

# Release notes – Overseer version 6.5.12

## Contents

|        |   |    |
|--------|---|----|
| 1.     | Introduction .....  | 2  |
| 2.     | Overall impact on modelled results.....                                       | 2  |
| 3.     | Individual fixes .....  | 3  |
| 3i.    | Defoliation and regrowth in oats (grain) and feed wheat (grain) .....         | 3  |
| 3ii.   | Crop block event handling correction for end crop event .....                 | 4  |
| 3iii.  | Separation of weaning mobs in Dairy Replacement enterprise.....               | 4  |
| 3iv.   | Correction to digestibility values in dung allocation calculations .....      | 5  |
| 3v.    | Revision of soil order averaging logic in fodder crop rotation blocks .....   | 6  |
| 3vi.   | Correction to handling of dairy goat leftover feed in pastoral systems.....   | 7  |
| 3vii.  | Safeguard for 100% field-loss inputs.....                                     | 8  |
| 3viii. | Correction to display of plant available water (PAW) at 60 cm .....           | 8  |
| 3ix.   | Correction to organic fertiliser nitrogen allocation logic .....              | 9  |
| 3x.    | Improved messaging for invalid animal feeding or placement on structures..... | 9  |
| 3xi.   | Corrected applied water total on farm summary page.....                       | 10 |

## 1. Introduction

OverseerFM model release 6.5.12 is a significant technical update which addresses a series of model defect fixes identified through user feedback and internal reviews at Overseer Limited. These fixes improve the accuracy and consistency of model behaviour across a range of farm systems and scenarios.

Each update has been reviewed by our in-house modelling team and independently tested to ensure that the corrections are performed as intended. The potential impacts on modelled nitrogen (N), phosphorus (P), and greenhouse gas (GHG) results have been assessed both individually and collectively using the latest year-end analyses from the OverseerFM database. The overall model performance remains highly stable and validated; the model changes introduced have meaningful effects at the farmlet and enterprise levels.

The resulting impacts, individually and collectively, are summarised in these release notes.

## 2. Overall impact on modelled results

The updates introduced in version 6.5.12 of Overseer have had a low impact on modelled results. The following graphs illustrate the impact of release 6.5.12 on N, P, and GHG results at the farm analysis level. For this comparison, we utilized the complete OverseerFM database, comprising nearly 180,000 analyses, with results available for almost 160,000 of them. 232 analyses with no results before the update now generate results. This dataset covers predictive and scenario analyses, which may not always represent realistic farm systems.

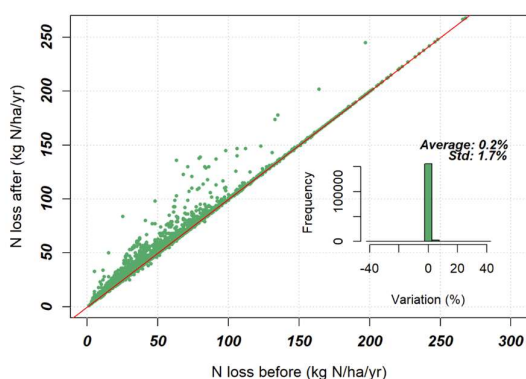


Figure 1: Comparison of N loss (kg N/ha) before and after version 6.5.12 update.

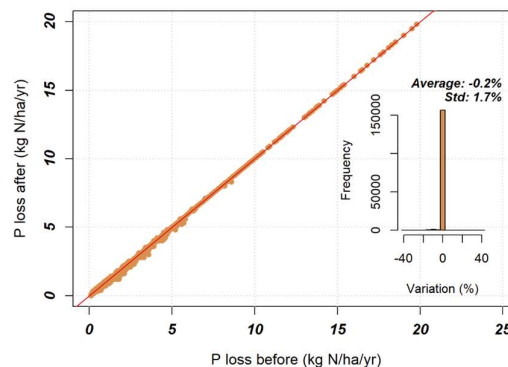


Figure 2: Comparison of P loss (kg P/ha) before and after version 6.5.12 update.

