

## Kale vs Fodder beet Farm System Comparison: 2018-2022

### Background

When surveyed during the development of the Southern Dairy Hub in 2017, the top issues that farmers wanted investigated in farm systems comparisons on the farm, with the aim of developing more sustainable production systems were:

1. Fodder beet
2. Nutrient loss reduction to achieve impending ES rules,
3. Wintering, and
4. Infrastructure

In June 2018 a four-year farm systems comparison commenced to address the fodder beet, wintering and nutrient loss reduction priorities identified by farmers (Figure 9). The standard farmlets were designed to represent comparable systems being implemented in Southland at the time with regards N fertiliser inputs, stocking rate, supplementary feed use and wintering practices. Following estimation of the N leaching losses of the Std system the lower impact systems were designed to reduce N leaching by at least 30 % relative to the standard system of the same winter crop type utilising proven N loss mitigations which included N fertiliser inputs, supplementary feed inputs and type and subsequently stocking rate.

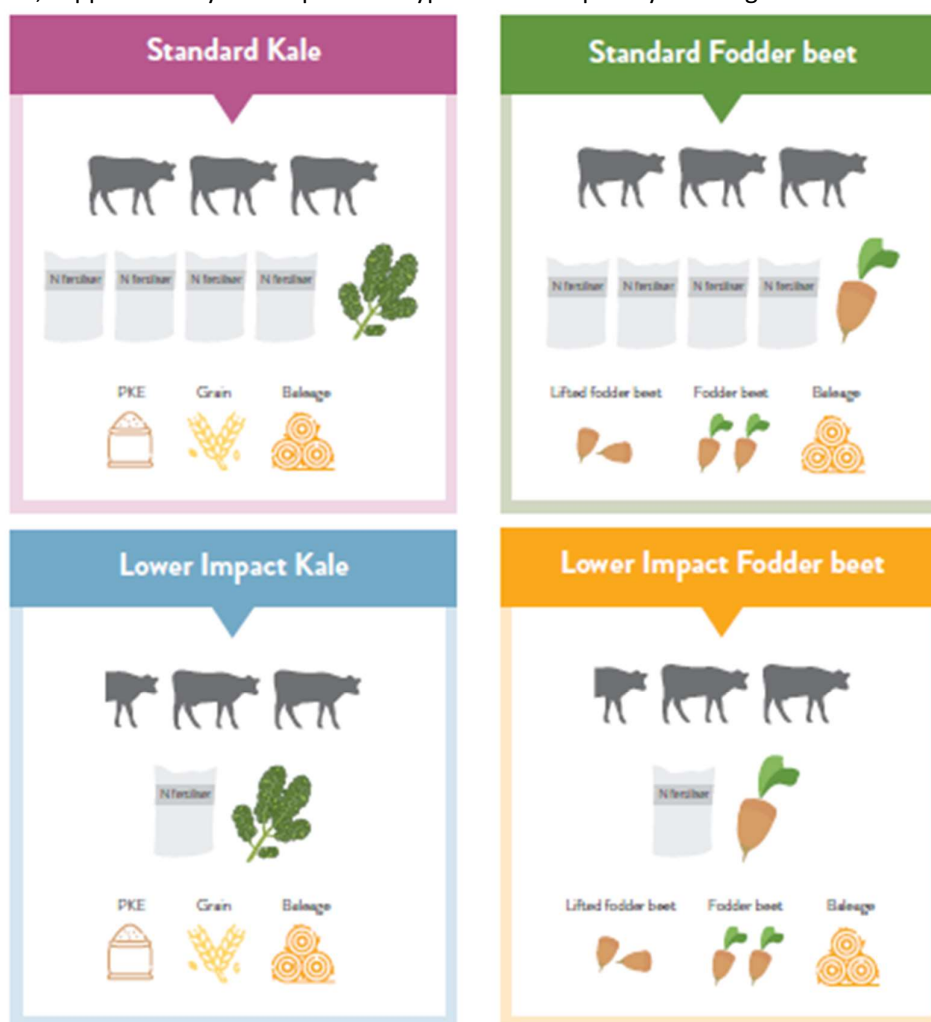


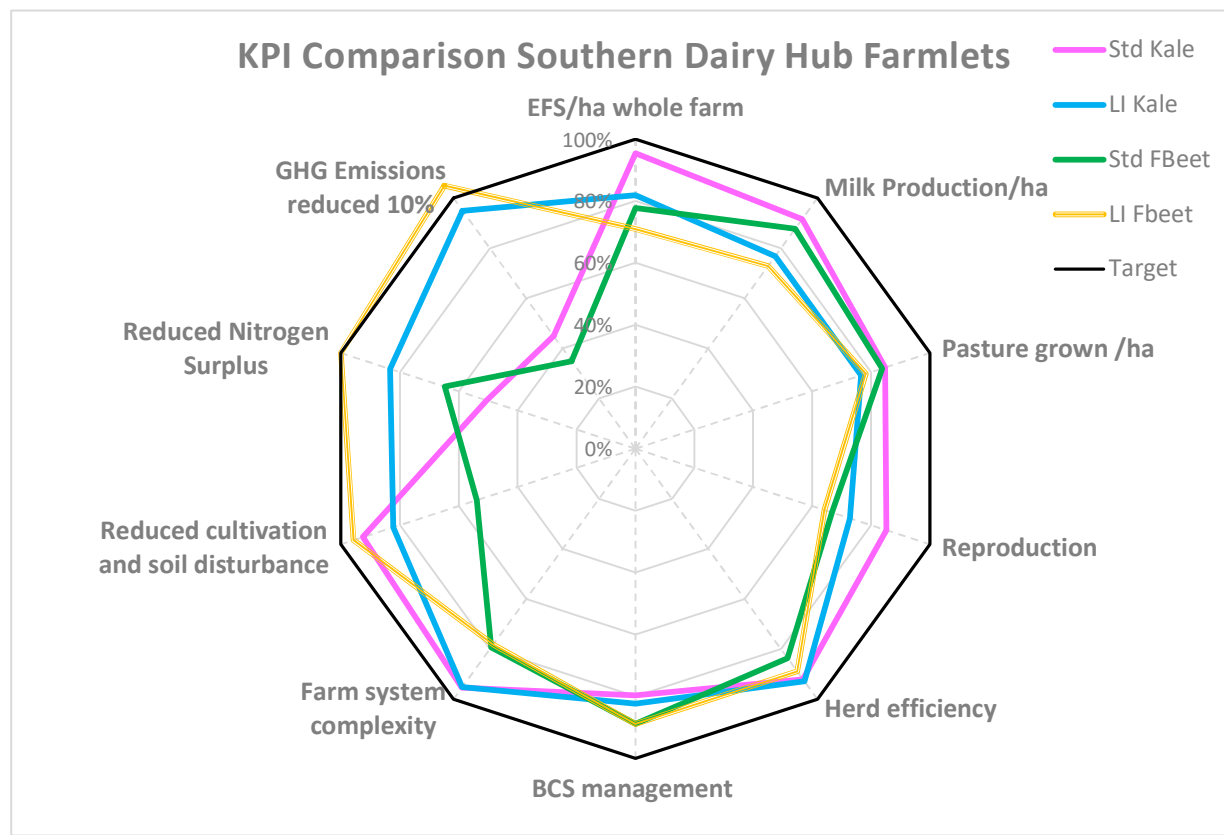
Figure 9: 2018-2022 SDH farm system key system features

**Learnings**

The “Wagon Wheel” graph allows us to compare all aspects of a farm system in one view. The black outline of the graph is the ideal target, and the coloured farmlet lines show how close each farmlet got to that target (as % achieved of 100%). It’s clear that some farmlets deliver well in some areas, and under deliver in others.

