

## Boosting landscape function for profit and planet

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Regenerative farmer Bruce Maynard is on a mission to ensure the future of agriculture and the communities that make it tick.

Farming must be about working with nature, not against it, says Bruce Maynard, one of Australia's leaders in regenerative agriculture.

He believes this philosophy, which he's worked hard to nurture on his family's property in central NSW, is critical for agriculture's sustainability and the health of the planet.

"Twenty or so years ago, climate models were anticipating what we're experiencing now, but in 2050 or 2100. We're getting there early," said Bruce, who is experiencing the harsh realities of climate change like so many NSW growers.

"It's pretty nasty around our way. We've had just four growth events over the past three years. Our rainfall pattern as it's travelling now is more like Alice Springs. Our stocking rate is only a fifteenth of what it was prior to the millennium drought and we're scratching our heads wondering whether it should be zero. Like many places in Australia I've travelled to lately, we've got some decisions to make. The continent is in pain, landscape-wise and community-wise."



REGENERATIVE FARMER BRUCE MAYNARD.



BRUCE MAYNARD IS WORKING TOWARDS 'TRIPLE LAYER' COVER – GRASSES, SHRUBS AND TREES – ACROSS HIS PROPERTY.

The fourth-generation mixed enterprise producer, who farms at Willydah, near Narromine, has dedicated much of his 35-year career to developing a farming system that maintains as much landscape function as possible.

His environmental awareness led the Maynard family to become early adopters of holistic management and cell grazing and to embrace diversity across their property. It also gave rise to Bruce's development of No-Kill cropping, a system in which crops are sown into natural grasslands that has helped enable the family to reduce input costs and boost their land's carrying capacity by increasing biomass.

Bruce's appetite for innovation in agriculture and his respect for environment was sparked by a one-year Rotary exchange to the United States where, as a senior high school student, he witnessed the full gamut of farming extremes including growers going broke despite rich glacial soil, price subsidies and government support for those buying land for cash.

The lesson he took from his US

observations was that systems are key.

He subsequently came to believe that incremental improvements to existing systems would not drive the change that agriculture, farming communities and the climate needed. Rather, success in agriculture would rely on creating systems that capitalise on the resources available.

"The exchange program was a good experience for a young man and made me think hard about how things operate," he said. "It had to be about a constant search for systemic change rather than a change in tactics."

"When I came home it was straight into the frying pan. We had started to run into the first precursors of the major climate shifts allied with high interest rates and expansion. We had to work hard for quite a period of time amending what we were doing with our existing systems but the thought never left me that if we just kept on trying to improve existing systems we were going to continue driving the existing trends in a similar fashion.

"So I always tried to think hard about breaking away from those systems. If

I didn't want the results we were achieving I had to think about a change in direction."

That change came in the 1990s in the form of a holistic approach to agriculture that treated cropping and grazing as one entity and actively considered the impact of farming enterprises on the ecology. It was a move away from a simplification model in which monocultures ruled to diversification fostered through time-controlled grazing management and No-Kill cropping.

The starting point was a long-term whole-farm plan, produced in conjunction with the then NSW Soil Conservation Service, that set out objectives for the next 100 years of farming at Willydah and helped the Maynards focus on the future sustainability of their property.

"The reactive annual stuff is necessary but you have to always keep stepping forward to the next point," said Bruce. "Long-term planning was one of the planks in the early '90s. We were one of the first people in our part of the world to implement cell grazing and holistic management and that changed things dramatically for us because it started to create a huge amount of diversity that wasn't there before with our traditional grazing and management system. That was a precursor to a cropping system that boosted diversity rather than simplified the ecosystem."

**We are going to have to do a hell of a lot more in ag with a hell of a lot less.**

Bruce developed No-Kill cropping, which involves disc sowing dry into natural grasslands and eliminates the need for pesticides, herbicides and fertiliser, in 1996.

The family had been direct drilling their crops since the mid-1980s but began to question the wisdom of removing the biological diversity and biomass being built up through cell grazing and other management initiatives to accommodate their cropping program.

"We'd been direct drilling for a decade but having to remove all that diversity each time we wanted to sow a crop was a bitter pill to swallow," said Bruce.

"We realised we were at a big fork in the road. Either we keep on increasing



CHECKING THE LATE-SEASON BIOMASS OF A 2006 NO-KILL CEREAL CROP SOWN INTO ESTABLISHED PERENNIAL GRASSES.

diversity with our grazing then taking it back to zero with our cropping or we think about doing cropping differently. We chose the latter."

