

Making hay while the sun shines

There is a perception that returns from agriculture are risky and as a consequence there is reluctance amongst potential investors who look at the sector.

It is true that returns from year to year are much more variable than many other sectors. In fact it is quite unlike say, commercial property that gives a nice, steady year by year return, often indexed to the CPI.

The volatility brings with it particular issues that need to be considered in any investment, but it also brings opportunity.

The graphs below show the long term operating yield of two farms over an eighteen year period. One is a grazing farm and the other is an irrigated cropping farm. The grazing farm, as is typical has a less variable return. In comparison the irrigation farm has something of a roller-coaster ride with some highly profitable years and some shockers on the downside. In this example the average returns are similar for the two (7.4% versus 6.6% respectively) though over a larger number of farms the average returns from the irrigation farm will usually exceed that of the grazing farm – as it should to provide some reward for the volatility of returns.

If we look at when the money is made on each the farms, the following points stand out:

- ▶ The best 30% of years generate around 50% of the profits over the 17 year period on the grazing farms
- ▶ The worst 30% of years generated only 8% of the total profit for the business over the 17 years.
- ▶ The best one third of years contributed over 88% of the total profits on the irrigation farm.
- ▶ The worst 30% of years contributed -51% of the profit on the irrigation farms – as it turns out these were all the loss making years.

The key point is that these two farms show that most of the money is made in the few very good years. Conversely the bad years tend to be a disproportionate drag on the overall returns.

Over the longer term any investment in agriculture must recognise this trend and manage it as well as possible. This means addressing both the upside and the downside performance of the business. First though, it is worth considering the underlying reasons for the volatility. In its simplest form there are two explanations – production variation and price variation. Production variation encompasses weather as well as pests and diseases plus the effect of management on the production. Management effects include issues such as timeliness (sowing, harvesting, worm control etc).

All of these factors combine to determine the quality and quantity of product produced as well as the cost of producing it.

On the price side the major factor is the variation of price both within and between years. Quality can affect price for example prime hard versus feed wheat. However for most agricultural commodities the price received by the farmer is determined by larger forces outside the farm gate such as global trends in prices, exchange rates and economic growth.

The years that provide the high returns are obviously those where production levels are high (e.g. full water allocation for irrigation, good growing season and rainfall for crops) and this coincides with high prices. Unfortunately these do not happen very often which is why we only see a few extremely good years in both the irrigation farm and the grazing farm.

The key question is how much control, or how predictable are these years? If they are predictable then you can set the business up to capitalise on those good years when they come along. This question comes down to how predictable are seasons and prices? To be of substantial value the prediction of the season must be useful early enough to influence the big decisions e.g. to sow or not to sow crops. This means they are required at least six months but often closer to twelve months in advance. Unfortunately we do not have any weather forecasts which predict 9-12 months in advance with useful accuracy. Even the three month forecasts, on which there is considerable focus, are so inaccurate that they are useless and therefore should be completely ignored.

When it comes to prices unfortunately the story is similar. There is a lot of time and effort put into predicting future price trends but their track record is low. The variation that we see within a year is substantial, for example the relationship between wheat price at sowing and wheat price at harvest is very low if looked at over a series of

