

The effect of pSWLP Rule 20(a)(iii)(1) on Crop Rotation & Environmental Management at Wilkins Farming

This note explains Wilkins current approach to crop rotation and the on-farm implications of reducing Intensive Winter Grazing (IWG) to either 100ha or below 15%.

It has been prepared by Sean Wilkins and will form the basis of his evidence on Topic B5, Issues 36 and 45.

Current situation

Across the majority of our farms we operate a 10-year pasture rotation cycle: 6 years of grass, followed by 2 years intensive winter grazing (IWG) crop, followed by 2 years cereal and then back to pasture.

In the medium hill country where it is too steep to harvest cereal, the rotation is 8 years of grass followed by 2 years IWG and back to grass.

There is no IWG in the steeper hill country. Across the entire Wilkins' landholding, 15% is steeper hill country.

In terms of percentages:

- In the area of arable cropping, the rotation results in 60% pasture, 20% IWG and 20% cereal crop.
- In the medium hill country it is also 20% IWG.
- The percentage on each farm is different, but within the range of 15 - 20%.

The 10-year pasture rotation cycle is supported by robust reasoning:

Six years of grass

- Young grass species are highly productive. As pasture species age their productivity wanes and clover is outcompeted by the more persistent ryegrass that it typically accompanies in a pasture.
- Ryegrass is more robust & resistant to grazing than clover and has a longer growing season- it is a natural progression overtime to ryegrass dominance and the clover content of pastures diminish.
- Managing pasture renewal in a manner favorable to clover is beneficial for many reasons such as pasture productivity, stock performance and nutrient management.
- Clover compliments ryegrass as it maintains higher feed quality later in spring and summer when ryegrass goes reproductive (the part of its life cycle where it is of lower quality). Clover will grow at higher temps when ryegrass is suppressed maintaining feed quality and quantity through the growing season. The prostrate growth habit of white clover suppresses weeds that threaten ryegrass and its upright growth habit.
- Stock will perform better with clover in their diet vs straight rye grass and clover reduces the need for supplementary Nitrogen (N) to be applied as legume properties of clover mean it will produce a significant amount of the pasture's N requirements. 25-30kgN/kg DM (Dry Matter)/ha clover production, or approx. 100kgN/ha/yr.
- Improved clover content of pastures not only mean higher feed quality, but also mean greater pasture resilience. The companion ryegrass will have a deeper root mass increasing access to moisture and nutrients. This sustains the pasture through moisture deficient periods and increases the pastures' ability to retain nutrients.
- Clover content is excellent for biodiversity strongly supporting the bee population which improve the potential for adjacent flowering species to be pollinated. It's prostrate growth habit also minimizes the amount of bare soil in the pasture, further enhancing the positive environmental aspects of the pasture.
- Breaking up a pasture phase with a diverse crop rotation is good integrated management (organic technique) and considered good management practice (GMP). This rotation breaks weed, pest and disease cycles. Diversity of crops also protects the chemistry options to farmers for pest and weed

control as resistant life biotypes are exposed to different modes of control e.g cultivation and grazing. Hard to control weeds such as thistles, pests such as clover root weevil and diseases such as white clover mosaic virus are effectively controlled through a well-designed crop rotation.

Two years of IWG

- Our farm rotation has two years of IWG in the same paddock as part of our farm systems approach to minimizing environmental impacts.
- Two crops allow us to plan long term and gives time to effectively break pest and disease cycles. Alternating crops utilizes nutrient build ups from one crop to another reduces toxicity or propensity for nutrient loss. A brassica crop will absorb nutrient surplus from a pasture phase as will a cereal crop from brassica phase. This rotation philosophy is to consider a 'farm systems' approach rather than a crop in a season or a single year. This rotation is designed with the intent of capturing and utilizing nutrients created by or left over from the preceding crop.
- Rotating crops, will result in better crops than growing one in isolation, there's a range of complimentary factors contributing to superior yields including but not limited to those outlined in this comment attributing to an 'hybrid vigor' effect.
- Brassica is required to feed our stock May-Aug when pasture growth is either non-existent or unreliable. Not only does this sustain the animals but it protects the existing pastures, so they are not damaged from pugging in wet months and means they are more productive during the growing season.
- Southland has few wintering alternatives to growing fodder crop, there are some exceptions which the sustainability has not been market tested at scale. With wintering barns, the capital outlay could have the potential to make some businesses unsustainable, the expense and lack of supply of grass wintering could have the same effect. Grass wintering does not completely alleviate the challenges of IWG.
- It is also expensive to introduce a paddock to IWG, winter cropping two years in a row spreads that cost further and improves our farm resilience.