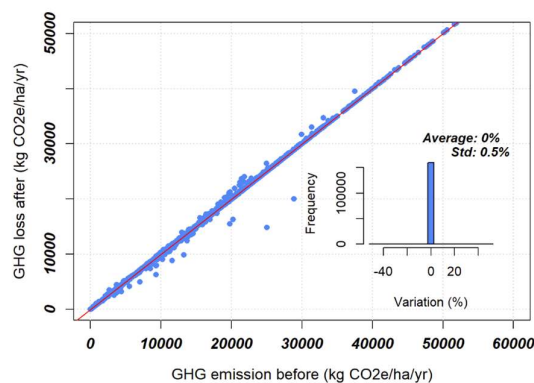


Figure 3: Comparison of total GHG emissions (kg CO<sub>2</sub>e/ha) before and after version 6.5.12 update.

### 3. Individual fixes

All model updates included in this release were verified through comprehensive impact testing using a production copy of the OverseerFM database. This process ensures that each change functions as intended and does not introduce unintended effects.

Testing was undertaken across all latest year-end analyses from real farm data, providing a representative assessment of how the updates perform under real-world conditions. The results were used to confirm the accuracy of individual fixes and to evaluate their collective impact on modelled nutrient and greenhouse gas outputs.

The following sections outline each fix in detail, including the issue addressed, the correction implemented, and the resulting impact on modelled results.

#### 3i. Defoliation and regrowth in oats (grain) and feed wheat (grain)

Resolved an issue where defoliation and regrowth for oats (grain) and wheat (grain) were incorrectly modelled, leading to inflated crop yields and animal nitrogen (N) intakes. In previous versions, user-entered yields were treated as representing only the final harvest, while an internal defoliation scaling factor was applied, effectively multiplying total biomass production and feed availability. This caused unrealistic estimates of available feed, total energy, and nutrient cycling, with some crops appearing to provide up to ten times more metabolic energy than comparable systems.

The revised implementation now interprets user-entered yield as the total output after all defoliations. Intermediate defoliations remove only additional growth beyond this total, and residual material is correctly returned to the crop at season end. This correction removes double counting of yield and N intake, ensuring realistic consistency between biomass production, feed removal, and nutrient accounting.

**Impact of change:** Very low impact. Results show no system-level change in nutrient losses or greenhouse-gas emissions. Only two cases showed >20% variation, reflecting correction of prior N overestimation. Nutrient budgets, residue dynamics, and emissions remain stable, confirming improved model realism without affecting farm-scale outcomes.

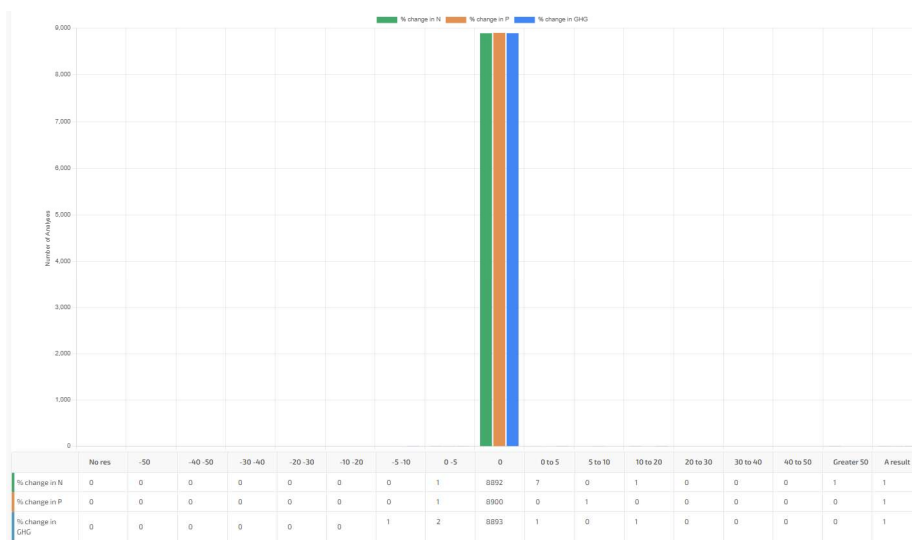


Figure 4: Impact (%) on N and P losses and GHG emissions resulting from the correction to defoliation and regrowth in oats (grain) and feed wheat (grain).

### 3ii. Crop block event handling correction for end crop event

Resolved an issue where “End Crop” events were incorrectly treated as “Harvest” events, resulting in all above-ground biomass being removed from the system. The “End Crop” action is intended to represent crop termination without product removal (such as spraying off or ploughing in) and should therefore retain plant material within the system to support nutrient cycling.