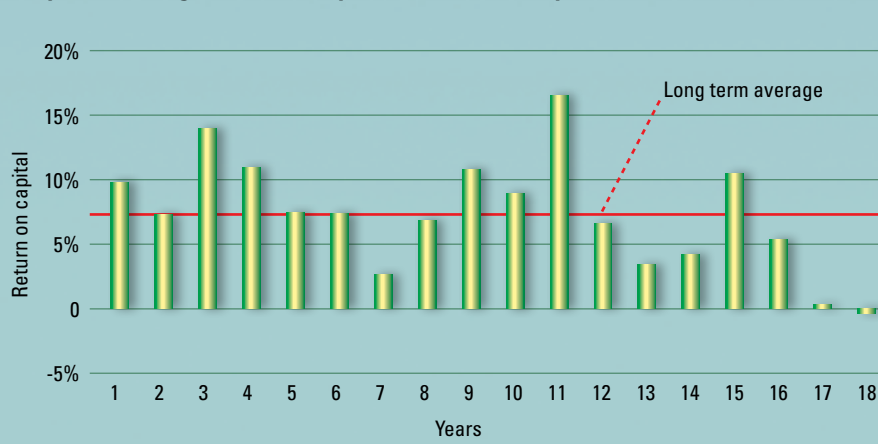
Making hay while the sun shines - 1

World Food Price Trends - 2

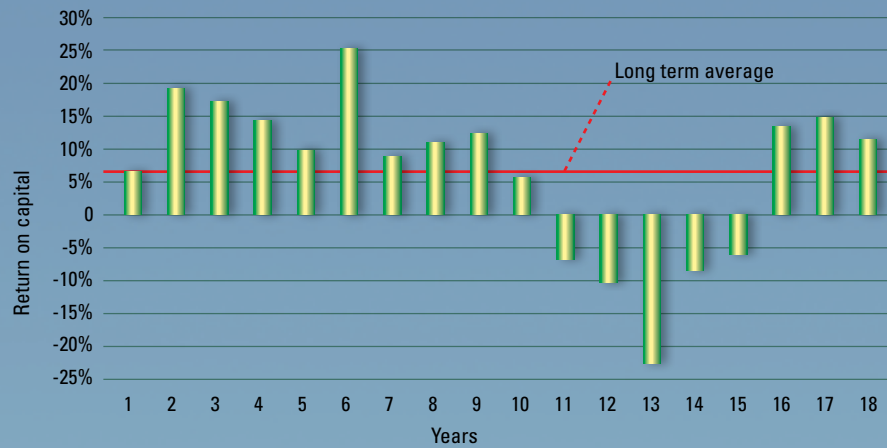
Soil Carbon Sequestration Potential - 3

GF Profile - 4

Graph 1: Grazing farm volatility of returns over 18 years



Graph 2: Irrigation farm volatility of returns over 18 years



years. That means it is unreliable to sow extra wheat simply because the price at sowing is high.

So where does that leave us? Does it mean that returns from agriculture are totally at the mercy of factors that are outside the control of the manager? Up to a point yes, but there is still plenty that managers can do to influence the size of the profit swings, both on the upside and the downside as well as the long term average performance.

The things that are within the manager's control are:

- ▶ **A knowledge and deep understanding of what causes the volatility for each business.** That knowledge will at least enable the high risks and the big opportunities to be focussed on
- ▶ **Aim to be a low cost producer** rather than being someone who

produces product for a premium. In our experience the market rarely rewards producers sufficiently with premiums that are sufficient to cover the additional cost of out of season or organic production etc.

- ▶ **Have the business set up so it can readily capitalise on the good years.** As you often do not know that a good year is coming until it is happening around you, have strategies that enable you to capitalise quickly. One important strategy is to have the right stocking rate and flock or herd structure. This is always a challenge but deliberately understocking to better cope with the bad years will consign the business to low profits in the long term – the bad years might be a bit easier but you lose in all the average and the good years. Other tactics might include delaying sales of stock to add extra weight

or topping up crop fertiliser when soil moisture is good. For a livestock enterprise, taking on trade stock is an obvious strategy but often hard to execute well because many others will be looking for similar opportunities to capitalise so you may need to look hard at unconventional options.

- ▶ **Know clearly the factors that will likely lead to the bad years.** In most cases it is simply well below average rainfall, production declines and costs rise, at least in livestock enterprises. As mentioned above, we cannot usefully predict these seasons. We can however get useful warning signs as the season progresses. These signs are never absolute so are best considered in terms of probabilities as they provide useful indicators. Examples might be the probability of a river flow by a certain date or the probability of a substantial rainfall event by a critical date. Using them will not mean you will be right every time but you will be right more often than not. And it might help avert the -23% result on the irrigation farm. Humans are inclined to be overly optimistic when faced with decisions so tend to underestimate the risk and leave the critical decisions too late. Numbers bring objectivity.

In summary the returns from agriculture are volatile and always will be – but that does not mean they are outside your control. If you focus on lifting the long term average return, thinking of ways to minimise the harm on the downside and maintain the ability to capitalise on the upside, prosperity can be yours! **GF**

World Food Price Trends

The FAO (Food and Agriculture Organization of the United Nations) food price index is a measure of the monthly change in international prices of a basket of food commodities.

February 2011 saw the FAO food price index reach an all time high of 238 points. However in the month of June 2011, this had decreased to 234 points. In June, meat prices were stable, while wheat prices fell the most of all cereals and oils were steady.

