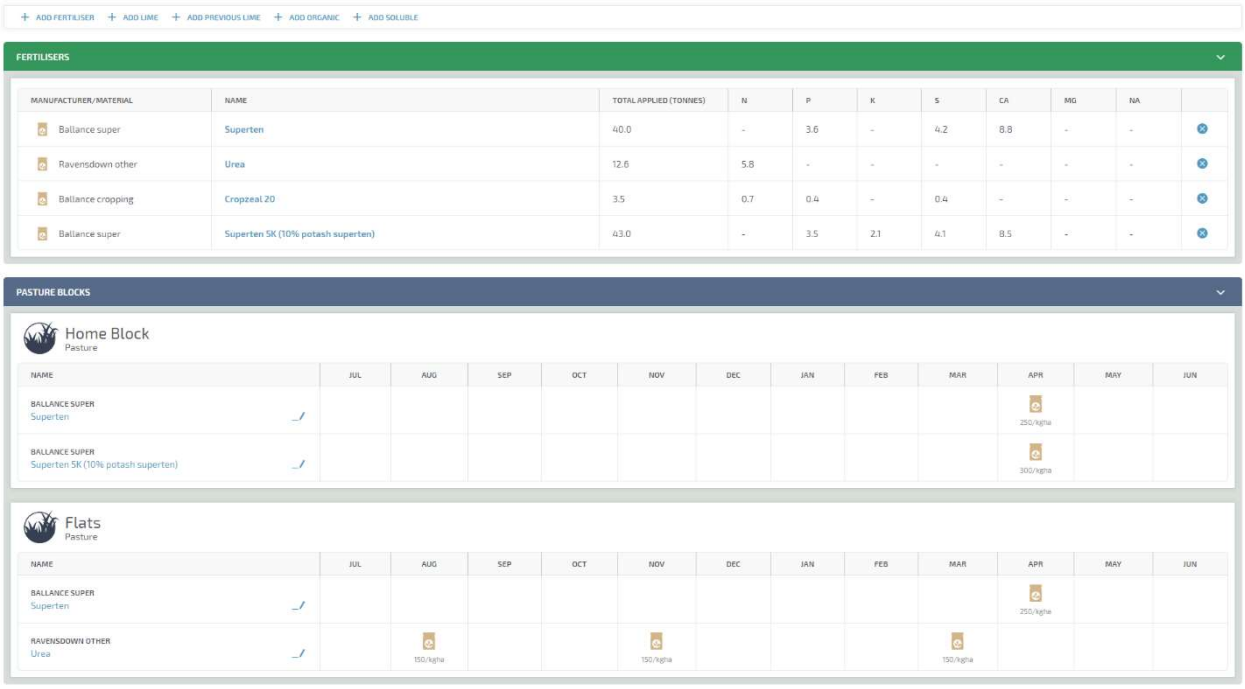
Select +add application, enter the application details and select one or more blocks.



After saving, select the months for the application. All the applications of a fertiliser for the year must be added.



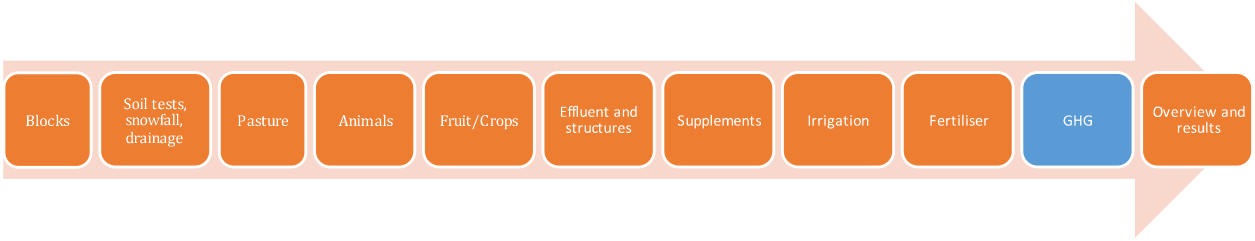
Fertiliser applications entered can be reviewed for the whole farm and per block on the fertiliser page.



