Landcare
Landcare

COMMUNITIES SHAPING THE LAND
AND THE FUTURE

Andrew Campbell
With case studies by Greg Siepen

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Colin (1930–87) and Elisabeth Campbell
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In the twilight of the twentieth century, the need for humans to re-think the way we use the land, water, air and biodiversity which supports us has become pretty obvious.

The imperatives are economic, social and environmental. They are characterised by huge scale and technical uncertainty and the need for action is often urgent. It is easy to be overwhelmed by the size and complexity of the questions and we do not have neat, off-the-shelf answers.

One of the most pressing issues facing society over the next generation is how we produce food and fibre. Farming systems will need to support twice as many people by the year 2025 as they do today, hopefully with a much more equitable distribution of food. Yet, all around the world, farmers are under financial and social stress which, together with inappropriate technologies, have accelerated depletion and degradation of natural resources—soil, water, air and biodiversity. Farming communities all over the world are in decline.

But this book is not about the problems, although they are mentioned in setting the scene. Rather, we want to introduce an exciting Australian phenomenon which shows how local communities, particularly but not exclusively rural communities, can get together to tackle their own problems. It is called 'Landcare', a unique national program which is a partnership of government, farmers, conservationists and community groups, and which has quickly grown to involve about one quarter of the farming community in local voluntary conservation groups.

Imagine a country in which one person out of every four belongs to a conservation group, actively seeking ways of improving their...
local environment. Think about the possibilities of this scenario for
issues such as waste management, water quality, transport, urban
design, food and fibre production, and wilderness management. In
rural Australia this is already happening. Among the ten per cent of
Australians who do not live in cities, being a member of a com-
munity conservation group is no longer a cause of raised eyebrows
and suspicion, but a sign of a progressive attitude to the land and of
a belief in working for the future of life on the land.

Landcare is much more than just an innovative, participatory
land conservation program on a large scale. It encompasses en-
vironmental education in schools and in local communities, com-
munity-based land use planning, community-based monitoring of
the status of land and water resources, farmer-driven and farmer-
managed research and development, and community involvement
in the allocation of public funds to land conservation activities. But,
above all, Landcare shows what can be achieved when rural people
are directly involved in cooperatively thinking about the future of
their communities and the land which supports them.

This book documents constructive, long term, practical action at
a community level for tackling environmental (and increasingly
social and economic) problems. It shows how people can operate
effectively at a level which is bigger than their own backyard, but
not as remote, diffuse and intangible as national or international
politics. It shows how communities can learn much more about
their physical environment, and how to question creatively their
long term directions. Taking the long view means moving outside
personal and social comfort zones, often confronting difficult is-
issues. If this occurs at a community level in an appropriate context,
then people can learn a great deal and exert greater conscious in-
fluence over their own direction.

If there is a word which emerges after four years immersed in
Landcare it is potential. Landcare, by involving, encouraging and
providing resources to committed people closest to the land, has
the potential to underpin the evolution of new land use systems
and new relationships between people and land, which build upon
human resources instead of discounting them or seeing them as
part of the problem. Landcare is not yet secure in the Australian
landscape; however it is continuing to grow in an extremely hostile
economic environment and a stressed rural society. It is still vul-
erable, but Landcare is exhibiting many of the characteristics of
indigenous Australian flora and fauna—extraordinary tenacity, re-
silience and innovative responses to seemingly unfavourable cir-
cumstances. Rural communities are demonstrating that they are far
from indifferent to environmental issues and that, with appropriate support (not necessarily financial), they can create some of the building blocks of more sustainable systems of land use and management. Whether Landcare becomes a permanent feature of the landscape or not, valuable lessons are there to be learned.

We want to tell the Landcare story through the experiences of some Landcare groups and some of the individuals in Landcare. This is not a technical text. But there are many lessons emerging from Landcare about the way in which modern industrialised democracies learn, about how we do research and extension and land use planning, about how we make decisions on land use and management, about environmental education and about some of the blockages to wiser use of natural resources. We hope these lessons crystallise as the story of Landcare unfolds.

The most exciting aspect of Landcare is the people involved—people with energy, enthusiasm and commitment who are prepared to work hard within their community to improve the relationship between the land and human use of it. This book is primarily about these people. It is not a book about land degradation or rural decline, although these profoundly disturbing issues are catalysts for Landcare. Rather, we intend to bring to a wider audience the circumstances and the efforts of many rural Australians within the Landcare movement.

After 200 years, Europeans in Australia are starting to understand the characteristics of this ancient land, and some are starting to develop some humility in attempting to live with the land, rather than from the land. The issues Landcare is tackling are of vast scale and complexity and it is easy to be overwhelmed by the enormity of the task. But one cannot experience at first hand the excitement and the commitment of the people actively involved in Landcare without becoming infused with hope. This book is about sharing that hope.
Growth in global levels of population and per capita production and consumption has meant that humans have used as much natural capital in the last two generations as in all previous history. Current political and economic systems reinforce accelerated depletion of non-renewable resources and unsustainable use of renewable resources. Furthermore, they ensure that the products of this exploitation are distributed so that the net flow of both nutrients and dollars is from poor countries to rich countries, a trend which is increasing. The doubling of world population in the next 40 years seems likely to compound these trends, especially, in the absence of fundamental changes in trade relations, patterns of production and consumption, and social organisation.