With this update, ending a crop now correctly returns product, stover, and root biomass to the residue pools, contributing to soil organic matter and nutrient turnover. “Harvest” continues to represent full removal of crop product from the farm. This correction ensures consistency between model behaviour and intended agronomic practice, improving the accuracy of nutrient and carbon flow representation following non-harvested crop management.

**Impact of change:** Low to moderate impact. Impacts are primarily observed in systems where crops are commonly terminated rather than harvested, such as mixed and dairy livestock farms. These analyses show small increases in soil organic matter and nutrient returns due to retained crop residues, with minimal effect on overall nutrient loss or greenhouse gas estimates.



Figure 5: Impact (%) on N and P losses and GHG emissions resulting from the correction to ‘end crop’ event handling.

### 3iii. Separation of weaning mobs in Dairy Replacement enterprise

Resolved an issue in the Dairy Replacement enterprise where calf and replacement mobs were sometimes incorrectly merged into a single post-weaning group in the model. This occurred when both mob types existed after weaning, leading to double-counting of animal numbers and nutrient demand, occasionally causing the model to return an “Insufficient P” error.

The model now correctly maintains Calf and Replacement mobs as separate entities throughout the season. Calf mobs can originate from Starting or Purchase events at default breed weight, while Replacement mobs can originate from Starting, Purchase, or Weaning events. This change ensures accurate tracking of herd structure, feed requirements, and nutrient flows, while preventing errors caused by incorrect mob merging.

**Impact of change:** Low impact. The change primarily affects dairy and mixed livestock systems, improving the

accuracy of herd composition and phosphorus (P) balance reporting. The correction prevents the “Insufficient P” error from occurring and ensures more reliable representation of post-weaning mob dynamics.

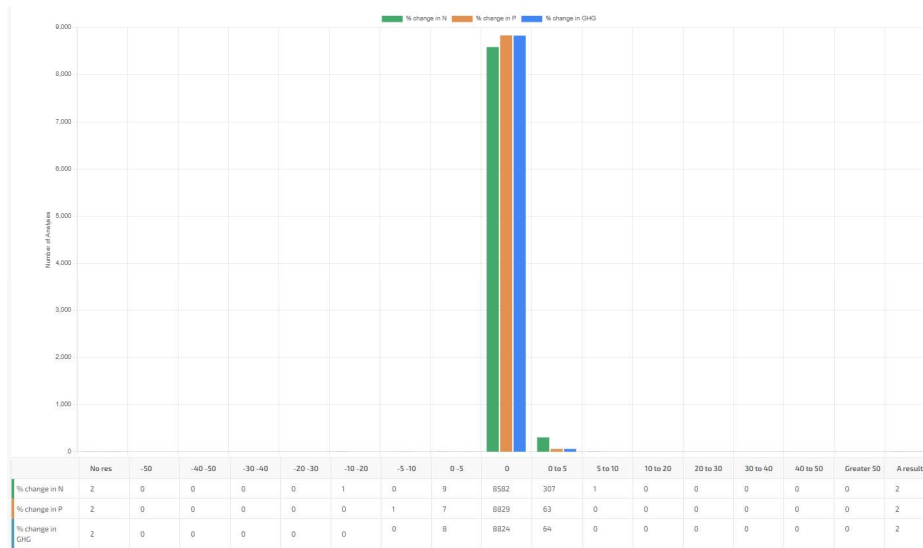


Figure 6: Impact (%) on N and P losses and GHG emissions resulting from the correction of separation of weaning mobs in the Dairy Replacements enterprise.

### 3iv. Correction to digestibility values in dung allocation calculations

Resolved an issue where digestibility values for feeds consumed in feeding structures (e.g. milking sheds, feed pads, and wintering pads) were incorrectly set to zero when supplements originated from on-farm storage. Because digestibility determines the proportion of feed converted to dung, this error caused all stored supplements to be treated as completely indigestible, resulting in overestimation of dung deposition and inflated methane (CH<sub>4</sub>) emissions from dung.

The model now correctly applies digestibility values for all feed sources, including pasture, harvested supplements, stored feeds, feed pads, and fodder crops. Dung and associated CH<sub>4</sub> emissions are now accurately allocated across feeding structures, without altering total nutrient or energy balances. This correction ensures more accurate partitioning of emissions while maintaining consistency in overall nutrient accounting.

**Impact of change:** No impact on N and P. Low impact on GHG. Impacts are limited to systems where a large proportion of feed is supplied via stored supplements on feed pads. The correction results in a slight reduction in CH<sub>4</sub> emissions from dung in these systems, with no change to total nutrient loss estimates or feed energy balances.