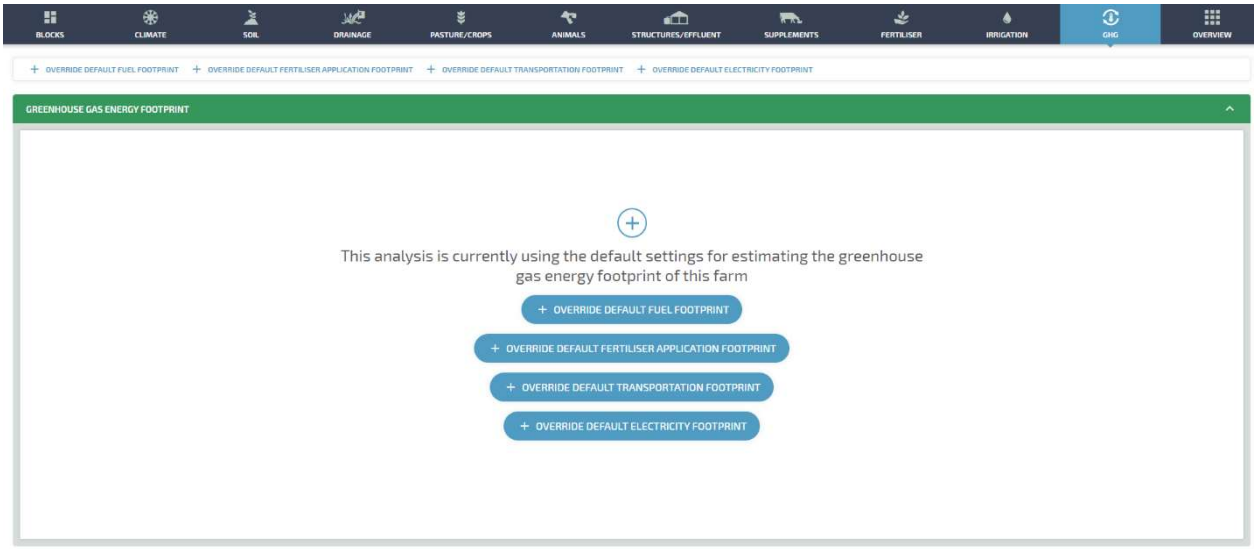
8 Green House Gases

OverseerFM provides users with information to examine the impact of greenhouse gases. You can enter data for your greenhouse gas energy footprint. The analysis is currently using the default settings for estimating the greenhouse gas energy footprint of this farm. By entering data, you are able to override the defaults.

The model reports greenhouse and energy emissions at a farm scale only, although some of these emissions are calculated at a block scale.



You can enter data to override the defaults for the fuel footprint, fertiliser application footprint, transportation footprint and the electricity footprint. Click on the appropriate + and follow the instructions.

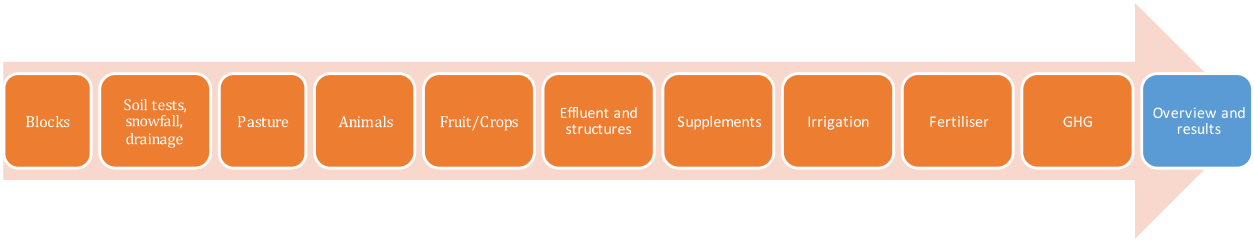


9 Analysis Overview and Results

The overview tab shows all the block details entered. This shows a visual representation of the data at a farm and block level. Expand the Pasture Blocks and Crops section to see the block level details.