The industrialisation of the last two centuries, and a parallel revolution in farming methods in industrialised countries, has seen a continued decline in the market prices of food and fibre, and a continued increase in reliance on off-farm inputs to support ever-higher production levels. Consequently, farmers’ terms of trade (the ratio of returns to costs) have been on a long, slippery, downwards slide, farms have increased in size, and each generation has seen fewer and fewer farmers. The achievements of modern agriculture in feeding those people who can afford to buy food have been commendable. But there have been many costs, costs which have yet to be passed on to the consumer, but which will be borne by everyone eventually. All around the world, farmers are struggling to maintain their livelihoods. The social fabric in countless rural communities is threadbare and disintegrating.

There is no shortage of environmental signals pointing to the need for profound change. We do not want to descend into a dis-
mal litany of doom and gloom, but neither do we want to gloss over the issues confronting us. Here are some fairly obvious warning signs which any society concerned about even its short term future would be wise to take extremely seriously. The important feature of the few examples mentioned here is not the accuracy or significance of each individual statistic, but their collective impact, in terms of scale, complexity, uncertainty and urgency, the fact that the trend in most of these indicators seems to be towards greater depletion, degradation, pollution and inequity, and the extent to which they defy management by conventional political systems and decision-making processes.

Neoclassical economics since the industrial revolution has tended to ignore the fact that the human economy, or macroeconomy, is an open subsystem of the biosphere and is totally dependent on it as a source of inputs and as a sink for waste. Managing the size of the human economy relative to the global ecosystem (or in farmers' terms the carrying capacity of the planet) has been described by World Bank economist Herman Daly as 'the major problem of our time'. Daly suggests that the greenhouse effect, ozone layer depletion and acid rain are telling indicators that we have already exceeded a prudent carrying capacity for the scale of the macro-economy.2

One of the clearest indications that humankind has fully occupied the ecological space available, and is probably starting to exceed it, is the impact of Homo sapiens on other living organisms, either directly, by wiping out or severely over-harvesting species of flora and fauna, or indirectly, through habitat destruction, degradation and pollution. The loss of species is staggering. After a slow increase in the extinction rate due to the hunting, clearing and burning of earlier generations, the earth is entering a phase of unprecedented extinctions: The erosion of genetic diversity within species, particularly animals and plants domesticated for human food and fibre, is probably equally critical.3

While the world demand for food and fibre continues to grow, the amount of arable land available continues to diminish through land degradation and conversion to non-agricultural uses. A continuation of present trends will see a net loss of eighteen per cent of the world's arable land by the year 2000 and the same again by 2025.4 In 1950, just over 100 million hectares of forest had been cleared, but 30 per cent of global land was still covered by forest, half of it tropical. By 1975, the cleared area had more than doubled, and the area of tropical forest had dropped from fifteen to twelve per cent of the land, and is likely to be less than seven per
cent of the land by the end of this century. The effects of forest clearance are not merely local. Large-scale deforestation has far-reaching impacts on rainfall patterns, hydrological cycles (exacerbating floods and droughts) and probably global climate. The increasing scarcity of fuelwood, on which more than two billion people rely for cooking (crucial for hygiene) and warmth, is an often overlooked energy crisis at both global and human levels.5

The oceans are the earth's sump. They play a natural role in absorbing run-off of silt and minerals, but in recent decades oceans have had to absorb exponential increases in human-generated waste—sewage, industrial effluent, bacteria and viruses, agricultural chemicals, as well as soil and radioactive wastes. The global level of this waste reaching oceans is difficult to quantify,6 but the more disturbing point is that we have very little idea of the assimilative capacity of oceans, nor of the impact of the many toxic substances finding their way into the oceans. What is known is that human-made toxins are present throughout the world's oceans and that many of these chemicals become more concentrated as they move up the food chain. The world fish catch increased by an average of seven per cent per year between 1950 and 1970, but has reached a plateau, despite large changes in the composition of the catch as major stocks have been reduced and replaced by small fish processed into fish meal and oil, and animal feed supplements. Thus the food value per tonne has declined, and over-fishing and poor management have impoverished many fisheries.

In industrialised countries, pollution of both groundwater and surface water has become one of the most pressing environmental issues. The continued popularity of large dams for hydroelectric power and irrigation schemes, despite a tragic litany of profound ecological dysfunction, threatens fresh water ecosystems and human food and water supplies in many countries—not just in the south.

The average daily energy requirement for human well-being is estimated to be 2400 calories. People in the developed countries of the north receive an average of 40 per cent above this figure, while the average person in the developing countries of the south subsists on ten per cent less than this basic requirement.7 The Worldwatch Institute's State of the World divides the world population of five billion people into three groups which they call overconsumers, sustainers and marginals. There are about one billion overconsumers—people who travel by car and plane, eat lots of meat and generate vast quantities of waste. North America tops the scale for consumption and waste, with the average citizen
accounting for nearly his or her weight in basic materials each day. At the other end of the scale, one billion people (the marginals), live at or below subsistence level—travelling by foot, eating no meat, but generally food of low nutritive value, drinking contaminated water, producing virtually no waste, and often lacking basic shelter. The middle group (the sustainers) travel by bicycle and public transport, eat healthy diets of grains, fruit and vegetables supplemented by a little meat, drink clean, unbottled water and recycle much of their wastes. David Korten points out that the latter group are also the targets of a multibillion-dollar advertising industry devoted to convincing them to adopt the lifestyles of the overconsumers in the name of economic progress.

