

Towards sylvan Australian farming systems

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Introduction

The Bunyip Hotel in Cavendish, western Victoria, is a typical country pub in the heart of good sheep country. On any Friday night in spring the bar is full of shearers, shed hands and farmers, and talk is of wool cuts, tallies, prices and football finals. On such a night recently, I overheard a conversation between two young shearer/farmers, each bragging about how he had planted hundreds of native trees last year and how well they were growing. They had established short, narrow shelterbelts at a cost of several dollars per tree, not counting labour. They felt good about their achievement.

Fifteen years ago such a conversation would not have occurred. Tree planters on farms were few and were largely seen as eccentric, green, or both. I had just come home for the weekend, weary after three weeks on the road interviewing pastoralists and farmers in the Gascoyne and Central Wheatbelt regions of WA and in the Adelaide Hills. Over a few more rums I tried to compare what I had just heard with what I had recently seen by air and road.

Current revegetation efforts seem superficial and trivial when measured against the goals which are usually espoused for revegetation. We have all heard the arguments for trees many times - providing shade and shelter, lowering watertables, reducing water and wind erosion, improving wildlife habitat and landscape values, providing alternate sources of farm income. Yet, an overwhelming (subjective and intuitive) impression of three years extensive travel throughout Australian farming and pastoral districts is that the trend in all of these areas, is negative, with the possible exception of erosion which has been reduced by improved management practices (mostly agronomic) in some cropping country.

Why? Because, with few exceptions, our revegetation efforts are band-aid measures which just soften the hard edges and cover the sore spots of farming landscapes. A few tennis court-sized patches of trees here and there, some trees along the creek, shelter around the homestead, sheds and yards, an avenue down the driveway, a couple of kilometres of shelterbelts - that sums up my own efforts at home over the last decade. I am acutely aware that our grand old red gums continue to die, that we use effectively very little of the rain which falls on our land, that we rely increasingly on fertilisers and pesticides, that soil acidity looms and that costs exceed returns in an increasing proportion of years. We are probably losing species of birds, small mammals, frogs, fish and invertebrates but we don't know because we are still massively ignorant of the structure, functions and processes of the ecosystem in which we farm.

This paper is an attempt to put Australian revegetation efforts into context in the quest for sustainable land management. The structure of the paper is based on the premise, discussed in detail in Campbell (3), that for sustainable land management (regardless of how it is defined) to occur, land users must want it to happen (commitment), they must know how to achieve it (knowledge) and they must have the capacity to achieve it (resources). The paper implicitly assumes that sustainable Australian farming systems (the term 'farming systems' in this paper includes R&D, extension, processing, marketing, promotion etc.) will have to make greater use of perennial plants, most of them native, than do current farming systems being applied in Australia.

Commitment

Popular consensus has it that there is a much more positive attitude towards revegetation in Australia than there was over 10 years ago. The two blokes in the Bunyip are not freaks; it is no longer suspect for a fanner to plant trees, and a rural revegetation industry is emerging, particularly in southern grazing and south-western sheep/wheat districts.

The latter point is critical - the people most interested *in* revegetation have already cleared their land. European farmers in Australia have always (and still do) see the bush as a source of agricultural land, not having intrinsic worth - whether conservation or commercial. Industries based on native vegetation have been incidental to its replacement by sheep, cattle or crops, with the exception of some State-owned forests in high rainfall areas. This is not a question of farmers' attitudes, but of society's attitudes, reflected in pro-clearing legislation, leasehold administration, drought subsidies and closer settlement schemes.

I am continually amazed at the efforts and achievements of the old-timers in clearing the land. It was a magnificent effort over several generations, with axes, horses and cross-cut saws, 100% commitment by land users reinforced by clearly established community norms and Government approval and assistance. Now, with infinitely more efficient methods, the clearing continues.

We are now at the same point in our revegetation history as the old-timers were when they first contemplated a vast, unfamiliar mantle of resilient vegetation which stood in the way of progress and development. We have a vague idea of what to do, but there is little evidence of the **total** community commitment to a common goal which supported the land clearers.

The 1500 landcare and tree groups (perhaps 20% of Australian land users (4) and countless urban conservation groups provide a sturdy platform of community participation. There are many among them who have lifted revegetation from a fringe activity to a key element of their enterprise. There are dozens of outstanding case studies and literally thousands of skilled revegetators.

Revegetation is gathering momentum, but in a slow and patchy way. In areas where salt is extensive and spectacular, such as the WA wheatbelt, and/or areas in which we have had a concerted extension effort backed by financial and technical resources, such as in western Victoria, there have been visual changes in the landscape. One has only to fly over one of these areas to realise that revegetation efforts need to be increased by orders of magnitude. There are still more trees dying than being planted.