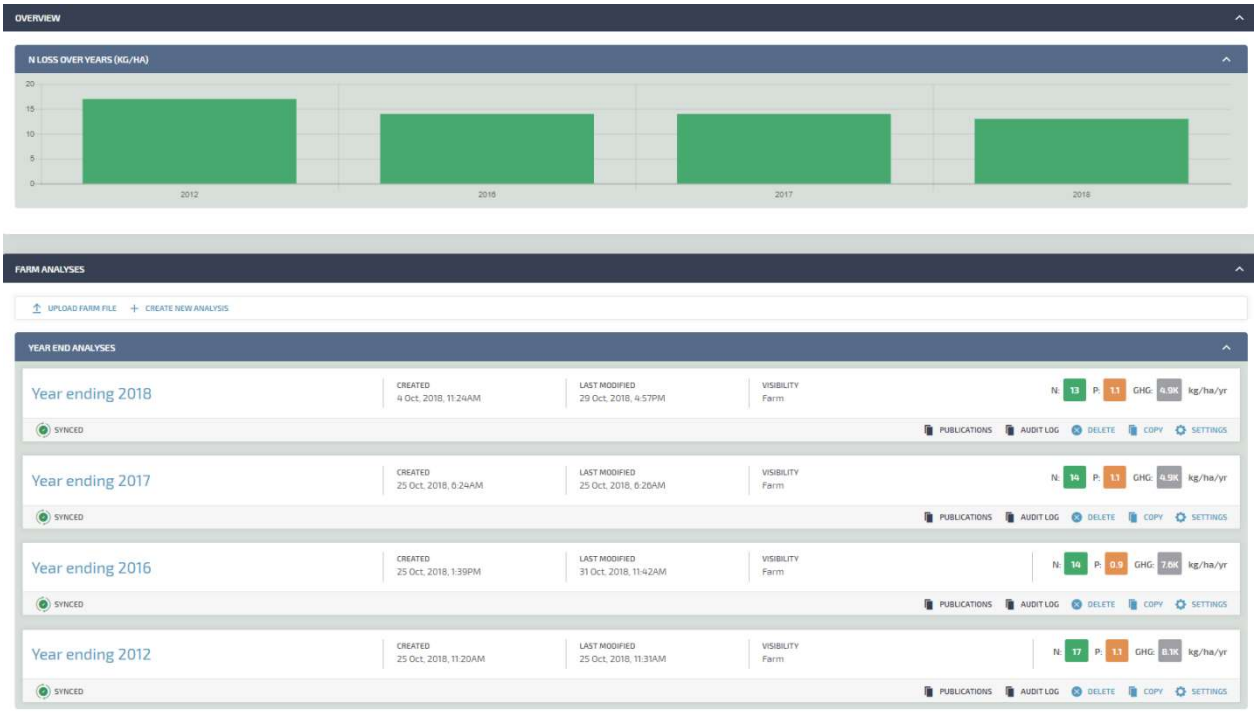
If any data is incorrect, it will need to be edited in the appropriate tab. Whenever data is saved for an analysis, the model is run, and the results are returned and made available for to view.

This sections provides a visual representation of the data that has been entered. The results are presented at a farm scale, and are also broken down by block. This is where you will be able to see what your blocks are showing.



9.1 Analysis overview

At the Analysis overview screen and what it shows the trend of the whole farm nutrient loss over time.