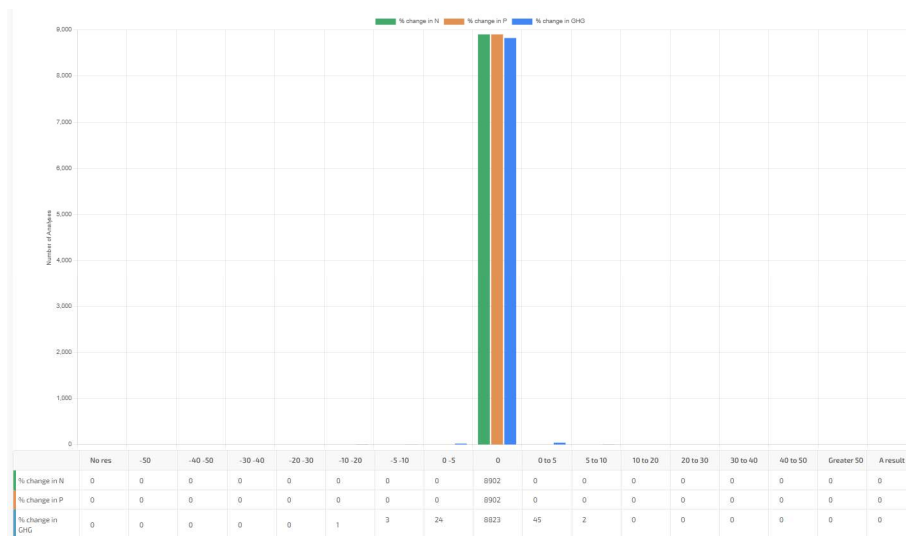


Figure 7: Impact (%) on N and P losses and GHG emissions resulting from the correction to digestibility values in dung allocation calculations.

### 3v. Revision of soil order averaging logic in fodder crop rotation blocks

Resolved an issue where soil order within fodder crop rotation blocks was previously calculated using an area weighted average of numeric enumeration values. Because these numeric codes do not represent a scientific ranking, averaging them could produce unrealistic “intermediate” soil orders. For example, shifting from *Brown* to *Pallic* soils, when only small area changes occurred within the rotation. This led to unstable or disproportionate changes in related outputs such as runoff risk and phosphorus (P) loss.

The updated implementation now determines soil order based on area dominance, ensuring that the soil type covering the largest proportion of the rotation block is used to represent the block’s soil characteristics. This approach produces more stable and intuitive results that better reflect real-world soil distributions.

**Impact of change:** Low impact. Effects are confined to analyses containing fodder crop rotation blocks with mixed soil orders. The correction stabilises soil-related outputs, improving consistency in modelled runoff and phosphorus loss, without materially altering nutrient or greenhouse gas results at the farm level.

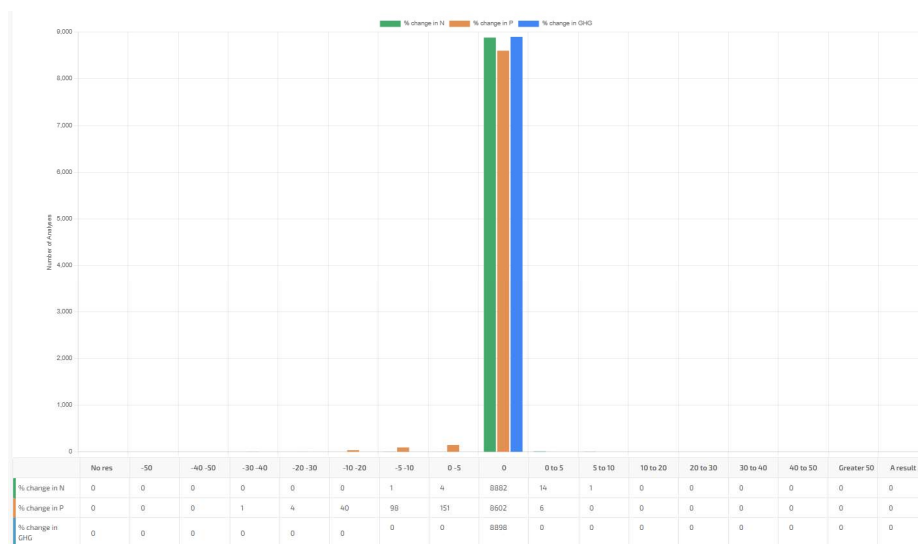


Figure 8: Impact (%) on N and P losses and GHG emissions resulting from the correction to the revision of soil order averaging logic in fodder crop rotation blocks

### 3vi. Correction to handling of dairy goat leftover feed in pastoral systems

Resolved an issue that affected how the model handled dairy goat leftover feed in pastoral systems. Previously, the rule governing leftover feeding was linked to the wrong part of the model's management logic, causing the system to process these rules inconsistently. The correction ensures that leftover feeding is now managed correctly within the stock management framework, consistent with how the model is intended to operate.

