P21 PRINCIPLES:

Protection of pumice soils

Reducing soil damage and nitrogen leaching

George and Sharon Moss

The Mosses aim to operate a system-1 to 2 farm with minimal soil damage and reduced N leaching.

Farm profile (two farms)

Pukerua Farm:
Cow numbers: 180 Friesian Cows
Milking platform: 72ha (effective)
Stocking rate: 2.5 cows/ha

Tokoroa Pastoral Farm:
Cow number: 175 Crossbred Cows
Milking platform: 67ha (effective)
Stocking rate: 2.6 cows/ha
Location: Tokoroa, South Waikato
Grazing block: 40ha (effective)
Soil type: Pumice
Annual rainfall: 1500mm
Wintering system: Both herds are grazed on their respective farms (will stand off cows on yards and quarry if required)

Key learnings

- Paying attention to cow performance alongside pasture production provides an overview of what’s happening on farm.
- It’s important to ensure pre and post-grazing targets are attained. Too low and cows are underfed, too high and the result is poor quality feed for current and/or future grazings.
- By carrying out regular pasture walks, surplus and deficits can be identified early and action required planned. Aim to know what is likely to happen before it happens.
- Flexibility around moving cows on and off paddocks achieves residual targets.
- If changing system, make it a considered one. Talk to consultants and run options through available models.
- Spend time training staff on why and how you want your farm run and include them in the decision making.
- When lowering stocking rate, there will be more available feed per cow and a need to ensure cows eat it while retaining high pasture utilisation. This may be difficult to achieve in the first year due to developing and refining new management decisions. Continual awareness is the key.

"Today in an industry where those who bleed the least survive the longest, you should never fix your costs unless you can fix your income," George Moss.
**Farming background**

George and Sharon own three adjoining farms. One is used as a support block (40ha) and the other two are dairy farms of 72ha and 67ha.

Management policies are similar on all three farms. The original farm (Pukerua) is managed by Sharon with staff support. Tokoroa Pastoral is overseen by George with an experienced couple employed to manage it. The grazing unit is managed by George.

George and Sharon are from farming families and worked to farm ownership through contract milking and 50:50 sharemilking.

George is a dairy representative on the Waikato Regional Council Collaborative Stakeholder Group for healthy rivers. After reviewing technical material and gathering stakeholder and community views this group will propose solutions to the council to reduce contaminants entering the Waikato River catchment.

George and Sharon were targeting N loss of 30kg/ha/yr prior to the model change and have noted that Overseer predictions can vary significantly with accuracy of core data.

To test their options for when limits are decided, George and Sharon have run scenarios through Farmax and Overseer which also test their system’s robustness and to give them a feel for where they want the business. They are using a $4.50/kg/MS for the scenarios.

**Farm operation**

The farms soils are Taupo pumice and deficient in most minerals especially cobalt. With an average rainfall of 1500mm, even these soils can pug easily. The farm’s altitude is approximately 350m and frosts can occur in any month of the year.

The Mosses aim to operate a system-1 to 2 farm with minimal soil damage and reduced N leaching.

On Pukerua Farm five years ago, the stocking rate was reduced from 2.6 to 2.3 cows/ha to better match feed supply and help reduce N leaching. Before deciding to reduce stocking rate, George and Sharon used Farmax and a consultant to verify their thinking and quantify the benefits. In 2015 the stocking was moved to 2.5 cows/ha to ease management of spring surpluses.

George reported this year (2016) the farm achieved pasture growth of about 15 tonnes DM/ha/yr. The Mosses have achieved this by paying attention to detail and being proactive on pasture management. The Mosses:

- Use a modified spring rotation planner to control early spring rotation length. Their planner is based on the percentage of the herd calved
- Monitor MS/cow on a daily basis throughout the year to identify issues early. Spring production needs to be on a rising plane to achieve milk production goals for the year
- Aim for pasture residual targets at each grazing and note paddocks needing remedial action of either putting cows back in immediately to achieve residuals, grazing earlier next round, cutting for supplement, or topping
- Identify and conserve paddocks when pre-graze covers above 3,000kg DM/ha or if they think cows will not graze well
- Have a flexible approach to moving cows - either back to a paddock to clean up with all or part of the herd or moving cows onto a new paddock
- Be aware of what is happening on the farm in terms of growth, next available paddocks, weather and its effect on stock and pasture.
Importing feed, supplement and N use

The Mosses have a policy of only purchasing imported feed (PKE and hay) if it is profitable to do so, i.e. they will not contract the purchase of PKE until they know the milk payout. Instead, N fertiliser is used as a cheap feed source to help increase feed supply when upcoming deficits are anticipated.

PKE will be purchased when needed to bridge feed deficits in August and in autumn to help increase cow BCS. The Mosses see the main benefit as a big saving on wintering costs, although adding supplement can create some challenges in maintaining pasture utilisation. The decision on when to put in and take out supplement is something the Mosses are prepared to train staff on so that skill sets are there to maintain a high level of pasture utilisation.

To better meet feed supply and demand, the Mosses have been changing to chicory (also used for pasture renewal) on Tokoroa Pastoral Farm, and sowing new ryegrasses and legumes in an attempt to increase feed grown on the farms.

Protecting soils and reducing N leaching

N loss is the main issue and there are no waterways to complicate the farm management. To reduce N leaching the Mosses have:

- Improved the effluent system on Tokoroa Pastoral Farm and are reviewing the Pukerua effluent system
- Reduced the amount and frequency of N fertiliser applications trending down from 15 years ago when they peaked at 250kg N/ha to 120-140kg N/ha
- Tried to avoid applying more than 30kg N/ha at any one application
- Applied fertiliser in August or September when growth occurs and only when grass growth and the “look” of the pasture (i.e. urine patches stand out) requires it – keeping in mind the total amount they want to use in the year
- Used TracMap to get efficient and accurate N spread by a commercial firm.

To avoid soil damage, the Mosses aim to reduce pugging. Cows on both dairy farms are moved off pasture onto yards and/or a quarry (rhyolite base) overnight when ground conditions indicate that pasture and soil damage is likely. This may happen for several days during the winter.

Deciding when to move cows off pasture is based on experience and considering:

- The level of recent rainfall
- Forecast rain
- Existing ground conditions
- Forecast temperature i.e. very cold overnight temperatures
- Which paddocks the cows are in at the time (drainage and depth of topsoil) and the likelihood of damage.

George and Sharon acknowledge taking stock off paddocks may impact on pasture residuals and potential quality.

In wet conditions it may be better to take cows off paddocks before they have achieved target residuals to avoid longer-term pasture and soil damage.