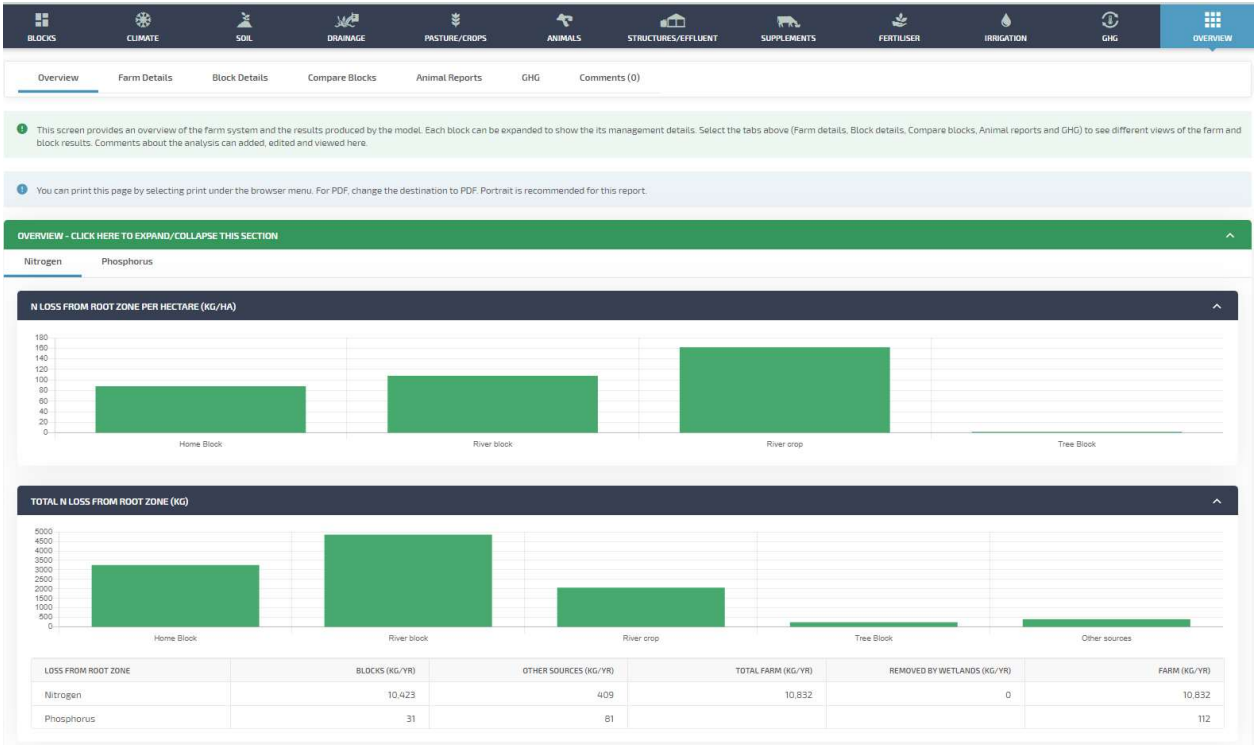
9.2 Results Overview

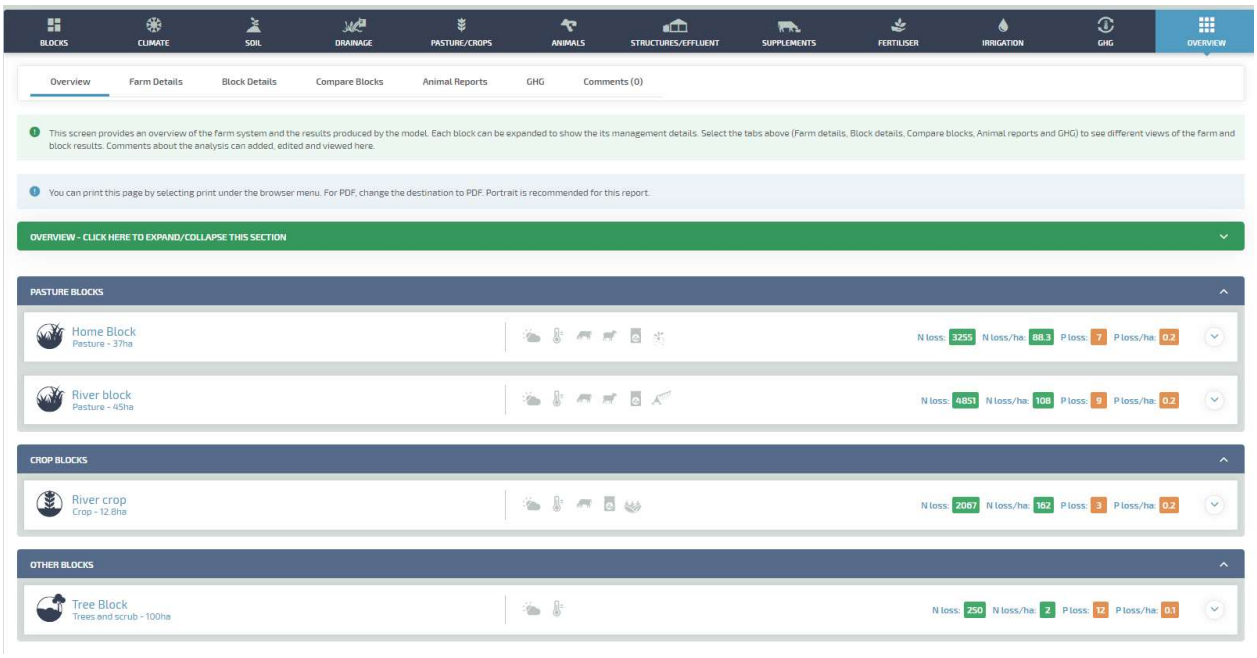
This is a visual representation of the data entered. If any data that is incorrect, go to at associated data input tab. At the top of the page, graphs showing N loss (total and kg/ha) by block. N and P loss are shown as a total and kg/ha. The Version of overseer is shown in the right-hand corner as e.g. v6.3.2.