When the farmlets were designed, we expected to see a very even profit outcome from all of the farmlets but hoped that some would demonstrate some environmental benefits relative to the others. By the end of year 1, it was very clear that this wasn’t the case for profit – a trend which continued throughout the 4 years of the trial.

We look at the graph below and it really puts some perspective on how we define farm success. Profit is an easy measure – but in the changing regulatory landscape the animal welfare, environmental, GHG and people areas of the business, there are undeniably pros and cons with each system that we have run.



- Key messages**
- Systems to reduce nitrate leaching by 30% reduced profit much more than we expected, but also delivered significant reductions in GHG emissions
  - Our fodder beet systems have:
    - cost more to run
    - generally, been more complex to manage
    - have not made the same milk as kale systems, a symptom which starts in early lactation and continues throughout the season
  - Focusing on key drivers of reproductive performance eg. BCS at calving, resulted in more predictable reproductive outcomes for the Std kales but less predictable performance for the low impact and Standard FB farmlets (sometimes great, sometimes bad and always unexpected!)
  - We are confident we can deliver significant reductions in nitrogen loss and GHG emissions in the lower impact farmlets, due principally to the reduction in total feed eaten and reduced nitrogen surplus
  - One year for a system will not tell the whole story. System performance will vary over time and performance (positive or negative) may compound over years.