The key point here is that problems of obesity, hunger and malnutrition are clearly not problems of aggregate world food supply, but rather problems of distribution and weak effective demand, exacerbated by war.

Between the 1950s and 1980s, agricultural use of synthetic chemicals in northern industrialised countries rocketed. For example, the use of nitrogen doubled in Europe between 1950 and the 1980s, and quadrupled in the US between 1960 and 1981. Over roughly the same period in the US, there was a 170 per cent increase in the amount of pesticide ingredients applied on farms, but no increase in the cultivated area. Much chemical pest control is not only environmentally damaging and potentially harmful to human health, but it ignores basic ecological principles of genetic selection, and is thus ineffective over the longer term, except from the perspective of increasing the use of chemicals. Pesticides tend not to be specific to a single species of pest, and thus wipe out natural predators. It should be noted, however, that in response to these issues more work is now being done in many countries to develop Integrated Pest Management (IPM) strategies designed to minimise the amount of pesticides used and to apply them to optimum effect, complemented by natural predators and making much greater use of farmers’ observation skills.

Finally, it seems that man’s influence has extended to the global climate, although the long-term ramifications of this influence are uncertain. Carbon dioxide (CO₂) levels in the atmosphere have increased by about 30 per cent from 1850 to 1980 and are projected to leap a further 75 per cent by 2060. CO₂ and other so-called ‘greenhouse gases’ are creating a thermal blanket, causing the temperature at the earth’s surface to increase at an abnormal rate. The possible impacts of a global rise in temperature of between two and five degrees Celsius over the next century include rises in sea
levels due to melting polar ice caps, more severe climatic extremes (hurricanes, floods, droughts etc), and highly differentiated impacts on agricultural productivity. Perhaps even more disturbingly, significant 'holes' have appeared in the stratospheric ozone layer in an apparently short time—a phenomenon which is linked to emissions of chlorofluorocarbons (CFCs). These man-made chemicals break down ozone molecules in the stratosphere. Even if present emissions of CFCs ceased, ozone depletion would continue to occur for many years, allowing a greater amount of potentially damaging ultraviolet radiation to reach the surface of the earth.

In other words, humankind has already caused irreversible changes in atmospheric biochemistry. The key questions now are: to what extent will these changes be benign or malign, what will be the cost of coping with the impacts, and for whom? And will we learn quickly enough to modify practices which are causing these problems?

In summary, attitudes which see natural resources as inexhaustible and substitutable have fostered systems of land use which have degraded and/or depleted land, air and water, flora and fauna, not just out of ignorance but with an acceptance of degradation as a corollary of 'development'.

**TURNING THINGS AROUND**

Litanies of doom and gloom are prevalent in the explosion of green literature which has symbiotically accompanied the growth in environmental awareness since Rachel Carson's *Silent Spring* was published in 1962. The statistics are hard to grasp, and when one does understand their implications, they are so alarming and/or depressing that it is hard for any individual to know where to start or how to make a difference.

Turning around the global environmental trends mentioned above seems unlikely to occur through merely fine-tuning the existing relationship between humans and nature. Much more fundamental re-thinking is required. What most alternative approaches have in common is reliance on a fundamental change in values to underpin subsequent redirection of political and economic forces, to alleviate resource depletion and degradation, and to ensure more equitable distribution of the wealth generated from the use of natural resources.

But how can a community or a society undergo a fundamental change in values? How can communities learn to learn and to reach and implement difficult decisions? This is a critical issue in the face
If we had discovered England...

of environmental problems characterised by technical uncertainty, large scale and apparent urgency. It seems unlikely that fundamental change will come about solely through the statesmanship of political leaders (although some far-sighted leadership is essential), or through altruism among powerful groups whose power is vested in the status quo. Such learning and changes in values seem most likely to occur if ordinary people are directly, actively involved in these issues at a human level, rather than remote from them. As most environmental issues need to be tackled at a scale bigger than the individual, the family or the household, it follows that there is a need for processes for bringing people together cooperatively and constructively at a community and regional level.

Landcare in Australia is an exciting example of just such a process. Landcare is a multi-faceted, highly differentiated movement which is hard to define or to put boundaries around. At its core there are almost two thousand Landcare groups. These are groups of local people mostly in rural areas and mostly consisting of farmers, who have joined together to tackle land degradation problems and to work towards better land management in their district. The issues they are tackling and the ways they are doing it are as diverse as the landscape itself.

Northern Territory pastoralists trying to combat infestations of the noxious weed Mimosa pigra on the flood plains east of Darwin; rural communities in Tasmania concerned about stream water quality and river bank erosion; part-time farmers in central Victoria organising coordinated rabbit control programs; coastal communities in New South Wales stabilising sand dunes; Western Australian wheatbelt farmers surveying and mapping their district to develop catchment plans to coordinate salinity, drainage and erosion control works; Land Care Committees in Queensland combining local and scientific knowledge to produce land management manuals for their district; schoolchildren measuring salinity levels, producing maps, investigating environmental indicators such as frog and worm populations; rural Landcare groups planting trees helped by visiting bus loads of city people, bridging the Great Divide between urban and rural Australia; farmers working jointly with researchers to define and investigate more sustainable farming practices—all of these activities are threads which make up the rich pattern of Landcare.