The following results are shown:

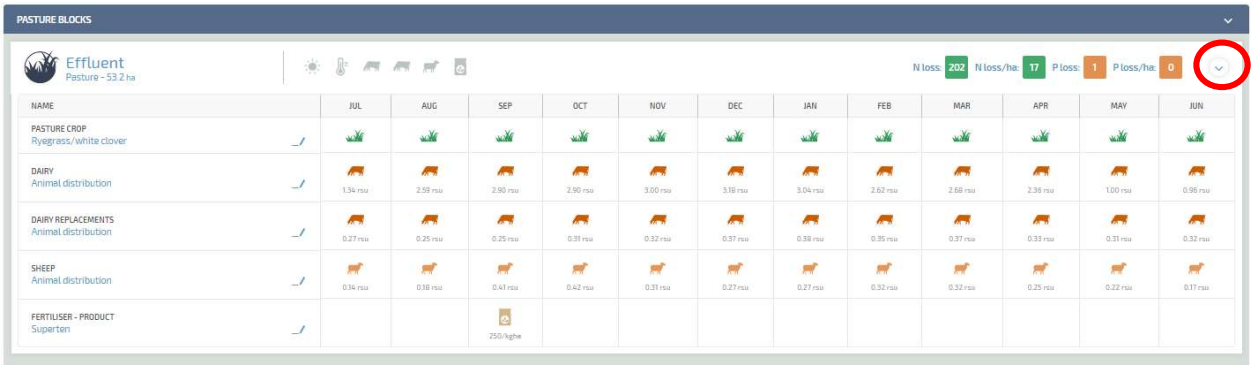
- N Loss and P Loss numbers for each block on the overview screen
- N Loss and P Loss numbers for the farm at the top of the screen
- Pasture production by block under the pasture/crops tab
- Irrigation applied by block and month under the irrigation tab
- Animal RSU for each block and month under the animal tab
- Access the analysis overview and blocks summary from the Overview tab

The next sections are separated into Pasture, Crop and Fruit blocks (depending on what information has added). If there have multiple blocks entered e.g. Pasture (Flats, Home) each of the blocks will be shown under Pasture heading.



