

INVESTING IN AGRICULTURE'S FUTURE

The role of natural capital in enhancing agricultural productivity



Introduction

The global food boom could be a bonanza for Australian agriculture. Demand is predicted to rise 60 per cent by 2050, mostly due to rising incomes in Asia. Average food prices are expected to be 20 to 30 per cent higher over the next decade compared to the last.

Yet agricultural productivity growth has halved since the 1960s. That means increasing production will take more land, water, labour or capital than before. Much of Australia's land is already highly degraded by soil erosion, water degradation and biodiversity loss, which further threatens farming returns. Climate change makes the outlook even more uncertain.

So how can Australia grasp the big opportunity presented by rising food demand in Asia?

Debates so far have focused on how production can be increased through investment in R&D, technology, raising skills, infrastructure, or improving supply chain efficiency.

However, this overlooks one key fact. Agricultural productivity growth depends on the sustainable management of natural capital such as soil, water and vegetation.

Farming smarter, not harder

An emerging debate asks - can we farm smarter, by preparing agricultural land to reliably supply products?

'Farming smarter' means using practices which stabilise farmer profits and improve input efficiency, without depleting soils or causing long term damage to the landscape. By contrast 'farming harder' means intensive production practices which sacrifice long-term wealth for short term gains.

Australia's poor soil and variable weather mean we need to farm smarter, and avoid the boom & bust cycles in land prices that force farmers to work natural capital harder.

Showcasing smart farmers

This briefing paper showcases Australian farmers who are leading the way with innovative new methods that show how:

- » Sharing knowledge can turn a farm around
- » Improving soil condition can insure against weather variability
- » On-farm innovation restores grasslands and productivity

These farm business models represent attractive investments in natural capital that enhance productivity.

Calling for smarter investment

The risk of investing in 'business as usual' agriculture will increase with more variable weather due to climate change, both for existing farmers and new investors.

A new model for investment in sustainable agricultural practices is needed. This should sustainably intensify production, retain skilled farmers & enable new entrants, support innovation in farming practices, and reinvest in natural capital.

As the Centre for Policy Development's landmark report, 'Farming Smarter, Not Harder: Securing our Agricultural Economy' points out, this investment needs to be made and co-ordinated at a scale greater than most individual farms can manage.

SHARING KNOWLEDGE CAN TURN A FARM AROUND

Gilgai farms, near Geurie NSW



Changes made

- » Shifted to cell grazing and pasture cropping.
- » Invested in remote sensing to manage water use. Regularly tests soil condition.
- » 200,000 trees planted under the Carbon Farming Initiative. Put along boundaries to act as biosecurity buffers.

Key results

- » In three worst drought years of last decade, tripled farm carrying capacity of beef.
- » Grass fed beef sold at a premium above super-market prices.

Policy implications

- » Direct funds to programs that provide farmers with knowledge and skills to build natural capital and boost productivity.
- » Develop indicators for sustainable agriculture based on the metrics used by the most successful farmers.

Eric's story

Imagine if you had a solid history in farm management, great education, did everything by the book yet couldn't turn a profit? This was the situation that Eric Harvey was dealing with in 2004 and after suffering a heart attack he decided that things had to change dramatically.

Since 2004 Eric has increased his land under management from 2500 acres to 7000 acres, by abandoning traditional farming methods in favour of more efficient, regenerative practices. He has turned a farming operation that was losing \$87 an acre into a thriving purveyor of 'nutritionally superior' meats straight from the farm.

How did he make such a dramatic turn around? With help from one of Australia's best extension services through the Central West Catchment Management Authority. Eric had to wait to get a spot in their special courses that trained farmers in grazing management, whole farm planning, soil health, farm financial management, local soil geology and aboriginal land management in the local area.

Eric put his previous ideas aside and went "all in" with his newly acquired knowledge. As he says, 'the local Catchment Management Authority was instrumental in helping me turn the farm around.'

Since then Eric has largely abandoned herbicide, drenching and fertiliser. He has used this money instead to invest in farm infrastructure – including 196 paddocks and telemetry water management systems. Eric rotates his livestock so that they see 'fresh' pastures nearly every day. Not only does this improve soil health but it also improves animal health as they are never in one place long enough to be affected by common disease or parasites. He took advantage of the Carbon Farming Initiative and had 200,000 trees strategically planted on his properties to act as biosecurity buffer zones so neighbouring livestock couldn't contaminate his herd.

Unlike the average farmer Eric focuses on the triple bottom line (people, profit and land) and has a clear set of goals to address each of these. For example he has made a real effort in practicing regenerative farming methods which have improved the resilience and profit of his operation. Because the farm is profitable he can employ people over a longer term. As his farming methods use fewer chemicals and encourage native pastures, the local ecology is improved.

Eric is teaching his farming methods to his son and other farmers in the region who come to hear him talk at open field days and local trade shows. When asked what the biggest barriers to adopting his practices are he says 'the biggest obstacle to change are our egos and what we already know.'



“The biggest obstacles to change are our egos and what we already know.”