But before going into Landcare in more detail it is instructive to elaborate on its Australian setting, which is crucial to an understanding of how and why Landcare emerged and of its significance, both in contemporary Australia and internationally.
AUSTRALIA—A ROUGH SKETCH

Australia is an ancient land and the history of European settlement in Australia is very short. Bob Beale and Peter Fray in their book *The Vanishing Continent* illustrate just how short, by pointing out that, if the geological history of Australia is considered as a journey along the 4300 kilometre length of the Indian Pacific Railway from Perth to Sydney (so that each kilometre of travel equates with one million years), then the arrival of the first European settlers occurs only twenty centimetres before the train grinds to a halt at Sydney's Central Station. Even the Aborigines, the first human settlers, arrived only about 50 metres (50 000 years) from the end of the journey measured on this timescale—relatively recently in geological terms, but long ago in human terms.

The point of these comparisons is to emphasise that the land we live from is incredibly old, and that our current society has developed in the blink of an ecological eye. These two facts form a crucial background to any analysis of human impact on the Australian landscape.

In keeping with their great age, the soils of the flat and low continent of Australia are generally weathered and shallow, inherently infertile and poor at retaining water, relying in their natural state on efficient nutrient cycling by native vegetation and soil organisms to maintain structure and fertility. The natural rate of soil formation is so slow that Australian soil is effectively non-renewable. Only ten per cent of Australia's 768 million hectares is considered arable. The dominant feature of the Australian climate is not so much its dryness (although it is the driest continent) but its variability, due in large part to a huge instability of atmosphere and ocean known as the El Nino Southern Oscillation. The technologies to anticipate this phenomenon are improving, but drought, floods and fire continue to cause irregular devastation in the essentially European farming systems of Australian agriculture.

Agricultural and pastoral uses occupy more than 60 per cent of the physical area of Australia. Historically, Australian agriculture has always had to contend with a small domestic market, high labour costs and long distances to overseas markets. The response has been to grow large quantities of export commodities which do not perish on long sea voyages, and which require minimal inputs of labour. This strategy has persisted. In the 1990s, 80 per cent of Australia's agricultural output still consists of wool, wheat, beef, sheep-meats, sugar, butter and milk. About 125 000 farms (the vast majority run by a single family), with an average size of 2800 hec-
tares, produce these seven commodities, with few farms producing more than three or four different products. The dominant trend in the number and size of farms means that each year fewer people are working bigger farms more intensively. The volume of agricultural production and exports has doubled over the last 30 years, with only a sixteen per cent increase in the area farmed.

This is not a book about land degradation. Readers interested in detailed accounts of the impact of Europeans on the Australian environment would be moved by the forcefully argued chronicle of William Lines in *Taming the Great South Land* and by the disturbing description of the current state of Australian land in *The Vanishing Continent*. However it is too easy to fall into the trap of decrying the impact of Australian agriculture on the landscape without understanding the complex interaction of forces which shaped the way in which farming systems were developed. The evolution of farming practices in Australia represents a continuing search for better ways of managing this unique land. *Greening a Brown Land*, by Neil Barr and John Cary, traces this search for sustainability and discusses what appears to be a litany of destruction and exploitation in a more sympathetic light.

Barr and Cary describe European agriculture in Australia as a 200-year experiment, which of course is ongoing. They point out that the Aboriginal inhabitants at the time of European settlement saw themselves as part of the land, and that their culture and systems of land management had evolved with the land over tens of thousands of years. Aboriginal firestick farming altered the landscape, favouring the development of grasslands and open woodlands, thus increasing the marsupial stocking rate which benefited the native hunters. In contrast, the white settlement of Australia was inspired by overcrowding in British jails and Britain's strategic interests in the southern hemisphere. The composition of the first fleet was pathetically inappropriate for establishing, housing and feeding a new society and the first generations of white settlers did not see themselves as part of the land—quite the contrary.

Early Australian literature is full of phrases like 'taming the land', 'the harsh and hostile scrub', 'the lonely outback'. The seasons were upside down, the native animals seemed utterly bizarre and the trees shed their bark instead of their leaves. Farming practices and means of maintaining soil fertility which had been developed over centuries in the young fertile soils and soft gentle climate of England proved disastrous in Australia's ancient soils, hot sun, drying winds, unpredictable rains and long, energy-sapping dry spells.
It is still customary to refer to long dry spells as ‘drought’ or ‘natural disaster’ rather than considering them an innate characteristic of the territory.

*Greening a Brown Land* outlines the key phases in the development of Australian land use, beginning with the ‘anarchic pastoral expansion of the squatters’, which had a devastating impact on the native human population and on native grasslands and soils. The gold rush of the 1850s brought new settlers and, as the alluvial gold ran out, a phase of more orderly selection of land and closer settlement began. What Barr and Cary describe as ‘the great Australian dream of making land more accessible to its citizens’ was evident for roughly the next hundred years, with a succession of closer settlement schemes and irrigation schemes. These schemes were driven by social imperatives and concerns, including a wish to settle and develop the ‘empty’ land in the face of perceived threats from much larger Asian populations in the north, and the need to reward and pacify returning soldiers from the Boer War and the two World Wars. Such schemes were rarely well planned from an ecological or even agronomic perspective; large irrigation schemes and land clearance schemes have been pushed through by social and political pressure in the face of strong technical evidence of potential salinity problems and likely poor returns.