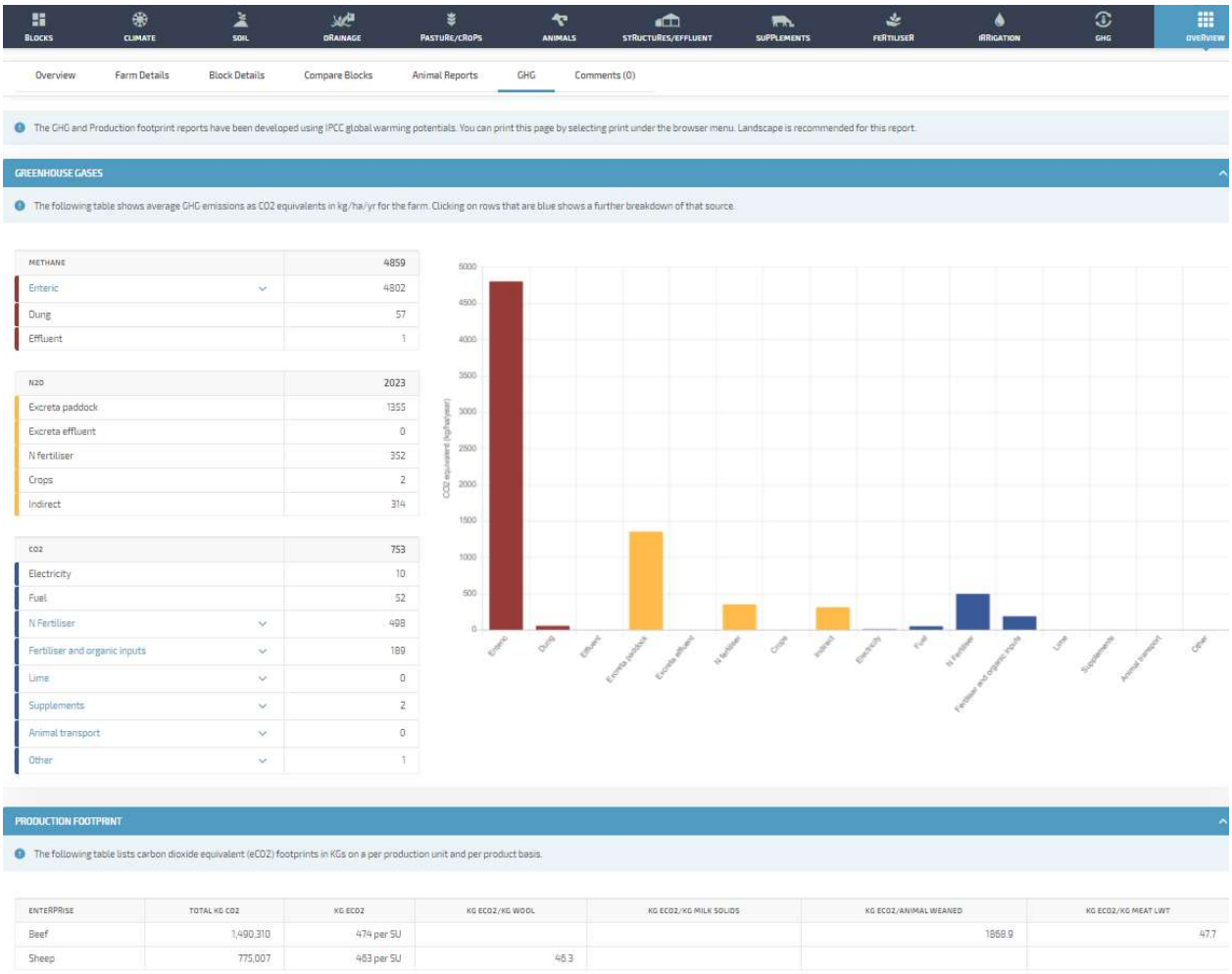


To see greater block detail, click the arrow. This will show the details of the data entered and the N and P loss for that block.