He describes the change to No-Kill cropping, which saw him sell his direct drill bar and sow 80ha dry using a double disc unit fitted to his old seed delivery equipment, as a 'burning bridges behind me exercise'. The rest of the cropping program was sown after the season break with the same equipment.

"That was the beginning of things because the crop sown dry literally doubled the wet-sown stuff," said Bruce. "It was the tipping point of the whole systemic approach, because any system that relies on moisture sowing must do something about weeds and that's the crux. If we're doing anything about weeds it falls to either tillage or chemicals, both of which are causing difficulties on a grand scale across the continent and around the world."

No-Kill cropping is based on five main principles: sowing dry, using straight-running, coulter-type seeding equipment, no pesticides or herbicides, no fertilisers and good grazing management. Eliminating chemical and fertiliser inputs reduced the Maynards' cropping input costs to one tenth of what they were previously, but there is a casualty.

"Croppers will ask the question, quite rightly, what about the yield?" said Bruce. "Grain yield with No-Kill is about one quarter to one third of what you might expect from a monoculture crop but here's

a really important point: total biomass increases by 30 to 40%. That's a real distinction, but a hard one for people to get their heads around, because when you're doing conventional cropping it's about grain production.

"In monoculture cropping you obliterate everything else and you've only got one product coming off the paddock. But with No-Kill you have the potential of multiple products at 10% of the regular cropping cost. It becomes your choice



ELLA MAYNARD IN A NO-KILL CROP OF CEREAL RYE GROWN IN 2009, DURING THE MILLENNIUM DROUGHT.



what you do with the crop, whether you harvest it for grain, get the four-footed headers to harvest it for you, make silage or use it as hay.

“There’s also a synergy with livestock, because No-Kill changes the whole feed base. It’s not just about the extra dry matter; there’s also dietary diversity.

“When you sow a cereal or other grain crop into mixed grassland you place a high-nutrient, low-toxin plant in amongst many other plants, some of which are high-toxin, low-nutrient, so you give the animals the ability to utilise the whole smorgasbord in front of them, which addresses all the long-term weed issues.

“Weed populations dwindle because the animals keep on consuming plants they wouldn’t otherwise eat. Using No-Kill on an area gives the stock a much greater ability to take on a swathe of plants that were formerly weeds and start to utilise them.”

No-Kill cropping is part of a holistic approach to agriculture that enables the Maynards to maintain a grassland layer in the landscape. Bruce has evolved a strategy that incorporates three layers of vegetation, including shrubs and trees. He believes each component benefits the environment and his farming operation in a different way but all contribute to landscape function. In simple terms, when the landscape functions at an optimal level it can make use of all of the resources available to it as they arrive, including moisture, sunlight and the soil’s nutrients and biological activity.

When they began holistic farming the Maynards’ farm was missing a shrub layer because the plants had either been removed to make way for cropping or grazed by livestock, so in 1998 Bruce began experimenting with planting saltbush in various layouts as a means of re-establishing shrubs in the landscape. This proved to be an evolving process in which he started with blocks of saltbush then transitioned to alleys before eventually adopting curved plantings.

“In some ways it was a matter of how long does it take you to get to the bleeding obvious,” Bruce joked of his experimentation.

He found block plantings, which involved mass planting saltbush in close proximity, simplified the grassland layer too much. Alley plantings, widely spaced rows of saltbush with room between the rows for cropping and grazing, provided shelter for livestock and protected crops from wind damage, resulting in a significant lift in production. Curved plantings achieved with spiral plantings, the configuration he has now settled on, provide protection from the wind for stock and crops at any time of the day. “My land is very flat, so it doesn’t have natural contours, but going on the contour is the way to go.”

The family established more than 300,000 saltbush plants on less than 15% of their property and these plantings, despite the relatively small area, improved livestock carrying capacity and profitability, a clear sign of how much extra biomass the shrubs provided, said Bruce.



LIAM MAYNARD WITH HANDFULS OF CEREAL PLANTS FROM A COMBINATION NO-KILL STAND OF OATS AND BARLEY SOWN IN 2014.

However, a fungal disease that hit saltbush plantings across eastern Australia in 2013 killed 80% of the original saltbush plants on the Maynards’ property and they are now looking for alternative shrub species to replace saltbush as a source of livestock forage.

