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Integration of crop and dairy farms

The growth of the Canterbury dairy industry has been well documented. Research from the Lincoln University Agricultural Management Group has shown that this growth occurred in three successive waves roughly covering the 1980s, 1990s and 2000s. The first wave of the 1980s was mainly entrepreneurs drawn by lower-priced land and irrigation water. Then in the 1990s, the second wave was dominated by corporate farmers in search of capital gains but also containing a number of traditional sheep farms which converted in search of increased profits. By wave three, cropping farmers with some sheep were drawn to the industry. Further research has shown an increase in high input systems in the 2000s, and that when use of supplements is combined with efficient use of pasture these more intensive farms can be highly profitable.

In this article we report on case study investigations in 2012 of seven farm businesses in mid-Canterbury. These are part of a further evolution within some of the region's dairy industry towards the integration of crop and dairy. The purpose of the project was to establish the reasons for the land use change from crop to crop and dairy, together with the benefits of integration for both crop and dairy systems.

All the crop systems for the seven farm businesses included cash crops and dairy support. The cash crops included milling wheat, vegetable and ryegrass seed, peas, potatoes, Asian brassicas, malting barley, hemp and oats. All the dairy farms fed supplementary feed at 600 to 1,200 kilograms per cow per lactation, or between two and five kilograms a cow daily, mainly grains, placing them within systems three to five of the DairyNZ Five production systems. The table shows that, in comparison to the production averages in the Ashburton district, all integrated dairy farms had above average stocking rate and production per cow.

Case study farms compared to Ashburton district farms

	Averages for the Ashburton district 2011 to 2012	Average and range for the case study farms
Stocking rate in cows per hectare	3.5	3.9 with a range 3.5 to 4.5
Cow herd size	859	881 with a range 500 to 1900
Milking platform in effective hectares	243	247 with a range 138 to 420
Milk solid production in kilograms of milk solids per cow	406	485 with a range 457 to 550
Milk solid production in kilograms per hectare	1421	1892 with a range 1600 to 2182

Adopting and developing the system

The development process was from intensive crop to crop with dairy. Previously the crop farmers had incorporated sheep, and in some cases dairy, support within their cropping system. All the case study farmers had specialist skills in crop farming before the introduction of dairying. Dairy was adopted into the system in three ways –

- Conversion of one cropping farm into separate but contiguous crop and dairy farms
- Conversion of one cropping farm into crop and dairy units with flexible boundaries between them
- Conversion, in some cases following purchase, of a separate non-contiguous parcel of land to dairy to create complementary units.

The search for profitability was a main reason for land use change for six of the seven farmers. Four of these farmers also talked about lifestyle improvements as a reason for converting. These farmers recognised dairying as being a simple system in comparison to cropping, with less stress and workload for the owner. They partially converted to dairy to recapture the enjoyment of farming and to increase their recreational time. Yet the same farmers did not want to fully convert because they had a personal preference for cropping and therefore wished to continue working on the cropping farm.

All the case study farmers employed a lower order sharemilker or manager, which removed them from the role of managing labour, allowing them to meet their personal work preferences, reduce problems and increase recreational time. This management strategy also removed some land from the case study farmer's direct care, further reducing workload. In all cases the cropping area was reduced.

Risk management

Spreading risk by diversifying income was regarded as an important factor in six of the case studies. Dairy conversion was seen to reduce the climatic, market and price risks associated with cropping. The security of the dairy farm led a number of the case study farmers to change their personal risk position within the cropping

enterprise. They substituted their perceived low-risk, low paying crops with higher-risk and higher paying crops. Risk management was also a primary reason the case study farmers chose not to fully convert to dairy.

Two farmers chose to convert as a method of making the farm more easily divisible for succession. One said the irrigation scheme and scattered trees made his property better suited to dairy than crop and this helped his decision to convert. Another said an important reason for his conversion was the excitement of entering a new industry and learning new skills.

Only one farmer mentioned without prompting the creation of synergistic relationships between enterprises as a reason for partially converting to dairy. All the other case studies needed prompting into a discussion. The use of land itself created synergies on one farm.

This farmer chose not to have a fully fixed area selected for the dairy platform. Instead paddocks could be switched between crop and dairy, usually with crop being incorporated into the dairy platform when re-grassing was required. This allowed for more rapid pasture renewal on the dairy farm. Having crop and dairy land adjoining without fixed boundaries also allowed the milking platform to be expanded when additional grazing was required.

Wintering

All of the case study farmers had full or partial dairy herd wintering on their crop farms. Some farmers used their crop farms for grazing milking cows at the beginning or end of the season. In some cases cut-and-carry feed was transferred to the milking platform. Given the proximity of the farms they also practised individual drying-off cows in autumn so that they could milk cows for longer.

Some of the case study farmers kept cows on the crop and winter grazing longer in spring, bringing them on to the milking platform in small groups at or after calving. Cows could also be moved across to the crop farm to graze ryegrass seed crops. In some cases farmers justified their self-wintering practices as providing security and guaranteeing cropping profit. Other farmers said wintering cows allowed their intensive cropping rotations to work. One farmer noted that maize following winter feed in a rotation benefited from the manure and required less fertiliser.

Supplementary feed

All of the case study farmers identified synergies involving supplementary feed. Some farmers bought all supplements for cows from their cropping farm regardless of the market while others based their decision on the comparative costs of other feeds. All farmers mentioned the benefit of reduced transaction costs when they traded feed internally. One farmer grew grain on his crop farm, but did not sell it to his dairy platform as the land was not adjoining and he could buy grain from dairy platform neighbours at a lower cost.

All of the case study farmers sold silage or baleage made on their cropping farm to their dairy farms. Other products the farmers sold to the dairy platform included pea and barley straw. The grazing of their seed crops of ryegrass and clover with cows could be considered a supplement. The case study crop farms did not subsidise the cost of feed for the dairy platform, but information sharing allowed the appropriate quantity and quality of feed to be supplied to the dairy farm with reduced transaction costs.

Information and knowledge

Although each farming enterprise tended to have its own machinery, the specialised machinery on each farm was used on the other. Information and farmer knowledge was important. The case study farmers felt they had greater knowledge than single enterprise dairy farmers about crop markets and the value of feed. The case study farmers generally felt this helped them make more informed decisions about feed costs.

Potential environmental benefits were discussed but not quantified. Evidence of the sustainability of these farms from a whole-system approach is a gap requiring further research to determine environmental footprints. The ability to reduce the potential environmental problems surrounding dairy farming by incorporating cropping land could have important implications for industry growth.

The future

It remains unclear whether the current levels of integration will continue in the long term. It is notable that all farmers had previous expertise in cropping before starting their dairy operation, and that all of the transition has been away from crop towards dairy. Six of the seven case study farmers plan to keep cropping as part of their operation as it is their preferred on-farm role. They are also developing crop rotation on these properties for dairy support and to take advantage of the higher value crops such as vegetable seed.

In the seven case studies, the reasons for land-use change were a combination of profitability, risk management by diversifying income, and personal lifestyle preferences. Dairy farming was attractive because it was a simple system with a reduced workload compared to the cropping systems.

The synergistic relationships between crop and dairy included shared land, wintering systems, supplementary feed systems and an associated reduction in transaction costs. Given the specific skills associated with cropping, it remains unclear whether the integrated systems will continue through to successive generations of farm ownership.

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