

# Green myths about Australian farming

By David F Smith

**A**griculture has a bad name in Australia. We are told that it has exhausted the soil, and yields of crops have collapsed. It has caused massive erosion. It has polluted some rivers, made many others salty and used all the water from the rest. Its animals make methane, a main cause of global warming.

Clearing the land has made too many species extinct. Put simply, we shouldn't have come here – we should have left it to the Aborigines who were so much more in harmony with the land than we are. Popular writers such as Jared Diamond and to a lesser extent Tim Flannery have written books that widely promulgate such views.

How much of these assertions is loose talk? What is myth? What is the evidence?

Few media people have any concern to get it right. Sweeping statements are reported uncritically – serious errors go uncorrected. Some of the repeating is innocent enough, but much is by people who should know better, such as people with titles like 'Environmental Editor'. Too frequently they write to whip up emotions, rather than to inform or educate.

Some statements are made, and repeated, when a little deeper thought shows them as meaningless. Some are valid in a limited context but are given status far beyond this. Some are true, but immaterial. Let's take them one at a time:

## FARMING LIKE EUROPE

It is often stated that not only were the early European settlers in Australia hell-bent on making a little Europe/England, but also that the farming systems used since are still part of such an attempt and therefore should be abandoned. The argument then goes that many of the environmental problems in the Australian landscape will only be 'cured' when farmers cease to farm.

One example was Tim Flannery's Australia Day message in 2002: "Most of us live as people from somewhere else who just happen to inhabit – sometimes unsustainably, ignorantly and destructively – this marvellous continent ... we have believed we could remake the continent in the image of Europe ... force our truculent soils to yield." Ross Garnaut's work also has a touch of this attitude.

In fact the new settlers must have



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quickly realised that they were in a very different land needing new approaches. Just because they brought some familiar, well-tryed garden plants from 'home' does not mean they eschewed the things that were already here.

And we need to remember that they would not have seen their 'home' land farming as ideal – Europe had had its share of famine and still had severe shortages of food well into the 1800s. Modern humans, who accept different ideas and technologies – and people – from all over the world naturally also scan the global range for useful plants and animals.

Some are pretty, adding to the wonderful variety of things already here – like roses. Some give deeper shade when needed and none when it is not – like plane trees. Some are easier to confine and manage – like sheep, rather than kangaroos.

The settlers were quite prepared to use things native: local trees for timber and honey, their bark for tanning, kangaroos for meat, native fish for food; but above all, native grasses for what was for nearly a century to be their mainstay – the sheep industry. They greatly valued these grasses, and soon called them by local names – kangaroo and wallaby grasses. Research was carried out on how to use them best – as late as 1930 the very first graduate student at the new Waite Agricultural Research Institute in Adelaide studied wallaby grass.

Granted they did not attempt to 'farm' the kangaroo or emu – with hindsight,

sensibly. Despite the occasional assertion that we ought to do so, for instance by Garnaut and Flannery, the extraordinary movements of kangaroos defy any system to contain them and regulate their grazing, even with the superior technologies of our modern times, and 'farming' emus remains problematic in economic terms.

Some make much of the kangaroo foot being softer than the sheep – ignoring the enormous damage done by the softest foot of all, the rabbit! It is grazing habit and pressure that matter.

In Australia, moisture shortage was a dominant consideration for crop growth; in Europe it was rarely limiting. Existing vegetation had to be cleared and regrowth shoots killed, stumps dealt with and often stones picked – processes that went on for many years. In Europe the crop was planted into 'old' land, long cleared of stones and stumps, farmed for centuries.

From the start, those involved (for example the acclimatisation societies) would have, sensibly, scanned the world, not to imitate and transpose whole systems, but to search for new species and to gather ideas to evaluate and possibly incorporate.

## Australia, the place to watch

Conversely, Australia soon became the place to watch, and many Australian inventions have been used elsewhere. Particularly notable ones are the Ridley stripper in the 1850s, the H.V. McKay grain harvester a little later, the stump-jump plough in the 1880s, the fertiliser spinner in the 1930s, and the corrugated-iron rainwater tank. Israel copied our rain-fed systems, not the reverse.

There was soon a distinctively Australian system for widespread grain growing and, especially since 1900, continual evolution supported by excellent research, now leading the world for drier climates.

The first system was especially interesting – and different in almost every way from Europe, perhaps only similar in that the crop was wheat, the staple food of the people. A long log was transported from the coastal forests, sometimes hundreds of miles. A horse team or a bullock team at each end pulled the log through the low scrub, often predominantly eucalypt trees, knocking most down. Axemen followed to cut the odd tree missed. When dry, the

debris was burned to kill as much of the eucalypt regrowth as possible.

