

Changing system, changing nutrient budget

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Altering your farm system will almost certainly affect your nutrient budget but it might not be the effect you think.

Understanding how farm system changes will affect nutrient losses isn't something farmers are used to calculating as a matter of course when they contemplate various farming scenarios. But farming within nutrient limits has fast become a reality across a number of regions already and for others it's on the horizon.

System changes, driven primarily by low payouts and a need to create an operation resilient to price volatility, must now also meet regulatory nitrogen and phosphorus limits.

Agrimagic director Charlotte Glass specialises in farm systems design and environmental management and says from her experience there's no prescriptive answer to how a system change will alter nutrient losses.

"Every farm has a different mix of soils, irrigation and climate so it's very dangerous to say a change to farm system will have a particular effect.

"You have to understand your own farming operation well, know your risks in relation to your farm and you have to run the scenarios – there are just no shortcuts to it.

"For instance, you may have decided to grow a crop onfarm to be more self-contained but you have two soil types on the farm. That alone will mean making that change will have a different effect than it would on a neighbouring farm even if everything else was the same.

"The effect will even vary within your own farm depending on which soil type you locate the crop on."

The natural assumption is shifting from wintering off to growing a winter crop onfarm will increase nutrient loss but even that's not a given, Glass said.

"There are swings and roundabouts when it comes to modelling those changes through Overseer that mean in some cases nitrogen losses may decrease.

"Cows will only be on those wintering paddocks for a few weeks each year rather than every three weeks throughout the season.

Charlotte Glass
– modelling
scenarios vital.



"If it's not being used as an autumn supplement there are no urine patches on it through autumn either.

"In Canterbury, if you manage your irrigation correctly, you can also restrict your drainage.

"By having those cows on, you are likely to have reduced your cow numbers and stocking rate and a combination of all of these things may in fact lead to a reduction in overall nitrogen loss."

Coupled with that could be a reduction in catchment-wide loading.

"But you absolutely must go through the process of modelling scenarios to get a definitive answer."

Glass is a big fan of the Overseer model but thinks some aspects of it need improving.

For instance there's a gap when it comes to integrating cropping into the system with the model getting confused as to where the energy cows are consuming is coming from.

Losses under crops such as fodder beet may also be inaccurate with research yet to provide definitive data.

Glass says in essence Overseer works backwards from the information provided on stocking rate and milk production to determine the demand side of the feed budget.

"By altering your farm system in response to payout the emphasis goes on driving feed harvested. You import less nutrient (through supplements) and you become a more efficient converter of that feed.

"That's where the payout drop has meant people have really sharpened their wits. They've become more

efficient farmers, more efficient users of resources."

The nitrogen cycle is a key component underlying the Overseer model and understanding how what you're doing onfarm affects the nitrogen cycle helps you understand what a change might do to nutrient losses.

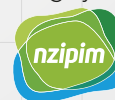
"There are losses generated at various stages of the nitrogen cycle so anything that ramps up the rate of the nitrogen cycle is likely to ramp up the losses.

"For instance, the higher the organic matter in the soil the more active the nitrogen cycle will be (in Overseer).

"The way you renovate your pastures or run your cropping rotation will have an effect on your modelled nitrogen losses too."

Across Canterbury farmers not only have to ensure they're not increasing their nutrient losses with any farm systems change, they need to be looking to the near future when many will be required to cut nitrogen losses by up to 30% in some areas.

"Thinking now about how you position yourself for those reductions is important, particularly if you are considering major changes to your farming system."



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Charlotte Glass is a founding director of Agrimagic and chairwoman of the Canterbury-Westland branch of NZIPIM.