Two years of cereal

- By alternating swedes-kale-spring barley- autumn barley allows management to target three different weed spectrums going from a root crop to leaf crop to a cereal. Again, crop diversity is the key approach.
- It also acts as a catch crop after the brassica crop.
- The grain is grown to supplement our stock during the shoulders of the growing season or key nutritional periods i.e. 'flushing' stock pre mating, late pregnancy and lactation. Our crop rotation is an efficient feed producer which minimizes the environmental impact of our farm system. The winter feed, the pasture and the grain combine to give us a high degree of feed self-sufficiency that further reduces the farm emissions intensity.
- Strategically supplementary feeding stock grain has scientifically proven to improve nutritional efficiency of stock and reduce pollution by improving digestion efficiency, reducing N concentration of excreta and reduce methane emissions, while improving productivity as demonstrated by a Lincoln University trial done on our farm in 2019.

Back to grass

- Sowing our pastures in Autumn after cereal crops rather than going grass-grass or going brassica-grass has given us superior pasture establishment. We experience less weed pressure after the weed

management from the cropping phase, better clover establishment because the nitrogen has been depleted in the soil from the cereal phase and better clover establishment because the early Autumn has a warmer soil temp than springtime when pasture is traditionally sown after a brassica.

This rotation model has been developed over years of evolution with multiple contributing dynamic factors, environmental, market, agronomic and productive. This example outlined has proven to be a best match fit for our pasture model, and similar models have been common for farmers traditionally to renovate pastures using a brassica-cereal break-crop for generations.

For different reasons Southland farm models have become even more monoculture over the last 30 years, but now for many reasons environmental, agronomic, and commercial more value is placed on crop diversity which is why we support flexibility on the area allowed for IWG.

Unlike further up NZ, due to our climate in Southland there is not a lot of land-use diversity, its mainly pasture based livestock production. IWG is a staple component whether it be sheep, beef, deer or dairy. Interference on these models, limiting the ability to winter capital stock is going to have a major impact on the dynamics of pasture-based farm systems which encompasses most of the province.

Changes

The pSWLP (Decisions Version) restricts IWG to 15% or 100ha, whichever is the lesser.

On our farms, the lesser area is 100ha. We lodged s274 notices in support of the appeals seeking to remove the reference to 100ha. This would result in a cap on IWG at 15%.

The National Environmental Standard: Freshwater currently intends to restrict IWG to 50ha or 10%, whichever is greater. On our farms the greater area is 10%. However, this limitation does not apply if a certifier certifies that the adverse effects of our rotation are no greater than the effects of restricting IWG to 10%. This is the option we intend to use if the IWG rule in the NES: Freshwater comes into force.

To achieve 15% we will need to amend our rotation cycle.

It is possible to amend our rotation cycle to achieve 15% IWG.

Amending it to achieve less than 15% IWG would create environmental effects.

For example, at 10%, only one year in ten could be IWG. This means:

- Higher yielding crops will need to be utilized for IWG across the smaller area to provide sufficient feed. The ability to have moderate yielding crops across a larger area allows soils maximum opportunity to utilize and retain nutrients in the root zone where they remain productive and less threat to the environment than in aquifers, waterways or the atmosphere. This is lost by requiring smaller areas and higher yielding crops.
- The alternative to higher yielding crops is more imported supplement, which itself creates higher concentration of nutrient loadings and more potential for nutrient wastage and pollution.
- Pasture is not renewed after six years, but only after seven years. The benefits of a younger and more productive pasture are lost in that seventh year. A greater reliance will be placed on manufactured fertilizer to sustain pasture productivity.
- The benefits of two years of IWG (as outlined above) are lost.

Rather than restricting land areas to a percentage, the threat of nutrient loss is more appropriately managed in a broader nutrient budget context with recognition of the broader benefits of a well-considered rotation.

This is why we challenged the percentage in our original submission to Council. However, we are now accepting of the percentage provided it is no less than 15% of the landholding.