A thumbnail sketch of the history of agricultural impacts on the landscape reveals a gradual exhaustion of the soils in cropping areas and of perennial pastures in grazing regions up until Federation in 1901, owing to overgrazing, overcropping and the devastating impact of the rabbit (introduced for gentlemen’s sport in the 1860s). Then the introduction of new wheat varieties, superphosphate and dry fallow heralded new prosperity for wheat farmers, which proved to be short-lived, as bare fallow and cultivation reduced soil organic matter, broke down soil structure and, in the words of one mallee farmer, ‘pulverised the soil into submission’. The erosion decades of the 1930s and 1940s spawned the first widespread community concern about land degradation and the establishment of soil conservation agencies by state governments. Improved pastures and crop varieties, clover ley rotations, soil conservation works, and the apparently successful biological control of rabbits, dramatically reduced erosion. The wool boom of the early 1950s saw a new golden era in which pastoral fortunes were made and consolidated, and agriculture was the mainstay of the Australian economy. However, over the last 40 years more insidious and intractable long-term problems have emerged in the form of soil acidification and soil structure decline.
over very large areas, and more spectacularly, soil salinity due to changed hydrological balances following clearing and subsequent cropping and grazing, exacerbated in irrigation areas.

As Barr and Cary caution, this history suggests that current prescriptions for more sustainable farming practices may not stand the test of time, and that these complex issues will not be solved by simple recipes. Importantly, they note that each generation has defined its own challenges (initially to survive, then to develop, then to fix obvious degradation problems, and now to pursue sustainability with all its inherent social, economic and environmental dilemmas) according to its existing cultural norms. An examination of the ecology of agricultural systems throughout history reveals that the exact nature of farmers' response to their environment depends not so much on the ecological constraints imposed by their environment, as on the society in which they find themselves. The European settlers tried to impose on the Australian landscape the farming systems with which they were familiar—sheep, cattle and wheat. The following dry reflection of an old western Queensland grazier puts this in perspective: 'If we [Australians] had discovered England, do you think we would have grazed it with kangaroos? This apparently bizarre notion is a simple inversion of what occurred in Australia.

Social and cultural norms are very influential, which is one reason why the direct involvement of a significant percentage of rural Australians in Landcare groups is potentially such a powerful force for change.

**LAND DEGRADATION**

While we have cautioned against drawing simplistic conclusions from stark portraits of environmental problems, one cannot understand the development of the Landcare movement and the impetus behind Landcare groups without a brief introduction to the severity and extent of land degradation in Australia.

Changes in the Australian landscape since European settlement have been astonishing in their scale and swiftness, to the extent that our knowledge of the impact of these changes and ongoing degradation processes is still sketchy and superficial. According to figures from the Australian Bureau of Statistics and Doug Cocks' *Use With Care*:

- Various combinations of soil erosion, salinity, acidification, soil structure decline, waterlogging and water repellency affect a sig-
significant proportion of the land used for agriculture. Fresh water resources (both groundwater and surface water) are threatened by salinity, eutrophication; sedimentation, contamination with agricultural chemicals and municipal and industrial wastes. Riparian environments commonly suffer ecological disruption through altered flow regimes caused by regulation for irrigation and urban water supplies.

- Half of the tall and medium forests (higher than ten metres) and about 35 per cent of the woodlands have been cleared or severely modified, so that, since European settlement, the area of Australian land under forest has been reduced from ten per cent to five per cent and of woodlands from 23 per cent to fifteen per cent.
- Ninety-seven species of vascular plants are extinct and 3329 plant species (seventeen per cent of the total) are either rare or threatened.
- Twenty species of mammals and ten species of birds are extinct and a further 111 vertebrate species are considered endangered.
- At least ten per cent of Australia's flora now consists of introduced species, some of which (including Mesquite, *Mimosa Pigra*, Prickly Acacia, Rubber Vine, Bitou Bush, Lantana, Blackberry etc) have been ecologically disastrous.
- Similarly, rabbits, foxes, cats, pigs, donkeys, camels, horses, goats and cane toads (among others) have been deliberately introduced to Australia and have become significant pests, causing widespread land degradation and either destroying the habitat of or directly consuming native flora and fauna.

The costs of this depletion and depreciation of natural capital are very difficult to calculate. Many estimates have been made, the most recent suggesting that weeds alone cost the Australian community three billion dollars a year, not counting the cost of blue-green algae. Losses in Gross Value of Agricultural Production due to land degradation are as high as seventeen per cent per year in some regions. These losses are not recognised as a cost of agricultural production in Australia's national accounts. Rather, expenditure on land conservation, which is directed at reducing this cost, is registered in Gross National Product as income. Depletion of natural capital such as soil, fresh water and biodiversity is not accounted for at all.

As farmers and as a nation we may be competent at recognising and allowing for depreciation of man-made capital assets, but when it comes to recognising depreciation of natural capital our account-
ing is third rate. Given the dominance of economic theory in policy formulation, the way in which the use of natural resources is accounted for reinforces rather than exposes irrational priorities in the allocation and use of these resources.