“Saltbush provided the biggest boost to our farm for 20-odd years but I couldn’t recommend it as a production plant now.

“The disease seems to be endemic now and the production characteristics of infected saltbush probably aren’t strong enough to warrant its use. It will survive but would have only wind reduction value.”

The family is experimenting with about 10 different shrub species that might replace saltbush as a forage. These include a cactus known as Spineless Prickly Pear but Bruce is unable to confirm its suitability at this stage. “We won’t stop with our work to find multiple answers. We’re never after a silver bullet; we’re after silver buckshot,” he said.

Bruce sees adding shrubs and trees as a way of making better use of the available land and believes all farmers, whether they run stock or not, can benefit from establishing grass, shrub and tree layers within a landscape.

“Think about adding componentry on



CATTLE GRAZING NO-KILL MILLET, WITH THE COMBINE BRUCE USES TO SOW HIS NO-KILL CROPS IN THE BACKGROUND.

top of what you're doing to enhance your existing product. Even if you never utilise the shrubs for forage, there are wind protection and long-term nutrient recycling benefits. Plants with roots that extend deep into the soil profile bring materials up to the surface that wouldn't otherwise be available to shallow-rooted plants. The same applies to trees. It's thinking about what we can put on top of places in ways that suit the individual and the business. That's the starting point.

"If someone is really focused on their cropping income we'd be thinking about doing designs with trees and shrubs on the edges of their paddocks that will give them an increase in crop production while adding elements that bring more diversity and other community benefits along for the ride."

However, species, site location and planting layout must be carefully considered before establishing plantings of shrubs and trees, he cautions.

"Shelter belts can be highly effective but there are plenty of examples of completely ineffective belts that make evaporation rates worse. If someone just dives in and gives it a go without a lot of good information it's very easy to do a poor job of it."

But he has no doubt that finding ways to introduce more diversity to the landscape is crucial for the future profitability of agriculture.

"In the long run we can't have simplistic systems without the expectation of an ever-increasing need for outside inputs. Simplification has served us well as a species for ten thousand years but we now have a problem with scale.

"We've gone everywhere on the planet and we keep on simplifying the last bits and there's a price to pay for that. Whenever we take out bits of landscape function we're going to have to pay to replace that function one way or another. We need to find creative ways of getting the function back that don't affect people's bottom line in the short or longer term.

"If you want to reduce your outside fertiliser use or herbicide use you've got to increase the soil biological activity and start recycling some of the stuff you've paid good money for.

"There's a squeeze point coming to us all fast, whether we're interested in the landscape or not. We are going to have to do a hell of a lot more in ag with a hell of a lot less.

"And that's not about energy, because humans are being very creative about finding new ways to energise. It's some of the non-renewable things, such as phosphorous.

"How can we liberate more phosphorous? The general statistic is that three quarters of the phosphorous applied as fertiliser gets locked up in the soil, so for a cropping regime, let's think about ways of getting that back by mobilising it. And how do we mobilise it? With biology. And that depends on how much soil function we

can reinstitute."

But, he acknowledges, adapting existing farming systems to regain landscape function is no simple matter.

"It's not just about saying, 'here do A, B and C.' It's a big mindset change and you have to assist people with that. The information is not enough, nor is desire. They also need support."

To that end, he is involved in the Constructive Farming Cooperative, which has developed the Grassland Grain System, a three-year structured program that assists farmers with achieving high incomes from nutrient-complex grains.

Bruce advocates that farming businesses be scaled to involve more participants, not less, and points to landscape enhancement as a means of helping resolve key issues around finite resources and diminishing farming communities faced by the agricultural industry around the world.

He sees buying more land as an example of scaling outwards that often leads to smaller farming communities.

"For a stronger industry we need more participants joining rather than a steadily declining number."

"Intensifying production by adding a pig or poultry enterprise or transforming the goods produced is one way to help achieve this but is not for most people," he said. "That's about increasing the intensity of activity and that's fine, but it requires a huge number of extra skills and risk."



HARVEST TIME AT WILLYDAH. NOTE THE FULL COVER OF GRASS UNDER THE NO-KILL CEREAL CROP BEING HARVESTED FOR GRAIN.

## MIXED COVER CROPS

FOR SUSTAINABLE FARMING

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