Pasture cropping reaps financial and environmental benefits

Case study: Colin Seis
Location: *Winona*, Gulgong, central west NSW
Property size: 810 hectares in family partnership
Mean annual rainfall: 650 mm
Soils: Mainly granite soils, pH 5.5
Enterprises: Merino stud, fine and medium wool growing, cropping (cereal rye and oats) and kelpie stud

During the early 1990s, Colin Seis started to question the value of various 'conventional farming' practices. He became particularly skeptical about the wisdom and benefits of destroying and rebuilding pastures to accommodate cropping and grazing cycles. As Colin discussed with Mark Filmer, over a beer he and a mate devised an alternative farming system known as pasture cropping. This system has improved the profitability and sustainability of his own property and has gone on to be adopted by many farmers throughout Australia and overseas.

"A devastating bushfire during 1979 sparked a major change on *Winona*.

Earlier that decade, we started to experience increasing soil acidity, weed invasion and a rising saline water table. The bushfire, which destroyed the family homestead, more than 3000 sheep and most of our fences, forced us to rethink the way we had been farming.

During the late 1940s, my father implemented a pasture improvement program using sub-clover, ryegrass and superphosphate to help address erosion problems. The program worked well for about 30 years — helping to increase our carrying capacity. But during the 1970s, when the other environmental problems began to emerge, superphosphate prices skyrocketed, making it uneconomical. The 'improved pasture' system, that relied on introduced grass species and fertilisers to replace native pastures, lost by a variety of means, no longer was the best form of management.

Photo: M Filmer

Far from reducing crop yields, pasture cropping has manitained yields and increased profitability through reduced inputs for Colin Seis, *Winona*, NSW.

Key points

- Pasture cropping is a low input farming system that combines grazing and cropping into a single land management system
- Restoring original native grass cover is critical to the success of pasture cropping
- Pasture cropping requires a different mindset compared with conventional farming methods.

We started to consider how to secure financial and environmental sustainability. For many years we used conventional no-till farming methods but I remained frustrated at the reliance on herbicides to facilitate the change between the pasture and cropping phases. It seemed absurd that pastures had to be destroyed and re-established to allow cropping and grazing cycles to take place.

During the early 1990s, a friend and local farmer, Darryl Cluff, and I got together to discuss options to combine grazing and cropping into a single system. We devised pasture cropping — a low input farming system involving the direct drilling of a cereal crop into an existing native perennial pasture.

We had a fair bit of red grass (*Bothriochloa macra*) and thought we could direct drill a crop into it without killing it because of its winter dormancy.

It was far more successful than we expected — the crop was as good as a conventional crop.

That first 'trial' planting was an oat crop to fill the winter feed gap. Its performance suggested that good grain yields also could be achieved using the same method.

During the past 15 years we have refined the system and use it in combination with high-density short-duration (pulsed) grazing. Financial returns have increased and the property's natural resource base has improved.

The livestock picture

We currently stock about 4000 sheep, which are split into two mobs. Carrying capacity of the property is about 8 DSE/ha.

The mobs are placed in one of about 70 paddocks (averaging about 20 ha) where they graze for about 4–6 days before being rotated to another paddock — a process that creates a rest period of up to 90 days before each paddock is re-grazed.

Although the system combines cropping and grazing, the focus is more on plants than animals.

We try hard not to graze a paddock until it has recovered from the last grazing, This usually means a 2–3 months' rest before regrazing.

You do need more paddocks to manage this system well, but it is actually less labour intensive as you only have to manage one or two large mobs rather than 10 or 15 smaller ones.

Better diversity and density

Short-term intensive grazing has improved the diversity and density of our native perennial grasses.

What we have done is to restore the original grassland and when you have done that everything starts to fall into place.

Year-round groundcover reduces wind and water erosion and weeds, improves soil structure and increases nutrient availability and soil organic carbon levels. As well as enhancing soil health, it also improves water-use efficientcy, nitrogen-use efficiency and general ecosystem functioning.

Researchers have measured much higher biodiversity of insects and soil micro-organisms on our property compared with neighbouring farms using conventional cropping and grazing methods. This has contributed to less crop insect and disease problems as pest insects are controlled naturally by predators.

There also is evidence that retaining perennial native grass in grazing and cropping systems and having complete groundcover throughout the year increases plant biomass compared with conventional cropping methods. The extra biomass and perennial native grass are significant contributors to the increased soil carbon levels.

Sheep graze a pasture right up until a crop is sown. This process controls weeds, reduces dry matter bulk and minimises the need for herbicides.

Our cropping enterprises have been just as productive as before, but we now use significantly less inputs, increasing profitability. Increases in soil fetility with this systems means we now apply about one-third of the fertiliser used in comparable no-till systems

Following harvest feed is immediately available to livestock. In fact, it appears that pasture cropping stimulates increased grass seedling numbers and diversity, producing more feed post harvest.

Pasture cropping recognises that natural ecosystems are complex. Through mimicry, a potentially valuable tool that can improve the financial and environmental outcomes of mixed-farm systems can be implemented."

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The science behind the story

By Dr Alison Bowman

'Roughing' cereals, particularly oats, into pasture paddocks has been a technique used by Australian farmers for decades to provide early season fodder to livestock. Yet rarely do these crops go through to grain harvest unless the season is particularly favorable. 'Pasture Cropping' is actually an optimisation of the system that allows a fodder supply plus a grain harvest from cereals sown into native pasture country through better management of both the crop and the pasture component.

With increasing pressure on dryland farming systems to reduce input costs in the current run of drought years, low input options such as pasture cropping are more attractive to growers. At the same time the Future Farm Industries CRC (FFI CRC) is looking to test farming systems that could better cope with changes to climate by adding more perennial options to the system. The combination of pasture cropping into this range of new perennial options is a research area which the CRC will invest in.

One of the options researchers will trial across a range of rainfall zones in southern NSW and northern Victoria in the next few years will be the performance role of a number of annual cereals oversown into a range of perennial pastures. These pastures will include native perennial grasses, similar to those on Colin's property, as well as lucerne and other perennial broadleaf plants, and a range of new domesticated perennial grasses. FFI CRC is endeavouring to find answers to the questions growers are asking such as: 'How long does it take before a perennial-pasture systems degrade,' and 'Can you quantify the yield penalties to the crop or pasture?" To date the information, even though mainly anecdotal, has been favourable. The CRC intends to provide management packages for growers wanting to use these types of systems along with risk management advice for those who intend to implement them in the various rainfall zones.

- *Dr Alison Bowman is the Program Leader for the Future Cropping Program (Program 2) within the FFI CRC.*

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