Sure, there are Government grants for revegetation. The biggest of which, the One Billion Tree program, is aimed to establish that number of trees with an average Government contribution of 5 cents per tree. Yet, if all these trees were on farms, they would cover about 2% of our grazing and croplands and require more than a million kilometres of fencing. That the program is on track is testament to the multiplier effect of funding voluntary community groups through a non-Government agency (Greening Australia), the cost-efficiency of direct seedling and natural regeneration, and the rubberiness of the figures.

That we cannot find the political will to control clearing until the vegetation is almost all gone, and have not been able to change the legislative framework - taxation, rating, research and development, extension resources, etc; suggests that we have a long way to go before we have a vegetation ethic to match the 'open up the country' ethic.

Knowledge

We do know a bit about the impacts of vegetation removal - at least on hydrology. Yet, we still clear indigenous vegetation, often badly. The next time you hear a grazier or farmer leader say that 'we are the true conservationists because we live from the land and understand it best', ask him/her how many frog species live on their place and about their current status. A simple indicator of ecosystem health and stability, yet frogs are seen by farmers (and agronomists probably) as external to agriculture! We are still ignorant of the ecosystems we farm. But to return to the commitment required to construct sylvan farming systems. Big strides have been made in the revegetation basics of species selection, establishment techniques, protection measures and management.

The greatest technical breakthrough in southern grazing districts in the last decade has been the re-emergence of direct seeding as a viable establishment technique. Direct seeding was a common means of establishing eucalypts and wattles early this century, but the advent of superphosphate and

consequent increased competition from weeds and improved pastures led to its demise until the 1980s. Greater knowledge of chemical weed control methods and determination to find more cost-effective establishment techniques has led to the development of reliable methods (mechanical and manual) for establishing trees in the field from seed at a cost of cents rather than dollars per stem (7). Direct seeding has not taken over from seedlings, however. Many farmers collect their own seed and grow their own seedlings and have developed their own efficient planting systems.

Open-rooted seedlings, as opposed to tubed stock, promise to be the breakthrough of the 1990s, combining the reliability and regular spacings of tubed stock at low cost/stem comparable with direct seeding. Alley cropping systems, based on open-rooted seedlings, are being developed in the WA wheatbelt in which acacias, eucalypts and tagasaste are planted in triple rows 20-50 m apart (with wheat, lupins or perennial pasture in between), at a cost of less than \$10 per hectare, as no fencing is required and no grazing is lost.

Recent studies at Esperance, Rutherglen and Hamilton (1) have shown in field conditions (for the umpteenth time) that shelter enhances crop, pasture and livestock production and is extremely cost-effective, particularly in areas where occasional spring/summer storms cause extensive shorn sheep losses. Given the imperatives to develop farming systems which use more water and which minimise wind erosion, it is puzzling why the introduction of trees into cropping systems (in the paddock, not around it) is so rare and so piecemeal.

Australia has an incredibly rich and diverse range of unique plant and animal species. Yet, the number of species which have been the basis of permanent local industries is pitifully small. There are a few working enterprises based on essential oils, wildflowers, fragrances (notably Sandalwood), native fruits and nuts, and craft timbers, but not many. The crocodile and the macadamia are notable exceptions in a land-use history dominated by removal of the natives rather than working with them.

In higher rainfall districts the opportunities for incorporating trees into farming systems are even more striking. World per capita demand for timber is increasing and traditional supplies are shrinking. Australian forest industries have relied for years on access to cheap logs from extensive publicly-owned forests, and have only a small proportion of their current plantation area established on farmland. Given the structure and institutional culture of the industry, this situation is likely to continue.

There is a great future in high quality, farm-grown timber, but the time frames involved frustrate conventional economic investment analysis. Outside capital is required to help farmers establish the first rotation - a point well understood by the German ethical investment companies, the Scandinavians and Japanese, who are investing heavily in New Zealand farm forestry.

The product need not be large sawlogs or big volumes of woodchips. Lamination, furniture and craft timbers and fuelwood are all options, processed by state of the art 'green' mills and portable equipment owned by farm syndicates (13). One western Victorian farmer makes a profit of about \$200 out of **each** old red gum fence post, turned into rustic rolling pins, bowls and lamp stands (5).

Farmland offers boundless possibilities for wood-based industries if we can open our eyes and our minds to see them. But efforts to consider and plan the land management system and the relationships between vegetation, soils, livestock, crops and finances are still in their infancy (5,8), particularly within the formal research and development and extension systems.