This point is not unique to Australia. One of the most pervasive influences of economics in modern industrialised countries is the compilation of national accounts and their consequent use to compare the performance of economies (and by inference the quality of government) over time and between nations. News bulletins and newspapers quote share market indices, the value of currencies, latest trade statistics and quarterly results in growth or otherwise in Gross National Product (GNP), which reveal whether an economy is growing (a ‘good thing’) or contracting (a recession, ‘bad news’). Economic growth as measured by increase in GNP is a political goal of the vast majority of national governments and is identified with increasing social welfare. So defined, economic growth measures production, not welfare. Thus the way in which economists carry out the analyses and the measurements which comprise these accounts is of great political importance. It is also one of the main targets of the green critique of mainstream economics.

According to Garret Hardin, who coined the term ‘tragedy of the commons’ in a seminal article in *Science* in 1968, for a politician to try to maximise GNP makes as much sense as for a composer to try to maximise the number of notes in a symphony. Roughly 70 per cent of GNP increases have traditionally been gained by growth in the most environmentally damaging and depleting sectors. Therefore, economic growth has tended to occur at the expense of the environment and the major goal of economic policy in almost every country effectively is translated into increased degradation, depletion and pollution of natural resources. Thus, in the words of Roefie Hueting, an economist working on reforming the Netherlands National Accounts,

... society is sailing by the wrong compass, at the expense of the environment; the error is covered up by a wrong use of terms; the belief in ever continuing exponential growth in production, as measured in national income, is the heart of the environmental problem.

The environment performs three economic functions—as resource supplier, waste assimilator and as a direct source of utility, the value of which is rarely reflected in national accounts or analyses of economic trends or international economic comparisons. Many econom-
Landscapeists, as well as environmentalists, are uncomfortable with the status given to national accounts, because they have three main deficiencies: the use of monetary transactions is inadequate for measuring social and economic performance; different forms of wealth (capital and income) are treated inconsistently; and important variables which influence economic activity (for example the extent and quality of natural resources and the depreciation or otherwise of human capital), are ignored.38

Regardless of how it is accounted for, and while rigorously ground-truthed statistics may not exist, visual and anecdotal evidence is sufficiently stark to suggest that in all the key degradation categories (with the possible exception of erosion on cropping land), Australia is still going backwards. Salinity, soil acidification, soil structure decline, vertebrate pests, weed infestation, rural tree decline, water quality decline and species extinction are all increasing, if not accelerating.

These are sad and sorry indicators of the extent to which current standards of living have been achieved at the expense of Australia's natural capital. But we should not lose sight of the other side of the equation—the achievements of modern Australian society. As Doug Cocks points out in his comprehensive, constructive and clear-sighted book Use With Care, Australia is one of the oldest democracies and, on the indicators of life expectancy, infant mortality and adult literacy, it has been among the most successful countries for more than a century. Our quality of life, admittedly an intangible and subjective descriptor, is very high by world standards.39 With its comparatively low population pressure, stable political climate, well-educated population and highly-developed technological capacity, Australia is well placed to take a lead in developing systems of land use and management which support a high quality of life without depreciating natural capital. If we accelerate our efforts in this direction, we are likely to generate new skills and technologies (scientific and social) which will be extremely valuable in Australia and elsewhere.

**RURAL DECLINE**

But we have a huge hurdle to confront. The rural crisis in Australia is one of the most severe this century.40 This crisis is a formidable constraint to Landcare, in that it limits the financial capacity of groups and their individual members to fund practical land conservation works. Furthermore, it is placing rural communities under great stress as families are forced to leave the land or are living
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under a shadow of imminent foreclosure. But it is also a powerful stimulus for Landcare, because it underlines in stark terms the sheer unsustainability of current farming systems, which is a compelling incentive to develop better ways of using the land—ways which are more profitable, which preserve or enrich the social fabric of rural communities, and which protect the resource base upon which the whole system and the Australian population ultimately depends.

The most obvious indicator of rural decline is farm finances. The Australian Bureau of Agricultural and Resource Economics (ABARE) estimates that farm business profit on Australia's 77,800 broadacre farms declined by 350 per cent between 1989-90 and 1990-91, to an average loss of $18,000 per farm. More than 70 per cent of broadacre farms recorded a farm business loss in 1990-91, and ABARE estimated that the average farm business profit dropped further in 1991-92, to an average loss of $23,100 per farm, the third year in a row that broadacre farms have recorded a negative farm business profit on average. The latest estimates are for an average farm business loss of $10,500 in 1992-93, worsening again to a loss of $13,200 for 1993-94. Obviously consecutive years of negative profits make things extremely difficult for people attempting to carry debt. By June 1992, declining terms of trade (the ratio of prices received for their products to the cost of their inputs) had seen farm costs rise to 95 per cent of the gross value of farm output, leaving the average broadacre farm a margin of only five per cent from which to repay loans, pay tax and support families. The average broadacre farm in Australia in June 1992 owed more than $100,000 and paid $14,000 in interest.

