

## **Making Conservation Pay**

**Ian McClelland**

It is essential that farmers recognize the significance of conservation practices to their future prosperity.

Making Conservation Pay has at its core the promise - or at least the goal - of not only finding new ways but also using those known ingredients that link profitable farming systems with sound conservation practice. This does not involve only the expectation that farmers will spend more money on the environment when good profits are made. It means that there will always be a determination to ensure that profitable acceptable and sustainable farming practices are solidly linked with good conservation principles.

We are all aware of the power of consumers who becoming more discerning about the way the food they buy is produced. Many want to know how the food is grown and what effect the growing of that food is having on the environment. In some cases market access depends on farmers demonstrating their integrity in relation to the production of safe food and the adoption of acceptable and sustainable conservation practices. As was shown in the wool industry recently, for example, our sustainability benchmarks for the sheep industry were not those accepted by some who purchase our wool.

It is now the expectation of all governments as well as of the people living in the cities, that farmers be good and sensitive custodians of our farms and of the countryside. "Our" farms are not ours to use as we may have thought in the past. What we do as farmers is now quite transparent. On the positive side, we also can show the world the many good things we do. Being rewarded for good farm practice is now possible and achievable.

When we consider some of the consequences of the droughts, gale force winds, water logging and ill-informed farming methods of the past, it is encouraging to know that solutions are at hand. We now have the technologies and the means to prevent the dust storms, the salt degradation of our soils and waterways, and the perceived destruction of our biodiversity and natural habitat.

Farmers must now demonstrate their interest in and determination, to continually improve the ecosystem around them. We need to show that our farm management decisions always take into account the environment and that we as farmers are continually looking for improvements in our practices.

A sustainable future for our community and towns not only relies on the continuing economic prosperity of our farmers and associated businesses, but also on the quality of the environment in which we live. Towns and surrounding landscapes that look attractive will help to maintain population while attracting others to live there. This does not necessarily rely on the existence of mountains, oceans, rivers, green grass or big gum trees – though we must recognize that they start in pole position. It could be the diverse habitat of the Mallee trees and under storey, the many and varied birds, the richness of the open country side or the serenity of a warm climate and big skies.

We must enhance these advantages by means of greater diversity, added interest and a greater number of attractions. We must make the most of the water that is available to us

for recreation, wildlife and profitable businesses. We must protect and enhance the potential of our soils to produce more from less.

Inevitably, in some cases there will be disputes as to whether some activities on the farm do conform with sound conservation principles. Using cultivation to control cereal root diseases or spraying crops to control insects are examples in which compromises will have to be made. Until resistant varieties are released these practices will continue to be used. In these cases, the aim will be still to find ways in which the changes that must be made are beneficial for both the farmer and the environment. However, in the short term, it may mean the best that can be done is to ensure that best farm safety requirements are met.

One goal of the BCG is to develop new, as well as using known, benchmarks of environmental sustainability for the many farm activities and systems. This will not only create some sort of base line, but also give farmers some indication of the direction in which they should be moving.

**Changing the culture of a region to embrace the “Making Conservation Pay” philosophy will be achieved by creating knowledge, sharing success and failure, and encouraging adoption through highlighting the advantages to both farm profit and to living standards.**

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# Healthy Agricultural Landscapes

## Dr David Freudenberger

Farming is a remarkable invention that has fuelled the amazing growth in human innovation and population size. Before farming began about 10,000 years ago, hunting and gathering only supported about 5 million people scattered across every continent and major islands except New Zealand. Farming now supports an astounding 6 billion people that will grow to 10 billion over the next 50 years. What an accomplishment! But what a challenge!

Whether we like it or not, farming is the foremost reason the world is experiencing major declines in biodiversity. This is inevitable. Farming is fundamentally based on simplification. Farming replaces diverse wetlands, grasslands, woodlands and forests with a few remarkable annual grasses that produces very large seeds (grains) that provide half the calories consumed by the world's people. Simplification works, otherwise we wouldn't be here today.

But we now acknowledge that agricultural simplification has gone too far. Soil erosion, salinity, and acidification are symptoms of simplification pushed to the limits – mother nature is biting back. All environmental problems are symptoms of the loss of biodiversity: the variety of life – what it's called, how it's arranged and what it does. Biodiversity provides essential ecosystem services including our sense of place, as well as protection and sustenance of soils, crops, pastures, and livestock. Most importantly for Australia, biodiversity maintains hydrological balance; it prevents ancient salt deposits from reaching the surface poisoning our soils and polluting our rivers.

*Making Conservation Pay* is about discovering innovative ways to diversify agricultural landscapes so that they produce a much wider range of ecosystems services, not just food and fibre. *Making Conservation Pay* is about farming better on less land in order to provide a diversity of habitats for all sorts of plants, animals and processes, not just crops and galahs. *Making Conservation Pay* is about building innovative partnerships between communities of farmers, researchers and regional institutions to invest in truly Australian farming systems that produce biodiverse goods and services in a profitable and environmentally sustainable manner.