In fact, the formal agricultural R&D and extension systems virtually ignored the productive uses of native perennials (for other than fodder reserves) for the first 150 years of European agriculture in Australia. There are still only a handful of farm tree researchers in Australia, chiefly in Western Australia and Victoria. The formal revegetation extension scene is a little better, with a rapid increase in farm tree advisers and the emergence of grant schemes (notably in Victoria) and plantation sharefarming/joint ventures in the 1980s (2).

However, government-funded extension and R&D has played and continues to play a relatively minor role in rural revegetation. The vast majority of the expertise, technical and practical, resides within rural communities. Enthusiastic amateurs often learn more about their craft than professionals and this is particularly so with revegetation.

The traditional linear model of information flow from research to extension to progressive farmer to other farmers, based on diffusion theory (9), has been seriously questioned, particularly when applied to complex innovations (like improved farming systems) or where costs and benefits are difficult to apportion in time and space as is common with environmental issues (6,12). The rural revegetation movement exemplifies what Ming (11) calls the Agricultural Knowledge and Information System (AKIS), which recognises that there is a common pool of information, formal and local or indigenous, into which all players -researchers, extension agents, land-users, business people and greenies contribute and from which all can learn.

Ruling (11), after examining successful participatory approaches to extension throughout the world, suggests that as agricultural development is ultimately a question of voluntary change among individual land users, then the best way to achieve change is not to train extension workers and give them resources, but to mobilise, train and empower farmers and farmer leaders. The landcare movement (of which revegetation is a part) is starting down this track.

Resources

Farmers have been the pioneers, the innovators, the drivers in the farm tree movement. That is a good thing, which is not to say that there is not scope for greater involvement and contributions from science and government. There is a lot which can be done to improve the capacity of land users to change, once they have the will and the know-how.

Land tenure systems and the tax system do not favour long-term commercial investment in trees, which characteristically yield lumpy cash flows over the first two rotations. Some reforms have improved the deductibility of revegetation for land degradation prevention or rehabilitation, but these have been minor, not really reflecting a change in culture but perpetuating the notion that revegetation is something which happens when prices are good. No Government has seriously tackled the cost of fencing - what about putting up a million dollar prize for anyone who invents a viable alternative to fencing, at less than 10% of the cost of the cheapest current option? (Lefroy, pers. comm., 1991).

If Australia is really serious about developing more **sustainable farming systems**, then that is what resources should be allocated to. Too much of what is funded under the all-embracing term sustainability ' is really just 'fixing' land degradation. We would be far better off developing farming systems (from the paddock right through to the customer) which are profitable and non-degrading, than continually trying to patch past mistakes while retaining the same reliance on raw wool, grains and beef which caused the degradation in the first place.

When R&D and extension expenditure on perennial fodder-cropping systems, essential oil production or processing and marketing of unique Australian craft timbers is of the same order of magnitude as the budgets for controlling internal parasites in sheep or breeding new wheat varieties, when we will have made real progress. Of course, there are powerful vested interests in the *status quo* content to see progressive young farmers leaving the land and putting it down to trade policies in Europe and America and inexorable international market forces.

Conclusion

There is more incentive for fundamental change in Australian agriculture now than ever before.

Current farming systems are neither economically viable nor ecologically sustainable. This is not to suggest moving out of wool, wheat and beef (that would be ditching the child with the bath water), but it is

obvious that to continue to merely refine current farming methods will lead to further decline. It is time to get out of the rut of trying to adapt European agriculture producing European products for subsidised European markets, to Australian conditions.

A young Western Australian farmer growing wheat, lupins and wool on deep gutless sands in 300 mm rainfall country, put this more succinctly at a recent field day:

'I want to develop Australian farming. I am sick of trying to keep alive animals and plants which just want to die in this country, while shooting and clearing animals and plants which are adapted to it and just want to live!'

With low population, a stable political climate (albeit not given to a long-term view), a well-developed technological capacity and resourceful, self-reliant farmers, Australia has a better chance than most of approaching sustainability. Along the way we will learn lessons and develop technology which will be highly marketable in an increasingly crowded, degraded and polluted world. A distinctive image for Australian produce of 'clean and green', associated with blue skies, wide open spaces and unique high value products, should replace the current reliance on high volume, low value products produced at the expense of the land (associated with images of dust storms, shooting sheep, algal blooms), with ever-declining margins to put back into its restoration.

We have been slow learners, but we still have time. Many committed land users have made a start and we have enough pieces of knowledge to move on to develop sylvan Australian farming systems in which perennial native vegetation will be a key element, rather than an obstacle to 'development'. Ignorance is no longer a defence.

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