Each newsletter we will provide an update of these prices.

<http://www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en/> **GF**



Soil Carbon Sequestration Potential: A review for Australian agriculture

Jonathan Sanderman, Ryan Farquharson and Jeffrey Baldock CSIRO Sustainable Agriculture National Research Flagship

Executive Summary

Conversion of native land for agriculture has typically resulted in decreases in soil organic carbon (SOC) stocks on the order of 40 to 60% from pre-clearing levels. Globally, this loss of SOC has resulted in the emission of at least 150 Petagrams (Pg) of carbon dioxide to the atmosphere (1 Petagram = 1 Gigatonne = 1015 grams). Recapturing even a small fraction of these legacy emissions through improved land management would represent a significant greenhouse gas emissions reduction.

Currently, there is much uncertainty and debate, particularly within Australia, as to the total potential of agricultural soils to store additional carbon, the rate at which soils can accumulate carbon, the permanence of this sink, and how best to monitor changes in SOC stocks. To help clarify some of these issues, this report presents both a review of the mechanisms of carbon capture and storage in agricultural soils and an analysis of the published evidence for SOC stock changes resulting from shifts in agricultural management.

On average, improved management of cropland, whether enhanced rotation, adoption of no-till or stubble retention, has resulted in a relative gain of 0.2 – 0.3 Mg C ha⁻¹ yr⁻¹ in the upper 15 cm of soil compared to conventional management across a range of Australian soils. However, when time series data was available, even the improved management often showed significant absolute declines in SOC stocks, which, in many cases, was likely a direct result of these soils still responding to the initial cultivation of the native soil. Since the traditional management practice often lost SOC at a greater rate, when only comparing the two treatments at the end of the trial there was a relative SOC gain in the improved management treatment. This means that, for the more traditional agronomic systems tested in these trials, Australian soils may only be mitigating losses and not actually sequestering additional atmospheric

^a Qualitative assessment of the SOC sequestration potential of a given management practice (0 = nil, + = low, ++ = moderate, +++ = high)

^b Qualitative assessment of the confidence in this estimate of sequestration potential based on both theoretical and evidentiary lines (L = low, M = medium, H = high)

Summary of major management options for sequestering carbon in agricultural soils

Management	SOC benefit ^a	Conf. ^b	Justification
1. Shifts within an existing cropping/mixed system			
a. Maximizing efficiencies - 1) water-use 2) nutrient-use	0/+	L	Yield and efficiency increases do not necessarily translate to increased C return to soil
b. Increased productivity - 1) irrigation 2) fertilization	0/+	L	Potential trade-off between increased C return to soil and increased decomposition rates
c. Stubble management - 1) Eliminate burning/ grazing	+	M	Greater C return to the soil should increase SOC stocks
d. Tillage - 1) Reduced tillage 2) Direct drilling	0 0/+	M M	1) Reduced till has shown little SOC benefit; 2) Direct drill reduces erosion and destruction of soil structure thus slowing decomposition rates; however, surface residues decompose with only minor contribution to SOC pool
e. Rotation - 1) Eliminate fallow with cover crop 2) Inc. proportion of pasture to crops 3) Pasture cropping	+ +/ +++ ++	M H M	1) Losses continue during fallow without any new C inputs – cover crops mitigate this; 2) Pastures generally return more C to soil than crops; 3) Pasture cropping increases C return with the benefits of perennial grasses (listed below) but studies lacking
F. Organic matter and other offsite additions	++/+++	H	Direct input of C, often in a more stable form, into the soil; additional stimulation of plant productivity (see above)
2. Shifts within an existing pastoral system			
a. Increased productivity - 1) irrigation 2) fertilization	0/+	L	Potential trade-off between increased C return to soil and increased decomposition rates
b. Rotational grazing	+	L	Increased productivity, inc. root turnover and incorporation of residues by trampling but lacking field evidence
c. Shift to perennial species	++	M	Plants can utilize water throughout year, increased belowground allocation but few studies to date
3. Shift to different system			
a. Conventional to organic farming system	0/+/ ++	L	Likely highly variable depending on the specifics of the organic system (i.e. manuring, cover crops, etc...)
b. Cropping to pasture system	+/ +++	M	Generally greater C return to soil in pasture systems; will likely depend greatly upon the specifics of the switch
c. Retirement of land and restoration of degraded land	++ +++	H	Annual production, minus natural loss, is now returned to soil; active management to replant native species often results in large C gains

carbon. Additionally, sequestration rates were found to diminish with increasing trial duration. The largest gains were generally found within the first 5 to 10 years with the rate of change diminishing to nearly 0 after 40 years.