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# Regional Conservation Values

## Geoff Park

Agricultural settlement of North-West Victoria has resulted in a drastically altered landscape. Much of the native vegetation in the region has been cleared or dramatically changed in terms of community structure, health and species composition and dominance.

Closer settlement and the broadscale clearance of native vegetation were primarily governed by the expansion of Victoria's wheat frontier from the Wimmera into the Mallee during the late 19<sup>th</sup> and early 20<sup>th</sup> Centuries. Southern parts of the bioregion, around Warracknabeal, Birchip, Houghton, Wycheproof and Boort, were selected during the 1870s to 1890s. The prevalence of mallee vegetation delayed the occupation of most land in the northern areas until the 1910s and 1920s.

Unfortunately, the vegetation types that have suffered greatest loss – those occurring on areas with heavier, more fertile soils, i.e. woodland and grassland communities – are generally also the communities that have also been impacted to the greatest extent by other threatening processes such as grazing, erosion, soil structure decline and salinisation.

### **Natural Capital**

The area in which this project is focused retains significant natural capital in terms of native vegetation communities, significant species of flora and fauna, wetlands and riparian systems and a range of distinctive landscape elements. The area comprises three bioregions (natural ecological regions) – the Murray Mallee, Wimmera Plains and Lowan Mallee. While around 65% of the area is freehold land a number of major nature conservation areas including the Big Desert and the Sunset Country are linked by a slender mosaic of roadside corridors and farmland remnants.

Largely ephemeral river systems including the Avoca River, Yarriambiack, Tyrell and Lalbert Creeks are major biodiversity “hotspots” in this semi-arid landscape. A rich diversity of vegetation communities remain in this landscape – typically they are small (< 10ha) and highly fragmented. Of the 38 Ecological Vegetation Classes (EVC's) mapped for the Murray Mallee bioregion 33 are regarded as endangered with 22 reduced to less than 5% of their original extent. There are records of 102 species of threatened fauna and 280 species of threatened flora for the Murray Mallee bioregion and a similar number for the other two bioregions.

### **Future landscape scenarios**

Making Conservation Pay recognises that protection and enhancement of biodiversity will underpin the development of sustainable farming systems in the future. The natural capital that is a feature of Wimmera Mallee provides the fabric for “new landscapes” that integrate production and nature conservation.

The application of key landscape ecology principles, combined with a growing knowledge of natural assets is being used to develop scenario's that can accommodate nature conservation, production and landholder goals.

Key actions that have been identified should primarily aim to:

- Increase the size of patches of remnant vegetation
- Increase connectivity in the landscape using corridors and stepping stones of habitat.

- Increase tree cover
- Give priority to restoring and reconnecting sites in the best condition
- Focus restoration in parts of the landscape that offer the best prospects and the “lowest cost” options
- Provide buffers around remnant vegetation to reduce infiltration of undesirable effects
- Focus on priority taxa

A key factor in the success of the project will be to plan, visualise and implement at a range of scales from paddock to farm to landscape.

### **Making Conservation Pay**

Existing landscape restoration efforts have made a significant impact on the landscape and communities of the project area. Despite the considerable achievements of projects such as the Buloke Biolink and Project Hindmarsh, the scale of implementation is not adequate to sustain key ecological processes across these landscapes.

What makes a sustainable landscape? The fundamental requirements of sustainable farming systems (Ridley 2003) which farmers and the broader community may aspire to include:

- Negligible erosion (wind or water)
- Balanced leakage of water and solutes
- No persistent toxicity (acidity, heavy metals, agrochemicals)
- Sub-threshold pest, disease and weed incursions
- No preventable loss of biodiversity in surrounding areas
- Sufficient profitability for people (including on and off-farm income)

Making Conservation Pay will provide a framework for integrating activities that move towards sustainability at the farm scale whilst identifying the key natural assets that can be protected and enhanced for the achievement of broader catchment goals.

The application and integration of tools from areas such as precision agriculture and landscape ecology will reveal exciting opportunities for “win-win” scenarios at a range of scales.

Geoff Park

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# Precision Agriculture on Farm

## Andrew Weidemann

Since leaving school in 1981 and returning home to the family farm many changes have taken place. On our farm the adoption of new ideas and techniques has been ongoing over many generations. My parents had a philosophy of keeping up to date with not only the latest information but also the latest technology, which has made our farm operate on a profitable basis.

Over the past 14 years the technology we have implemented has seen our productivity increase at a substantial rate. In 1990 we ventured into direct drilling and stubble retention to help the soils capacity to retain moisture and to improve the general soil health on our farm. In this time paddock recording and soil testing has been an integral part of this system. Currently paddock and soil test data are stored on Pivot Pam QA®, which is complemented with the Pocket Pam ® recording system that has become our notebook recording system.