The update corrects the class inheritance structure so that leftover feeding rules are now processed correctly under the stock management framework. This ensures consistent alignment between model behaviour and the intended design of stock management logic.

**Impact of change:** Very low impact. As the issue affected only rule-type references within the code, there was no measurable effect on modelled nutrients, feed, or greenhouse gas results. The change ensures correct rule linkage and future proofing of related pastoral management logic.

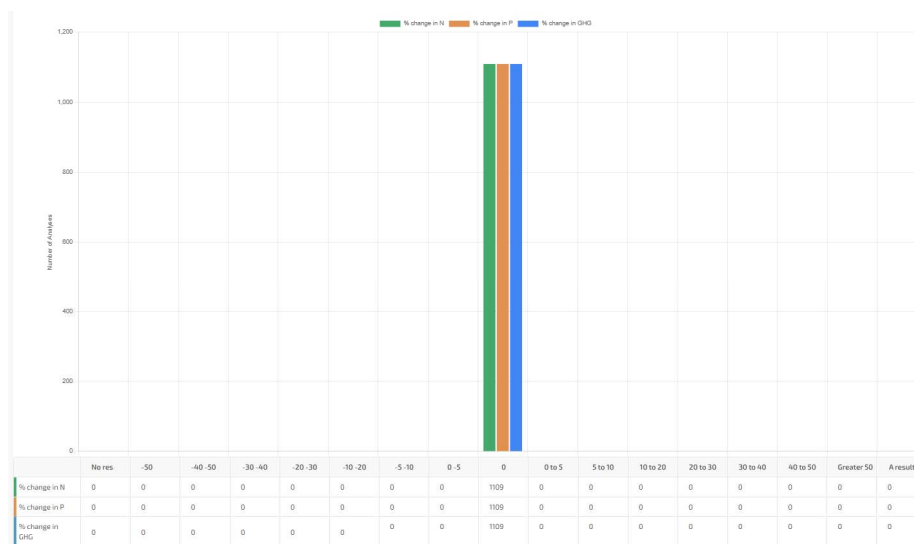


Figure 9: Impact (%) on N and P losses and GHG emissions resulting from the correction of the handling of dairy goat leftover feed in pastoral systems

### 3vii. Safeguard for 100% field-loss inputs

Resolved an issue that occurred when a 100% field loss was entered for a crop. In previous versions, the model attempted to calculate in-field yield by dividing by the remaining proportion of yield. When that value was zero, the calculation produced an invalid (infinite) result, causing the nutrient budget to fail to balance and triggering an error.

The model now correctly recognises that a 100% field loss means no harvestable yield is produced. Calculations for affected blocks continue smoothly, and nutrient budgets remain stable even when a full loss is entered.

**Impact of change:** No impact. The correction prevents rare calculation errors in situations where crops are entirely lost. It now disallows 100% field-loss entries; when all product is destroyed (e.g. by fire), the *End crop* option should be used instead of *Harvest*, ensuring more robust nutrient-budget results without materially affecting overall farm-level nutrient or greenhouse-gas outputs.

### 3viii. Correction to display of plant available water (PAW) at 60 cm

Resolved an issue where the block results sometimes displayed a Plant Available Water (PAW) value of “0” at 60 cm depth, even when valid soil data and non-zero PAW values were present internally. Although the model always stored and used the correct PAW values in its calculations (including nitrogen leaching), the display logic occasionally failed to show the soil-weighted value correctly in the results.

The model now consistently displays the correct PAW at 60 cm for all blocks. PAW is calculated for all soils and extended to 150 cm for deep-rooted crops such as lucerne; when a 150 cm value is shown, a valid 60 cm value will now always appear alongside it. This ensures alignment between displayed outputs and the underlying modelled data.