The land was then ploughed – with great difficulty, using a European plough – until in the 1870s a farmer in South Australia invented a stump-jump plough – it rode up and over the stumps, dropping back into the earth. This truly Australian invention led to a greatly increased take-up of land for development, especially in South Australia. It too was exported.

From the 1850s the crop was harvested using another South Australian invention, the Ridley stripper, taking the grain only, leaving the stalks (stubble) which when dry gave a burn hot enough to kill much of the remaining eucalypt regrowth. Stumps were progressively pulled from the ground by the ploughs and sold for firewood to supplement income.

After two or three ‘clearing’ crops a fallow-wheat rotation was established, the fallow a way of reducing the impact of soil moisture shortage on the crop (rare in Europe), and also extending the arid boundary for cropping (almost non-existent in Europe).

A little later came the close integration of cropping with sheep farming (not a feature in Europe) and by the 1900s the very widespread use of legume-based pastures which also avoided the costly use of nitrogenous fertilisers (normally used in Europe, even now, and an environmental black mark). Phosphatic fertiliser was spread on the legume pastures using a spinner (another South Australian invention, many units of which were exported to Britain).

In fact, visitors and new arrivals from Britain were critical of Australians for not farming the European way – not ploughing deeply enough, for example. In recent decades came minimum, even zero, tillage, now widespread in Australia, while Europeans tilled on. Australians visiting Europe today are critical of excessive tillage. Use of satellite guidance equipment to minimise impact on soils is very common.

The assertions of Flannery and his friend Diamond that our ecosystems are ‘farmed out’ is ridiculous. Flannery suggests that when taking a taxi in Perth the driver is likely to be a wheat farmer who has abandoned his farm. In fact, well-farmed wheat lands support flourishing farmers and in 2008 Western Australia produced at least half of Australia’s wheat crop.

No critical analyst could claim these farmers were simply imitating or establishing European systems. The frequent repeating of this brings into question the



**The close integration of cropping and sheep production is not a feature of farming systems in Europe and is a good example of Australian farmers’ adaptive and innovative abilities.**

speaker’s knowledge of history and understanding of Australian ecosystems – and analytical capability.

### **NATIVE IS ALWAYS BEST?**

It is commonly asserted that Australia will have continuing environmental problems in the landscape unless we ‘mimic’ the naturally occurring systems. Among other things, this makes assumptions about ‘original’ vegetation – it seems likely that Aborigines deliberately killed young trees by burning, and tree numbers exploded when the early settlers reduced the burning of grasslands.

The ‘mimic’ call is also based on the erroneous notion that the vegetation that was present when the Europeans arrived was a sort of ‘climax’ – the best that could ever be.

This assumes two things that do not stand up:

- That a full range of suitable species was present or arriving as seeds and being sorted by the environment; and,
- That the soil could not be improved by humans.

In other words, the notion completely fails to grasp the inherently dynamic nature of ecosystems and humans’ (who are, after all, part of nature) interactions with them

In fact, any given site may be relatively new in geological terms (alluvium deposited by a flood, or soils developing on fairly

recent volcanic flows), or may be an island, so plants quite suitable for that environment may not yet have arrived.

One bizarre result of the ‘we must mimic’ approach would be to remove most of the trees on the plains of the Western District of Victoria. This area is a recent (probably 20,000 years old) volcanic area, carrying grasslands for the most part because few tree species have arrived – eucalypts have small inedible seeds and do not normally spread quickly.

The Western District European settlers found a distant species to be very well adapted and planted it widely – the sugar gum, only occurring naturally on Kangaroo Island, Eyre Peninsula and the southern Flinders Ranges in South Australia.

The answer to species selection is not to mimic the past – to try to go back – but to design and manage ecosystems using the best plants intelligently selected for the needs of the land management situation and desired outputs, generally relating to human consumption and utility.

### **THE DRIEST CONTINENT**

People commonly assert that Australia is the driest (inhabited) continent. How is this measured and what does it mean? That less rain falls on the total land area than on any other? That the average rain per unit area is lower than any other? That less rain falls per inhabitant? That the riv-

...44▷

ers are smaller than elsewhere? That a lower percentage of it gets more than, say, 500 mm annual rain?

Hugh Trumble, in his 1930 book *Blades of Grass*, wrote that Australia had about the same proportion under 500 mm of rainfall as all continents except Europe. For below 125 mm, Africa and Australia are roughly equal – most of Egypt, Libya and Algeria receives less than 25 mm.