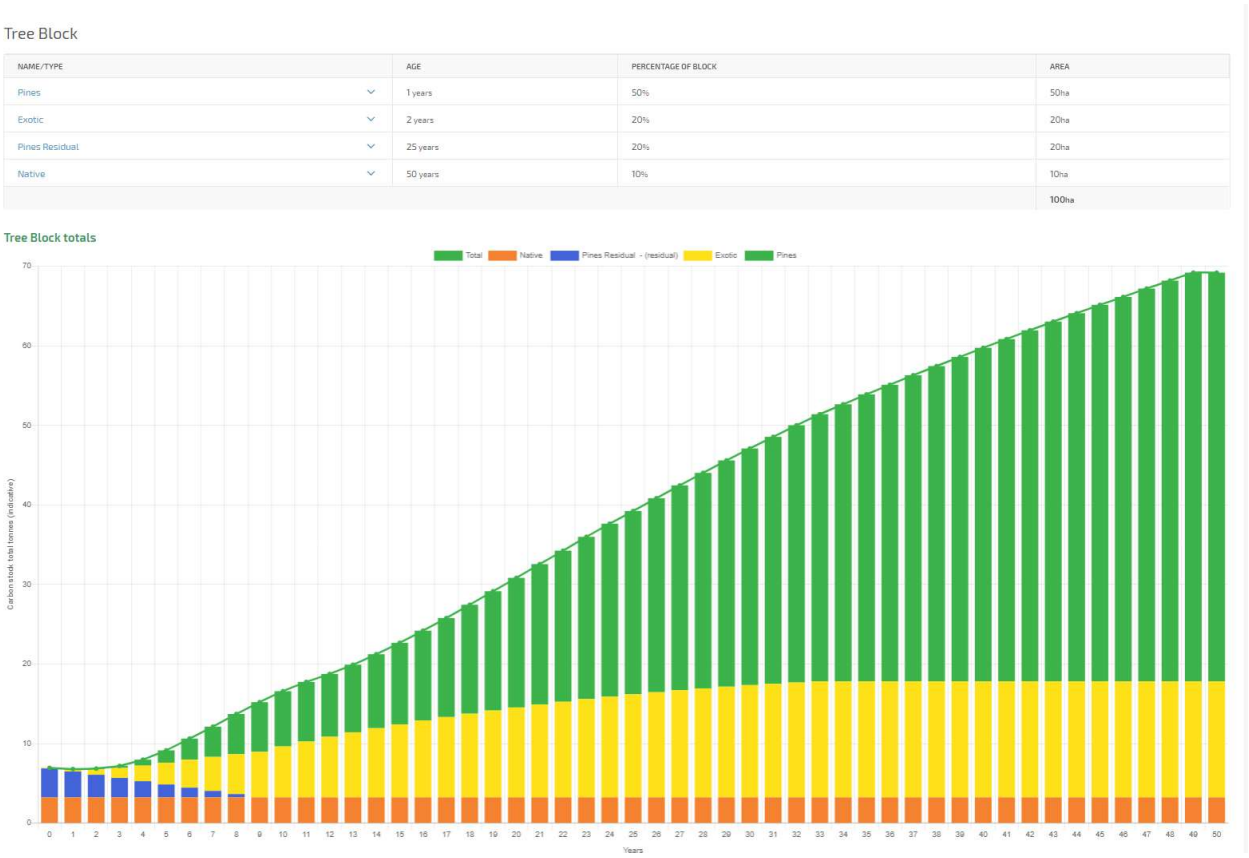


GHG

The following images provide an example of the GHG emission reporting you may see.


BLOCKS
CLIMATE
SOIL
DRAINAGE
PASTURE/CROPS
ANIMALS
STRUCTURES/EFFLUENT
SUPPLEMENTS
FERTILISER
IRRIGATION
GHG
OVERVIEW
Overview
Farm Details
Block Details
Compare Blocks
Animal Reports
GHG
Comments (0)
The GHG and Production footprint reports have been developed using IPCC global warming potentials. You can print this page by selecting print under the browser menu. Landscape is recommended for this report.
GREENHOUSE GASES
The following table shows average GHG emissions as CO2 equivalents in kg/ha/yr for the farm. Clicking on rows that are blue shows a further breakdown of that source.
METHANE 4859
Enteric 4802
Dung 57
Effluent 1
N2O 2023
Excreta paddock 1355
Excreta effluent 0
N fertiliser 352
Crops 2
Indirect 314
CO2 753
Electricity 10
Fuel 52
N Fertiliser 498
Fertiliser and organic inputs 189
Lime 0
Supplements 2
Animal transport 0
Other 1
CO2 equivalent (kg/ha/year)
5000
4500
4000
3500
3000
2500
2000
1500
1000
500
0
Enteric
Dung
Effluent
Excreta paddock
Excreta effluent
N fertiliser
Crops
Indirect
Electricity
Fuel
N Fertiliser
Fertiliser and organic inputs
Lime
Supplements
Animal transport
Other
PRODUCTION FOOTPRINT
The following table lists carbon dioxide equivalent (eCO2) footprints in KGs on a per production unit and per product basis.
ENTERPRISE
TOTAL KG CO2
KG ECO2
KG ECO2/KG WOOL
KG ECO2/KG MILK SOLIDS
KG ECO2/ANIMAL WEANED
KG ECO2/KG MEAT LWT
Beef 1,490,310 474 per SU 1868.9 47.7
Sheep 775,007 463 per SU 46.3

Tree block carbon stock report



Tree Block

NAME/TYPE	AGE	PERCENTAGE OF BLOCK	AREA
Pines	1 years	50%	50ha
Exotic	2 years	20%	20ha
Pines Residual	25 years	20%	20ha
Native	50 years	10%	10ha
			100ha

10 Other Information

10.1 Computer requirements

OverseerFM is a web-based software application. You will need to be **using the latest versions** of Google Chrome, Firefox, Safari or edge as the web browser.

10.2 Online and offline function

Data can be entered and saved in OverseerFM when you are offline. You will need to have the software open and loaded before going offline. Any data entered offline will update automatically when you go back online. You will be able to identify when you are offline, as the header will be red, and will indicate OFFLINE MODE. OverseerFM will not provide results offline.

10.3 Further Help and Contact Details

OverseerFM includes a range of features to help users as they create analyses.

In addition to this user guide, in-depth guides for popular topics can be found in both:

- OverseerFM / support
- Overseer website / support and training - our technical manual introduction and chapters are also available here.

Contact our help desk through support in OverseerFM or email us at helpdesk@overseer.org.

We aim to respond to emails within one working day, between the hours of 8.30 am to 5 pm, Monday to Friday.