These figures are even more disturbing when seen as merely a continuation of longer-term trends, rather than as the 'bust' period in a boom and bust cycle. Sure, farmers' terms of trade fluctuate and there were some good years in the late 1980s. But the underlying long-term trend is an inexorable downward slide. In the early 1950s (admittedly a boom period in Australian agriculture) agriculture accounted for 29 per cent of Australia's Gross Domestic Product (GDP) and 83 per cent of exports, but by 1991-92, this had fallen to 3.6 per cent of GDP and 22.6 per cent of exports. Over this period, farmers' terms of trade has declined by an average of four per cent per year. Overall, Australian farmers' costs have increased (in real terms) by more than 100 per cent, while their returns have increased by only about 50 per cent. Figure 2.1 illustrates this long-term squeezing of farm profit margins, and suggests that Australian agriculture is facing a crunch period, or in ABARE language 'there is unlikely to be any let up in the severe
adjustment pressure facing Australian farmers over the rest of this decade. 44

The bottom line to these figures is that throughout the 1980s and early 1990s Australian farmers have had to increase productivity by an average of five per cent each year (over good seasons and bad), just to maintain profitability. Of course the traditional response of farmers to declining terms of trade has been to raise productivity and this has continued to occur. Australian agriculture has improved productivity by an average of three per cent per year since the 1970s, which compares very favourably with other OECD countries and other sectors of the Australian economy. 45 Gross farm output in Australia has increased by 250 per cent since the 1950s, but most of this growth occurred prior to the late 1970s, largely through more intensive production involving higher input use. Since the late 1970s, productivity gains have been achieved through reducing inputs, to the extent that there has been a negative net investment in broadacre farm plant and machinery every year since 1982–83. 46 In other words, farmers have tightened their belts, making machinery last longer because they cannot afford replacements, and deferring other investments, which has severe flow-on effects for country towns and employment in agricultural service industries.

Figure 2.1 shows very clearly that productivity improvements through new technologies and reduced inputs have not been sufficient to compensate for increased costs and lower returns, which suggests that Australian agriculture is facing a massive shake-out.
Neoclassical economic rhetoric would have it that the most efficient and progressive farmers will survive, and that rural industries will emerge 'leaner, meaner and hungrier'. This is not necessarily the case, as survival for a particular family depends heavily on their level of debt. Younger farmers who are still trying to consolidate and improve their farms, and who have higher expenses with young families or children at school, tend to carry most debt and are most vulnerable regardless of their efficiency or progressiveness. Given the lack of on-farm investment during the 1980s revealed by the ABARE figures, when commodity prices rise again Australian agriculture will surely be lean, mean and hungry, with the social and environmental consequences that everyday use of these words implies.

The number of farms continues to decline and the average age of farmers is in the high fifties and probably increasing. Agriculture is becoming increasingly less attractive for young people, including the children of farm families, as there is simply not enough money in farming to enable younger expanding families with higher financial commitments to enjoy the lifestyle which Australian agriculture has traditionally offered. The vertical and horizontal restructuring of agriculture in rural regions raises questions about the long-term viability of the family farm in Australia.

The decline in farmers' terms of trade and the rural economic crisis has been well documented, but the social and environmental side effects of farm financial stress have not gained much public attention until relatively recently. When the social plight of rural communities has gained national prominence, it has usually been in the context of severe droughts, floods or bushfires, which the national consciousness can assimilate as 'natural disasters', rather than confronting the fundamental underlying issue of the future of rural communities.

Lawrence and Williams review the dynamics of decline in health, welfare and education in rural Australia and discuss its implications for social welfare delivery. They note many disturbing points, including:

- About one-third of Australia's country towns are in decline, associated with population movements and government rationalisation.
- Many of the people remaining in withering country towns are those who most need access to human services; they are trapped in a physical and social sense, unable to sell their homes or to gain work.
• Rural poverty is more widespread and is more chronic than urban poverty, and those in poverty in the country exhibit greater social and health problems than the poor in cities.
• The level of domestic violence is higher in rural than in urban Australia.
• Per adult consumption of alcohol and tobacco is about 30 per cent higher in rural areas.
• Rural people experience 28 per cent more hypertension and psychiatric disorders than urban people.
• Only seven per cent of boys and ten per cent of girls who finish year twelve in rural schools go on to tertiary study compared with 27 per cent of boys and girls in cities.

Lawrence and Williams note that rural people historically have always been disadvantaged in access to services such as health and education, and to information about service options and funding guidelines, probably because political and economic power has been located in national and state capitals and statutory power is vested in state rather than local government. Thus local communities have traditionally been able to exercise little self-determination in decisions about locating new services or withdrawing existing ones. With continued decline and withdrawal of services to regional centres, local influence dwindles further. When a community drops below a 'critical mass' in elements such as local skills, contributed funds, local volunteers and accumulated capital facilities, government funds are even less likely, particularly from submission-based programs which favour more articulate and better-organised communities. Lia Bryant notes that, in keeping with the dominant political flavour of economic rationalism, state and federal government agencies have rationalised health, welfare and agricultural-based services in country areas, withdrawing essential services from or closing schools, hospitals and government offices, further compounding the problems of the still growing proportion of rural people in poverty.50

Lawrence and Williams suggest that the tradition of self-help and self-sufficiency within rural communities is no longer sufficient to find local solutions to the problems caused by rural decline. They conclude that, given agriculture's shrinking importance in the Australian economy, new rural industries are required if real social development is to occur.