IMPROVING SOIL CONDITION CAN INSURE AGAINST WEATHER VARIABILITY

McDonald farm, east of Kaniva Victoria



Changes made

- » No till cropping to maintain soil moisture and reduce erosion.
- » Hosting other farmers' sheep for weeding, stubble management and natural fertilising.
- » Trialling bio-char to increase soil carbon and moisture during dry weather, and a variety of stubble management techniques to increase soil health.

Key results

- » Reduced input costs.
- » Greater resilience to variable weather conditions.

Policy implications

- » Customise climate adaptation plans for areas undergoing rapid weather change.
- » Ensure drought policy supports farmers who take risks in trialling new farming techniques.
- » Design payments for ecological services to provide diverse revenue sources for sustainable, low impact farming.

Ross' story

Ross McDonald doesn't talk much, but will when it comes to climate change. Ross is a third generation cereal farmer and his family have been on the land in the area for 130 years. For much of his life rainfall in the area has been consistent and the local wetland environment has remained largely unchanged. However in the last 15 years the effects of a changing climate have become increasingly evident.

The wetlands are drying up, the river red gums are dying and rainfall in successive years has averaged below 200mm, compared to a regional average of 400mm. As a result some farmers have had to leave the region which has had a large impact on the small community. As Ross explains, 'every farmer that is lost is felt by the community'.

Fifteen years ago Ross recognised the importance of retaining soil moisture in an increasingly dry environment. He adopted farming practices that would ensure 100% groundcover all year round to reduce evaporation. Central to this was the no till method of cropping which improved soil carbon and structure and led to greater water and nutrient holding ability. This made his land more resilient to weather extremes and reduced some of the cost of fertilisers.

Ross then started innovating with sheep on his farm, using them to eat down the crops and weeds after harvest and in turn provide fertiliser through manure. This reduced the need for herbicides and fertilisers, saving on input costs.

As mechanical technology improved, Ross also adopted a seeding machine which pressed the seed into the soil in a way that attracted water and trapped it around the seed.

More recently he has been experimenting with duck manure (from a local processing plant) on his fields, biochar with his local Landcare group, and biological and mechanical stubble management with his local Catchment Management Authority.

Although some of the costs of these projects are covered by the relevant groups a lot of them are not. Similarly a lot of the environmental projects Ross has implemented on his farm have been self-funded even though they have public benefits. Whether he gets paid or not Ross sees himself as a caretaker of the land and wants to leave it in a better state than what he received, though he muses 'if you want others to do it, they need to get paid'.

“If you want others to do it, they need to get paid.”

ON-FARM INNOVATION RESTORES GRASSLANDS AND PRODUCTIVITY

Winona, north of Gulgong NSW



Changes made

- » Developed innovative combination of cropping, grass pasture and sheep grazing to raise soil carbon, use water and nutrients more effectively, and reduce costs of fertilizer and feed.
- » Redesigned farm layout to use most productive land, rehabilitate saline areas, and plant remnant vegetation as shelter and habitat.

Key results

- » Enhanced farm productivity – annual input costs reduced by \$120,000 per year, additional revenue from crops as well as wool.
- » Prepared land for weather variability – soil carbon up by 200 per cent.
- » Reduced financial risks - higher quality wool and more diverse sources of revenue.

Policy implications

- » Design farm extension to encourage farmers to support and learn from each other.
- » Design carbon farming and similar initiatives to encourage early adopters and support the spread of sustainable agricultural practices while keeping transaction costs low.

Colin's story

Colin Seis can tell you a story or two about farming. A third generation farmer, Colin saw first-hand the risks of a business model that relied on cheap fertilizers. His father had farmed conventionally using horses and then tractors, leading to massive erosion. In the 1940's pasture improvement with high inputs of fertiliser was the order of the day. When Colin took over in the late 1970's he saw farm productivity decline. At the same time fertilizer prices rose and government subsidies were removed. When his farm burned down, Colin decided it was time to start afresh.

Colin developed an innovative agricultural system which keeps 100 per cent ground cover all year round. Cereal crops are planted over the top of dormant grasses in winter, as opposed to conventional cropping which requires all other vegetation to be killed prior to sowing crops. After crop harvest, cell grazing lets sheep feed on native grass pasture which has additional nutrients from cereal stubble. Sheep hooves dig crop stubble and manure into the soil, where it composts naturally. This directly increases soil carbon and nutrients.

Overall this reduces cost of fertilizer, sheep feed and soil erosion. It also avoids the cost of re-sowing pastures, because perennial native grasses thrive without fertilizer.

It also prepares the farm for greater weather variability and other risks. Pasture cropping leads to large increases in soil carbon, nutrients and moisture retention. The number of native grasses increases exponentially, supporting greater biodiversity and reducing production risks.

As Colin says 'An agricultural system has to be regenerative as well....if we don't restore grasslands it's going to cost us far too much money.'

However, he wouldn't have developed this technique without the support of his best friend on a nearby farm. Both men shared the risks of trialling new ideas. This local support was essential as it took time to find the right mix of crops and grasses to suit the local climate.

Colin's method of pasture cropping has been extensively studied by the CSIRO and Sydney University. Despite clear evidence of the benefits, Colin was recently unsuccessful in having pasture cropping approved under the Carbon Farming Initiative.



“An agricultural system has to be regenerative as well....if we don't restore grasslands it's going to cost us far too much money.”