In 1996 we moved into yield mapping and more intensive soil testing with the help of Pivot Fertilizer agronomists. Making profit from this technology has been hard to quantify but we place a lot of emphasis on the information gained. Em38 surveying, trialing the HYDRO N Sensor & now the introduction of satellite photo imagery has given us more opportunity to evaluate yield data and soil types in the one paddock & make decisions on nitrogen applications in crop.

Productivity gains are enhanced through the use of the APSIM yield prediction model. Trialing new varieties and Variable Rate Technology has also been an integral part of this technology with the ability to run full-scale paddock trials and record the outcomes in a format that is easy to understand.

With the adoption of this technology and the use of satellites for site specific work the use of Guidance has evolved. With the use of this Guidance technology we have found a way of making measurable savings on input costs. With average savings of around 5% on input costs this has made Auto steer Guidance more affordable for the average farmer and more importantly improving efficiency and returning more profit.

The future from here promises more challenges and many improvements. The need for more people with a higher level of training will be needed to help the agricultural industry cope with these new changes. What a great time to be involved in Agriculture.

Andrew Wiedemann

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# Mapping Productivity

**Dr Bob Belford**

The highly productive, marginally productive and conservation areas of a farm can only be identified and managed if the capability of the land is known. To do this, the 'Making Conservation Pay' initiative proposes to use the evolving PA technologies to map land at paddock, farm and catchment level. In conjunction with other components of the initiative, this will allow new 'models' for Victoria's rural landscape to be identified, tested and implemented.

Precision Agriculture means many things to many people, and is often assumed to mean expensive equipment and imagery. The definition used here is the management of information about soils, crops and vegetation, so that the potential of different zones on a farm can be realised. There are many layers of information to build up this picture of productive potential, including farmers knowledge and experience; EM surveys; yield, protein and biomass imagery; gamma radiometric surveys; elevation models; soil depth, and conventional soil maps. Collecting this information is straightforward, but analysing it in order to make good management decisions is much more difficult.

The 'Mapping Productivity' component aims to collaborate widely to conduct workshops, case studies, develop new models for future farming systems, and provide 'innovation' sites to test the outputs from the work. The overall aim is to ensure modern technology delivers a better balance between production and conservation values at farm, catchment and landscape levels, and provides sustainable and high value production from farms. It is essential that all the approaches adopted are economically sound – there is no doubt that much of the investment to create a better environment will be made by growers, who must see a financial benefit.

New technologies are constantly developing – the potential of the emerging tools of hyperspectral, and thermal imaging to measure crop performance in real time will be discussed briefly. These new and existing tools, coupled with improving seasonal weather forecasts, offer real hope to deliver more reliable production systems with a lower environmental impact.

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# Making Conservation Pay

## Professor Tim Reeves

One of the benefits of living and working outside of Australia for a significant time is the opportunity to see and evaluate agricultural systems from a different perspective. In a world where global connectivity is increasingly important do we really understand the international situation, the new opportunities and the new challenges that confront producers and those who support them?

What is clear is that world agriculture has significant challenges in this still relatively new millennium – how to feed a population growing globally at around 150 people/minute, many of whom are born in regions that already struggle to support their current communities. An associated challenge is the urgent need to reduce poverty particularly in the rural areas of developing countries. Over 1 billion people live in abject poverty (less than USD 1/day) and for many of them farming is their major occupation and the only potential pathway to enhanced livelihoods.

More people, more food required and greater incomes are all major challenges in themselves, but they are compounded when one also takes into consideration the issues of natural resource management and the ongoing problems of sustainability. Paramount amongst these is the challenge posed by the dwindling water supplies for agriculture that are exacerbated by the ever increasing demands for water in urban areas. Water shortages will occur without climatic changes, as more and more of the available water is utilized by growing populations, but in many areas of the world climatic variability will exacerbate this water challenge.

Whilst the situation described above requires urgent attention in much of the developing world, there is also another important perspective that pertains to emerging countries, such as China and India, and the industrialized world. It is forecast that the BRIC group (Brazil, Russia, India, China) will be the economic powerhouse of the coming decades, with their large populations and increasing purchasing power.

From the viewpoint of Australian agriculture the emerging nations provide economic opportunities for farmers, but this potential will only be realized if we understand their new requirements and develop products accordingly. Similarly, new market requirements in Europe and elsewhere will have significant consequences for production systems here in Australia.

So this is the context in which we should consider *'Making Conservation Pay'*, maintaining competitiveness in the face of new opportunities and challenges and assessing the impacts and ramifications for Australian farming systems especially sustainability.

*"Making Conservation Pay"* makes sense at the paddock, farm and regional levels as the necessary increases in profitability and productivity sought will not only be gained in the short-term, but sustained into the future. In the international context, it could be argued that *'Making Conservation Pay'* on local farms is essential if we are to increase competitiveness, meet changing market requirements and build the reputation of Australian agriculture as a 'quadruple bottom line' industry – economically viable; environmentally sound; socially appropriate and politically supported.

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