

Tabled at Hearing 15/10/14. ✓

Technical Memo

Why do we use of "Method Only" when entering irrigation data in Overseer

The following four Q&As explain our approach to entering irrigation data in Overseer and how it affects our N loss predictions.

Q1: Why has DairyNZ used the "Method only"? (When using the model, select irrigation "Method", leaving monthly application rates blank. See screen shot in Figure 2 for details)

A1: We used the Method only approach because:

1. It is recommended in the "Overseer best practice data input standards" manual (Figure 1)
2. It is the DairyNZ protocol position and is the compulsory option for Sustainable Water Accord (SWDA) reporting
3. It provides consistency of results for a range of purposes (regional council consents, SWDA, fertiliser advice etc.)

Q2: How does the Method Only result affect our N loss values?

A2: It tends to report lower N loss values and the impacts of changes (e.g. from flood to spray irrigation systems) tend to be smaller. This is because Overseer (in the absence of user applied information) assumes best practice application of these irrigation systems. It applies the "correct" amount of irrigation water and no more

Q3: What happens when you use the other irrigation options available in Overseer, such as real monthly data or you select the "Actively Managed" option?

A3: This is not recommended but:

1. Real monthly data can be entered provided the user has at least 5 years of measured monthly irrigation results. These figures will mostly be higher than those implied in A2 above and so the N loss figures will be higher
2. The "Actively managed" option can also be used. It invokes calculations which rely on a whole lot of potentially possible, but realistically not commonly practiced irrigation management actions which reduce N loss further than via the Method Only option. There is no science to validate this feature (Actively Managed) in Overseer at this time (Ants Roberts, pers. comm.). *The manual expressly advises not to use this button (Figure 1)*

Q4: So why is "Actively Managed" even in the model?

A4: As described in the Manual (Figure 1), it is "there for demonstration purposes to show the effect of eliminating all system losses and accurately predicting weather 5-6 days in advance".

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D Smeaton, DairyNZ, 22 September 2014

Figure 1: Screen shot copy from "Overseer, Best Practice Data Input Standards" August 2014

4.11 IRRIGATION

Impact: Irrigation in addition to rainfall drives soil drainage and thus has a critically important influence on drainage and hence nutrient leaching losses.

Irrigation

Recommendation: 1. Enter method and months only (leave rate blank).

Dairy Industry Enter method and months only (leave rate blank).

2. Enter method and months that irrigation is applied and actual monthly depth, based on at least 5-year average data.

NOTE: This needs to be commensurate with the rainfall data entered for the block i.e. 5-year average rainfall.

NOTE: DO NOT use actively managed at this time.

Justification:

- The three methods of data entry representing irrigation, potentially give widely different results, particularly with respect to N leaching.
- Actual data could be sourced from Irrigation Company Invoices, farmer records etc.
- Using method only, *Overseer* calculates the amount of irrigation water applied based on daily water balances and replacing the estimated soil water deficit. The calculated amounts are usually considerably less than actual rates applied on a long-term basis.
- Actively managed is there for demonstration purposes to show the effect of eliminating all system losses, and accurately predicating weather 5-6 days in advance.

Nutrient concentrations in irrigation water

Recommendation: 1. Use *Overseer* default values.
2. Only enter block specific data when you have accurate nutrient concentrations for irrigation water.

NOTE: Fertigation nutrients should be entered under the fertiliser section.

Justification: The *Overseer* default settings should be used as most people will not have accurate long-term average nutrient concentration data.

Figure 2: Screen shot of the Overseer model: Irrigation data entry section; for a particular block on a farm

Irrigation

Enter the irrigation rate applied and the application method for the month(s) when irrigation occurs. Do not include effluent applications here

Month	Method	Rate (mm/month)	
October	Centre pivot/lateral		
November	Big gun/rotorailer		
December	Centre pivot/lateral		
January	Flood/border dyke		
February	Centre pivot/lateral		
March	Centre pivot/lateral		
April	Centre pivot/lateral		

If an application method is selected but no rate is entered the model estimates irrigation rate from the calculated soil water deficit.

Buttons: Add months of irrigation, Clear all applications

Nutrient concentrations in irrigation water

Enter irrigation water nutrients if required and select units

Source of nutrient data: Overseer default (fixed)

N	P	K	S	Ca	Mg	Na
0.0	0.0	0.0	0.0	0.0	0.0	0.0

Buttons: Save, Save & Continue, Continue, Reload

Best practice recommendation is to not use this button

Figure 3 (not referred to in text above): Screen shot from Overseer "FAQs"

Irrigation

Q. The irrigation system that I use is not listed in the 'Irrigation method dropdown box'. What should I do?

A. You can enter the rate of irrigation applied and choose the default (leave blank) or the irrigation method which best suits the system that you use to irrigate with. The irrigation method has only a minimal effect except for border dyke irrigation systems.