**Figure 10: Wagon wheel KPI comparison of the SDH farmlets (2018-2022)**

Key performance summaries that reflect the differences in performance between each of the four farm systems (Summary shows the 2021-22 year, which is representative of the four years of this trial, when looking at the relativity of farmlets to each other

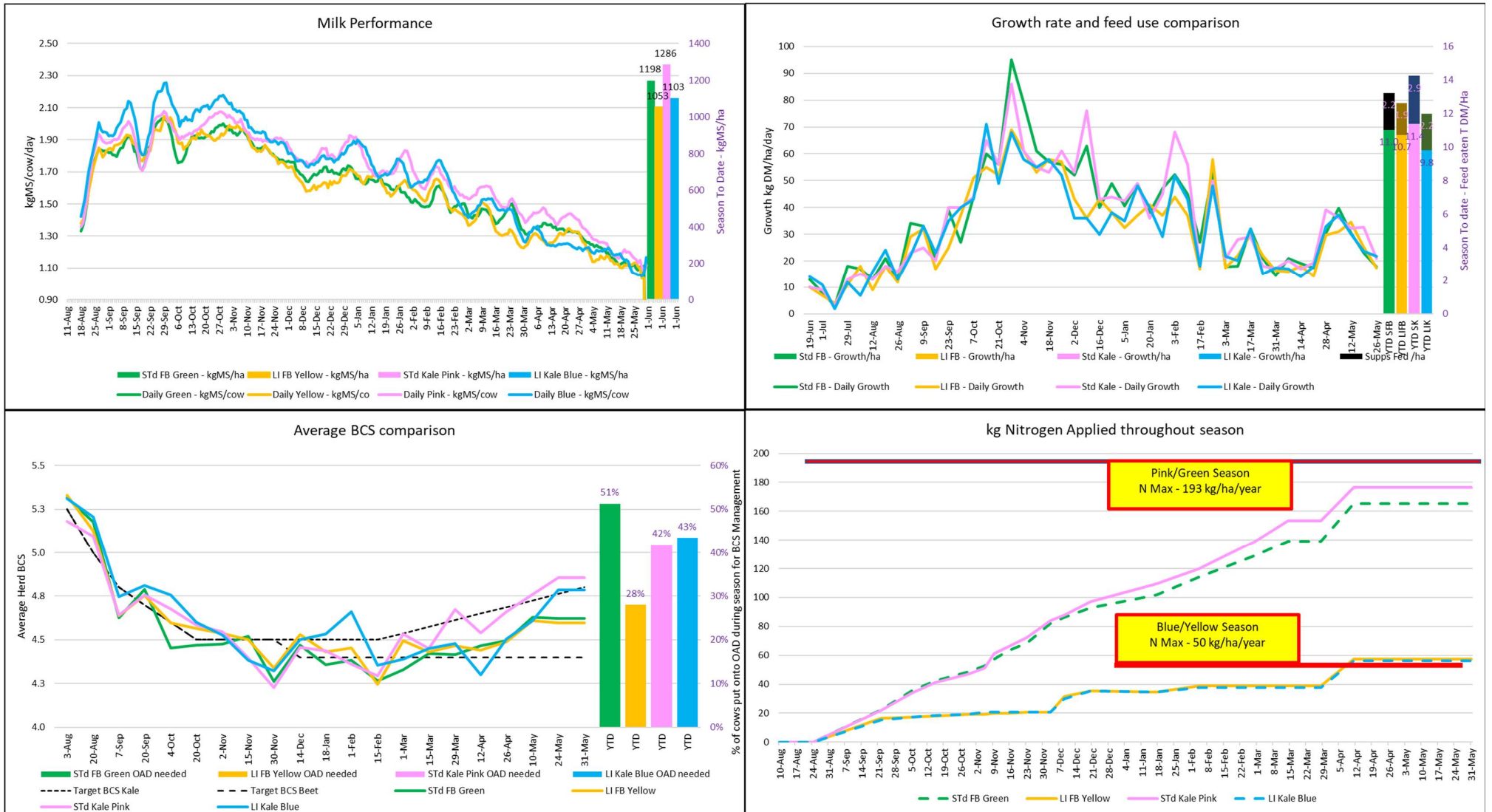


Figure 11 a,b,c,d: 11a weekly MS/cow; 11b Weekly growth rate; 11c fortnightly BCS; 11d annual nitrogen application