While there was much less field evidence, the data at hand indicates that pasture improvements, including fertilisation, liming, irrigation and sowing of more productive grass varieties, generally have resulted in relative gains of 0.1 – 0.3 Mg C ha⁻¹ yr⁻¹. Larger gains of 0.3 – 0.6 Mg C ha⁻¹ yr⁻¹ have been found for conversion of cultivated land to permanent pasture.

The majority of available field data comes from a fairly narrow range of management options for the dominant agricultural systems of Australia and little data exists on numerous management options which hold potential to sequester large quantities of SOC. Within an existing agricultural

system, the greatest theoretical potential for C sequestration will likely come from large additions of organic materials (manure, green wastes, etc...), maximizing pasture phases in mixed cropping systems and shifting from annual to perennial species in permanent pastures. Perhaps the greatest gains can be expected from more radical management shifts such as conversion from cropping to permanent pasture and retirement and restoration of degraded land. These options are summarized in the accompanying table.

Many of these management options that may increase SOC tend to also increase overall farm productivity, profitability and sustainability, and as such are being rapidly adopted in various regions of Australia. However, numerous other management shifts (for example, converting from annual crops to pastures) which may have the greatest positive impact on SOC stocks will likely

need incentives, either in the form of direct government subsidies or credits from an emissions trading market, before wide-scale adoption is seen.

There is a strong theoretical basis partially supported by a limited number of field studies for significant SOC sequestration potential in several Australian agricultural sectors. However, a general lack of research in this area is currently preventing a more quantitative assessment of the carbon sequestration potential of agricultural soils. **GF**

Dr. Jonathan Sanderman

CSIRO Land and Water
PMB 2, Urrbrae SA 5034
Ph: (08) 8273 8135
Email: jonathan.sanderman@csiro.au

Reproduced with permission of the CSIRO. The full report can be found at: <http://www.csiro.au/resources/Soil-Carbon-Sequestration-Potential-Report.html>

GF Profile

Richard Taylor is one of the founders of Growth Farms and continues to be a director and group manager.

Within Growth Farms Richard has been responsible for the acquisition of over AUD\$93M of rural property. These have covered a wide part of Eastern Australia as well as a diverse range of enterprises. Richard is currently directly responsible for management of over AUD\$157M in agricultural investments for a number of clients.

Properties within his management portfolio have a diverse range of enterprises including dry land and irrigated cropping as well as sheep and beef cattle. His responsibilities for these properties include farm planning and strategy, financial management, client reporting and liaison as well as recruiting

and managing staff. Currently Richard is responsible for approximately 75,000 sheep, 5,000 cattle, 7,000 hectares of dryland cropping and 5,000 hectares of irrigated cropping.

Richard heads a management team to run the farms in his portfolio, with Area Managers who work directly with Richard and the on farm managers.

Prior to taking on what is now a fulltime role with Growth Farms, Richard was managing the family agricultural business in southern NSW in conjunction with his father and brother since 1990. Over that time this operation has double in scale and now runs 35,000 sheep and 3,600 beef cattle on land owned by the business on the Monaro and South West Slopes. In addition to this, 18,000 sheep and 1,000 cattle are run on leased

properties. Whilst not involved the day to day activities in this business, Richard maintains close involvement in overall management.

Richard's background is as a graduate from Sydney University with a 1st class honours degree in Veterinary Science in 1987. He then spent two years working for the Mackinnon Project, a farm advisory service based at Melbourne University. During this time he completed a Masters in Veterinary Studies, with a focus on livestock production and genetics. **GF**



Opinions and information in this newsletter may be from other sources and are not necessarily the opinions or information of Growth Farms Australia unless expressly stated. Growth Farms Australia does not

accept responsibility for the opinions or information provided in this newsletter and strongly recommends readers contact Growth Farms Australia or rely upon their own enquiries before making any decisions.

The recipient is invited to further distribute this newsletter in its entire form. However, no articles in this newsletter may be separately reproduced in any other form without first obtaining written permission from the author or Growth Farms Australia.