All continents but Europe have sites as dry (mostly drier) as the driest part of Australia, rivers that disappear into the ground without reaching the sea, lakes that are marked on maps but rarely justify the name, desert-adapted plants, and areas with highly variable rainfall. The assertion is meaningless for practical purposes.

### Unique geography

What emerges from this is that we need to be much more aware of comparative geography. Few lay people have any idea of the unique geography of Australia and its climate. Further, ideas about the environment suffer globalisation, just as do cultural notions. What applies to Europe is expected to apply to Australia, but it often does not.

The most notable difference between hemispheres is that South America, Africa and Australia do not face the pole over land, as is general in the northern hemisphere, but are bathed by sea on the polar side. Then, within the southern group, compared with Africa and South America, Australia is very wide east-west and also rather flat in terrain.

So compared with zones of similar latitude in the northern hemisphere, winter air-flows are cool, rather than cold, moist rather than dry, and rain is not all dumped by the air reaching a mountain range, but spreads inland some distance.

It is also spread through the year. In addition, large moist air masses coming across the continent from the Indian Ocean, unimpeded by high mountains, also interact with the cool air from the south and ‘deliver’ some large rains from time to time, even as far east as Victoria (sadly, not enough in the past few years).

The winter-crop farming and livestock systems have evolved in these conditions, with the cool, moist air contrasting to the bitterly cold, often dry air of the plains of Europe and North America.

Several important things result from

this. One, hugely important, is the milder winters – little snow and year-long outside grazing. A second, very significant to the Australian economy, is the quite remarkable growth of pasture legumes brought from Europe. Though little more than roadside weeds there, here they fix vast amounts of atmospheric nitrogen and build up soil organic matter.

Combined with the climatic factors, this has enabled production of agricultural products from ‘new’ eco-friendly fertility, rather than, at worst, mining the old natural fertility, or, at best, using fossil fuels to produce fertiliser.

A third is that because animals are not housed in winter, there is not a mass of ‘muck’ that can be disposed of through organic production systems.

In fact, when we consider the characteristics of the rainfall, over quite a wide belt of coastal southern Australia there is arguably a more favourable rainfall regime for plant growth than in regions of similar latitudes on other continents.

The same average annual rainfall may be spread better through the year, and the probability of year-by-year repetition is higher and the rainfall per wet day is lower. The up side to this is that the season when plants can grow is longer, and some valuable plants, especially the nitrogen-fixing pasture legumes, have grown particularly well, much better than in their homelands.

The down side is that there is less runoff, limited stream flow and river systems, interrupted hydrological cycles and accumulation of salt in the landscape (rather than it being returned to the sea).

Thus the statement about being the driest continent may be useful to motivate politicians, perhaps even to sell water pipes and tanks, but for specific situations it is surely better simply to tailor water use according to local characteristics.

In terms of human behaviour, or agricultural management of a specific area, or management of water resources, the statement is nothing more than a catchcry.

### THE SOILS ARE OLD AND POOR

People frequently assert that the soils of Australia are old and poor, without any idea whether this has any importance. For a start, in the southern quarter of the continent, where much of Australia’s agricultural production occurs, a considerable proportion of the area does not have old soils, but very young ones – siliceous sands, soils derived from recent basalt, and alluvial river deposits.

Often in the same breath adverse comparisons are made between the impact of



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agriculture on these soils and the 'new' soils of Europe. In fact, it is the mode of formation more than anything that causes differences. Northern European soils are mainly derived from the widespread glaciation that dragged a variety of rocks across the landscape, grinding and mixing – but with the ice cover protecting the new soil material from leaching.

The resultant plains soils of much of North America and northern Europe, while in places a bit stony, are usually of good structure, easy to cultivate, stable and fairly fertile. Present-time rainfall and river drainage is such that in Europe there is little salt accumulation. Thus while in southern Australia almost any farming system will cause some redistribution of salt which will be manifest in the landscape, in Europe salt is not likely to be evident under any system.

The other half of the assertion – that soils are poor – has more truth in it, but not a lot of importance. There are substantial areas of soil in good rainfall areas that are not poor: the modest river valleys of the Great Dividing Range, the loams of the Wimmera and the Darling Downs, the volcanic soils of the Ballarat–Trentham area, Warrnambool and in northern Tasmania.