**Impact of change:** No impact. The issue was limited to the display layer only. All internal model calculations and outputs already used the correct PAW values. The correction improves the accuracy and consistency of displayed results without changing any nutrient, water, or greenhouse gas estimates.

### 3ix. Correction to organic fertiliser nitrogen allocation logic

Resolved an issue that caused the amount of nitrogen (N) from organic fertilisers to be underestimated in previous versions of OverseerFM. The model previously calculated organic N by subtracting the inorganic N portion from the total fertiliser N input. Because the inorganic component was already handled elsewhere in the model, this subtraction led to double-counting and a reduced estimate of organic N applied.

The updated logic now treats organic and inorganic N components independently, taking the organic N value directly from its defined input. This ensures that total fertiliser N supply accurately reflects user inputs and that organic fertiliser contributions are correctly represented in nutrient balance calculations.

**Impact of change:** Medium impact. Changes may occur in analyses that include organic fertiliser applications, reflecting corrected total N inputs. The adjustment improves the accuracy of nutrient supply and flow calculations without materially affecting greenhouse gas or phosphorus results.

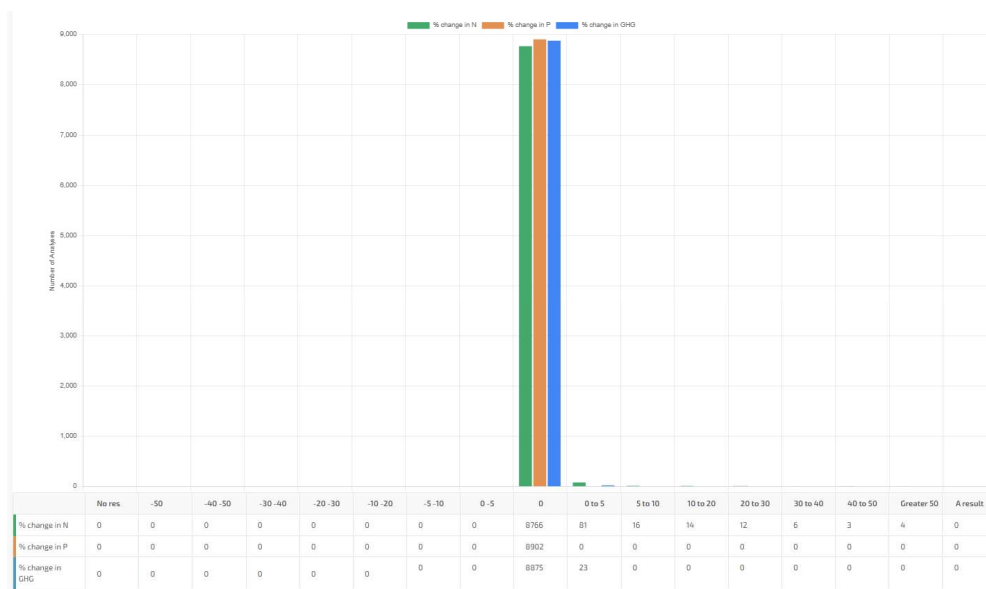


Figure 10: Impact (%) on N and P losses and GHG emissions resulting from the correction of the organic fertiliser nitrogen allocation logic

### 3x. Improved messaging for invalid animal feeding or placement on structures

Resolved an issue where users received a generic error message when animals were assigned to structures (such as feed pads or wintering pads) or given feed during months when no animals were present on the farm. The previous message “Unable to balance nutrient budget inputs with outputs on farm” did not clearly explain the underlying cause, making it difficult for users to identify and correct the configuration.

The update improves the clarity and specificity of the message. Overseer now provides contextual guidance when animals are assigned to structures or fed during periods when they are not on the farm. This enhancement improves the user experience and simplifies troubleshooting without affecting model calculations or results.

**Impact of change:** No impact on modelled results. The update affects only system messaging and user feedback, with

no changes to model logic, nutrient balances, or greenhouse gas calculations.

### 3xi. Corrected applied water total on farm summary page

Previously, the farm summary page overestimated the total applied water by irrigation because it used the total block area, even when parts of those blocks were dedicated to fodder crop rotations.

The calculation now correctly uses the effective irrigated area. That calculation is: the block area minus any fodder crop area, to match the block-by-block irrigation totals.

This fix ensures that the total applied water shown in the farm summary aligns with the detailed irrigation records and provides a more accurate reflection of actual irrigation across the farm.

**Impact of change:** No impact on modelled results.