

Pasture Cropping vs No-Kill Cropping

Pasture cropping and no-kill cropping were developed independently in the 1990s, with different objectives, but the inventors later discovered some shared principles. The shared aspects of these systems have been subsequently emphasised, but the differences determine how and where the systems should be used.

Pasture cropping

- Developed by Gulgong farmer, Col Seis, and Birriwa farmer, Darryl Cluff
- Devised as a strategy for low-input, zero-till cropping directly into perennial grasslands
- Aims ideally for a profitable crop yield, while maintaining stock numbers, enhancing soil health and ecosystem services under a healthy grassland
- Can fall back to animal production if necessary, reducing seasonal production risks
- Seed is sown into moisture, into living grasses that are either naturally in their dormant phase or are in chemically-induced dormancy
- Low-disturbance tyres or coulters discs can be used
- Chemicals and fertiliser are used, but only to ensure profitability rather than to guarantee a pre-determined yield

No-kill cropping

- Developed by Trangie farmer, Bruce Maynard
- Invented as an "integrated landscape production technique" – a way of growing crops without killing other plants
- Aims for extremely low input costs and minimal production risk
- Has the flexibility of harvesting for animal production or grain, depending on which offers the highest profit in a particular season
- Seed is only sown into dry ground, using disc coulters set to run dead straight for minimal soil disturbance
- Moisture and soil disturbance encourage weed growth. Under no-kill, crop growth is triggered by rainfall at the same time as weeds, ensuring weeds don't get an overpowering advantage
- No fertiliser, herbicide or pesticide is used. No-kill cropping aims to increase grassland diversity. Synthetic inputs simplify ecosystems while pushing up costs. The system relies on ecosystem diversity for crop and pasture health

Pasture and no-kill cropping jointly:

- Consider a healthy permanent grassland to be the ultimate system for capturing and cycling moisture and nutrient
- Regard diverse grasslands as checks against outbreaks of pest insects and disease in plants and livestock
- Aim to reduce the cost of inputs and spread seasonal production risk
- Agree that profitability is more important than outright production
- Use managed grazing as a tool to enhance grassland productivity

Pasture, no-kill cropping bring new life, options

AUSTRALIAN farmers know about cropping, and they know about grazing. But between these two production systems sits a third way: Australian-developed pasture cropping and no-kill cropping. MATTHEW CAWOOD reports.



PASTURE cropping and no-kill cropping are widely misunderstood, even by some of the hundreds of farmers now using them in some form.

To the observer, they may seem to involve simply direct-drilling crops into grassland, then the management of a grain-graze system with the possibility of a harvest.

The reality is more sophisticated. Their inventors, Col Seis and Darryl Cluff (pasture cropping) and Bruce Maynard (no-kill), regard each of these practices as unique production systems in their own right: the first cropping systems to work within grasslands without destroying those grasslands.

Apart from this common feature, the two systems were developed for different reasons and have different strategies.

At harvest, neither pasture nor no-kill cropping methods tend to yield as well as yield-focused conventional techniques, but they regularly produce greater quantities of biomass.

The methods' advocates say the yield drop is offset by the lower input costs and returns from grazing, which together often deliver better gross margins per paddock.

The systems also offer far greater flexibility under seasonal variability, and ecological outcomes that conventional methods can't duplicate.

The systems' inventors separately realised that as a basis for robust, low-input agriculture, perennial native grassland can't be beaten.

For centuries, farmers have recognised that a ley pasture phase restores land depleted by cropping. More recently, well-managed pasture has been acknowledged as one of the best ways to sequester soil carbon.

With no spray-out and no re-establishment, pasture and no-kill cropping access the ecological benefits of pasture without interruption and encourage the grassland to become more diverse and robust along the way.

Livestock are essential to the management of healthy grasslands, the systems' inventors say, particularly to the cycling of nutrients. In their view, if stock aren't in the equation, it isn't pasture or no-kill cropping.

Grasslands don't evolve without disturbance. Livestock can provide that disturbance by being managed for short bursts of "creative destruction" – consuming vegetation, trampling plant litter, breaking soil crusts to make a seed bed, fertilising with dung and urine.

Used before sowing, stock can also serve as a mechanical tool, opening the pasture sward to sunlight and trampling down mulch to hinder weed growth.

Over successive cycles, brief bursts of stock disturbance and rest intervals allow new plants to take hold, increasing biodiversity.

At Mr Seis's property, "Winona", near Gulgong, researchers recorded 12 new native perennials in one paddock between 1999 and 2007.

Livestock also underpin the economics of pasture and no-kill cropping, providing a reliable income base through the spikes of crop returns.

Conventional agriculture aims for the greatest quantity of a single product from each production cycle. Each cycle of pasture or no-kill cropping offers a wide variation of possible returns, including a yield of meat or wool, a yield of grain, or a combination of both.

Unlike a single-commodity focus, the pasture or no-kill cropper can read the drift of the season and switch emphasis to any of these outcomes. Until the final stages of crop growth, there is no lock-in towards one result, offering greater resilience in variable seasons.

The livestock element means that cropping purists are unlikely to take to pasture or no-kill cropping; others balk at the techniques for different reasons.

A pasture crop, and especially a no-kill crop, can look messy and "unprofessional" to those used to the neat appearance of conventional crops. The prospect of low yields per hectare are also a turnoff.

However, practitioners of pasture and no-kill cropping say expectations of how things should be mask an economic reality: production does not equal profit.

Agriculture is an industry where costs are the only part of the financial equation directly under the producer's control.

Pasture and no-kill cropping offer ways to use existing machinery and infrastructure in production systems that can slash costs while progressively building "natural capital".

As Mr Maynard observes, that should be enough incentive for pasture and/or no-kill cropping to have at least an experimental place on a lot of Australian farms, allowing farmers to make their own decisions about the systems' fit.



Bruce Maynard in one of his biodiverse pastures on "Willydah", Trangie.

Nature's done the hard work, now to best enhance it

THE engine that drives pasture and no-kill cropping is perennial grassland – and for good reason.

Across most of the area that is now Australia's farmland, millions of years of plant evolution defaulted to grassland or grassy woodlands as the best fit to the climate and soils.

The stocking rates of early settlers showed that some of these native grasslands were hugely productive.

The simplified native pastures dominant today do not reflect the productivity of the complex systems that preceded them.

Biodiversity is the key. Each of the hundreds of plant species in a healthy grassland has a different niche that allows it to successfully compete for water and nutrient.

As a result, a diverse grassland produces more biomass than a simple grassland, where a few

species compete for the same resources.

Different plants use and cycle different nutrients, support different microbes below ground, and different insects and animals above ground.

(Research found that one pasture-cropped field supported 600 per cent higher insect numbers than an adjacent conventional field, and 25 per cent more insect diversity.)

A permanent native grassland excels at capturing rainfall and holding the moisture in the root zone, where it can be used by plants.

In drought, many native perennials can survive water shortages that kill exotics, and respond faster to rainfall.

Pasture cropping and no-kill cropping aim to preserve these advantages, and enhance them through tactical management.

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