### Poor soils made productive

But, more importantly, there are endless examples of poor soils being made highly productive. How many young couples acquiring a new home on a barren building site on an outer suburban subdivision have built up the soil and made a garden, grown vegetables?

At that scale it is straightforward, of course, usually acquiring manure and organic matter, composting garbage, nurturing the soil. Now, especially in the era of modern agricultural science, more or less the same can be, and has been, done over large areas.

It has meant researching plant nutrition and plant growth, carrying out soil analysis, then using a mixture of manufactured, so-called artificial, fertilisers to raise the level of some plant nutrients in which the soils were poor. Then, wherever possible, legume pastures and crops have been used to capture atmospheric nitrogen, and hence intercept vastly more solar energy than did the original native vegetation, and raise the organic matter level in the soil (which is different from accumulating litter on the surface).

This has been done over millions of hectares, and continues. In the redgum country between Naracoorte, South Australia, and Hamilton in Western Victoria, the organic matter was raised from one to

three tonnes per hectare between 1919 and 1957.

Pasture legume growth has been extraordinarily successful in southern Australia, supplying nitrogen for crops and pastures, enabling much less manufactured fertiliser to be used, which should draw praise from environmentalists. Should not Australia's competitors be penalised for not doing the same? This success has induced a culture of belief in using natural nitrogen as far as possible, and many legume crops such as lupins, beans, lentils and peas are used in crop rotations, so we could argue for a penalty against other countries for failing to use such rotations.

Then, and perhaps even more importantly, the current emphasis on sustainability reminds us that the notion of 'fertile' soil is a snare and a delusion. Nutrient removal from the soil by a crop sold, or animals grazing and producing meat or milk, must be accompanied by a replacement program. It may follow, but increasingly it is seen as best done before, or during, the growth of the crop – hydroponics is a good example.

Thus initial 'poorness' does not matter, and fertile soils can be seen as an opportunity to cheat – to mine the soil of its high natural fertility without noticing, at least for a time. To hear a boast that 'my soil does not need artificial fertilisers' should ring an alarm bell for those interested in soil sustainability. Such people are either fortunate enough to have a large outside source of organic material, perhaps carried to the site with a large use of fossil fuel energy, and possibly being produced by running down some other soil – or they are mining their own soil.

Thus, to assert that 'soils are old and poor' is not constructive in the debate about resource management, or pertinent to the future of Australia.

### FORESTS HAVE BEEN CUT DOWN

There has been an especially sloppy use of the word forest, which in science means 'composed of trees with a trunk longer than the bole – the leafy part'. In fact much of the country cleared (especially the sandplains in more recent decades) carried low shrubby vegetation – either they were too infertile to grow larger trees, or seeds of other species had not arrived.

Building up the soil fertility allows a high stocking rate of sheep and cattle and better crop yields. It also means a wide range of trees can be grown, for example along fencelines. There is then a much greater capture of solar energy and absorption of carbon dioxide.

### TO SUM UP

The true story of Australian agriculture is generally one of aware people farming sensibly, problems being identified and researched (largely with their own funds) and amelioration carried out and adaptations devised. This is the basis of sustainability.

Good examples of current work are the zero-till sowing of crops and reduction of methane. In zero-till the sowing machine is frequently guided by GPS systems, with successive years avoiding the same row site.

The process means large reductions in energy inputs, greatly increased absorption of water (less down the rivers!) and better yields per unit of rain.

Methane research is in an earlier stage, but promising: the composition of different fodder crops (significant reductions), changes in the rumen flora and fauna (very promising, even in milk yield) and additives in the water supply. Methane production may vary from day to day, paddock to paddock, cow to cow.

Based on its intelligently adapted farming systems, Australia has developed a considerable trade in agricultural products: wool, meat, wheat, barley, and, to a lesser extent, fruit and vegetables, cotton, rice and wine. All come at least in part from areas that have had native vegetation cleared, or where there has been some soil movement (though much more in the past than the present) or salt-affected areas.

Raised awareness of the need to take great care with the environment, discussion of global warming and debate about trade agreements have raised the issue of 'loading' a product that is produced by farming that degrades the system, or unreasonably uses the earth's resources. Beef is now being marketed in Melbourne as having been produced in an environmentally friendly way, and more products will follow.

Given acceptance of loose assertions such as those detailed above, it would not be too difficult to link just about any product to some alleged misdemeanour in land management. Thus such assertions can come to have great importance, and it is not just a matter of whether we want honest intellectual analysis, but whether the unchallenged assertion, taking root as truth, may have important economic consequences in the life of our country.

It is important that we are well informed and able to challenge these myths.

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