We have painted a gloomy picture, perhaps too gloomy. There is always some room for manoeuvre for rural communities. Landcare groups and related initiatives enlarge the options for rural people and can more effectively harness local resources and energies in an at-
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tempt to reverse the dynamics of decline. Commentators point to encouraging external developments such as progress in negotiating the Uruguay round of the General Agreement on Tariffs and Trade (GATT) and the rapid expansion of the Asian food market, both of which present medium-term opportunities for Australian agriculture. Furthermore, in 1994 there are tentative national moves towards rural (re)development, with initiatives underway or planned under policy headings such as employment, welfare, rural adjustment, education and training, environment, ecotourism, and agribusiness.

A profound sense of unease about the future of farming and of life on the land permeates rural Australia. In many conversations with rural people, we have encountered a suspicion that urban Australians feel they do not need or want farmers any more. We do not wish to tar everyone in government, industry and farmer organisations with the same brush, as there is some hard, constructive thinking taking place in various offices in both the public and private sectors. But people in the bush see little evidence of such thinking, which is yet to crystallise into a long-term plan or clear direction for Australian agriculture. There are few obvious signs that the environmental and social consequences of rural decline have been thought through. There is no better time than now to develop a much more forward-looking rural policy for Australia, which takes as its point of departure the extraordinary community endeavour described here, using it as a platform to support strategic long-term investment in an economic sector in which Australia still enjoys a comparative advantage. It is short-sighted to see rural Australia marginalised.

Talk of 'level playing fields' is rancid rhetoric to people saddled with debt and high real interest rates, receiving wool and wheat cheques which fail to cover out-of-pocket costs. Ultimately, rural decline is not just a social and economic issue, it has profound environmental implications. More sustainable systems of land use and management are unlikely to be developed or implemented by people preoccupied with short-term survival. As one farmer put it, 'it's hard to be green in the red':

In short, existing systems of food and fibre production are unsustainable. The rural sector is ageing, declining, stressed and going broke, and depleting natural and human resources in the process. That is the bad news. While it may seem hard to be green in the red, many families and communities are doing just that, working to find solutions which get them off the accelerating treadmill of decline, and on to a more self-reliant and sustainable path. The rest of this book is devoted to how they are going about it—how rural communities are responding to these environmental, economic and social challenges.
NOT A SEXY ISSUE

Involvement of farmer groups in soil conservation is not new in Australia. Soil conservation departments (or soil conservation sections of agriculture departments) have encouraged and supported the formation of statutory soil boards and catchment groups as early as the late 1930s in New South Wales, the 1940s in South Australia and Western Australia, the 1950s in Victoria and the 1960s on the Darling Downs in Queensland. These groups were primarily concerned with soil erosion. Any works programs with which they were associated were essentially directed by, and often implemented by, government. Participation in such groups was thus limited to a very small proportion of the farming community (although it was very high in some districts), their focus was narrow, and ownership and direction of these programs was overwhelmingly vested in government. Nevertheless, early group schemes such as the Lake Eppalock and Glenelg Catchment projects were regarded as being successful in terms of their immediate influence on agricultural production, control of erosion problems and the subsequent protection of watercourses and specific assets such as town water supplies and infrastructure including roads, culverts, bridges and reservoirs.

As well as these examples of working with farmer groups, soil conservation agencies have traditionally been engaged in a full range of extension activities, including trials, demonstrations, field days, use of mass media, targeted campaigns, incentive schemes, one-to-one advice in the field, machinery loan and plant hire schemes, farm planning services, farmer short courses and a wide
range of publications. This work was directed to encouraging farmers to adopt soil conservation practices and discouraging non-soil-conserving practices. The latter aim has traditionally been backed up by soil conservation legislation in all states (except Tasmania), providing for prosecution of people or firms negligently causing soil erosion. However, soil conservation legislation has rarely been enforced, as soil conservation agencies have tended to assert that ‘carrots’ (financial incentives, persuasion, education) are more effective and politically acceptable than regulatory ‘sticks’. 55

Despite success in reducing erosion in some regions, the current condition of Australian land suggests that 30 to 50 years of professional government-led soil conservation in most states must be considered on the whole to have failed. Whether in recognition of this point or not, soil conservation agencies in several states began to change their focus and modes of operation in the 1980s.

South-west Western Australia vividly exemplifies much of the recent land use history of Australia. We give a disproportionate amount of space to this region in this book because it illustrates in a graphic way both the scale of the problems Landcare is up against, and some of the most innovative and active responses to these problems at individual, community and institutional levels.

The development of Western Australia in the nineteenth century, including the logging of the great Jarrah and Karri (Eucalyptus marginata and E. diversicolor) forests, the discovery of gold, pastoral expansion and the diversion of water to the arid inland, is graphically described by William Lines in Taming the Great South Land. Agricultural development in the south-west really took off after the Second World War. Technological developments in the 1950s and 1960s, including biological control of rabbits with the myxomatosis virus, and the widespread use of superphosphate in conjunction with trace elements and ley farming, underpinned a rapid expansion of the agricultural area. This development was underwritten by the Western Australian government, which extolled the virtues of its ‘million acres a year’ land clearance schemes in the 1960s. But large-scale clearing ground to a halt in the face of lower commodity prices, poor seasons and the emergence of wind erosion, salinity, water logging and water repellence problems. According to Roger Hartley, John Riches and John Davis, the sudden surge of dryland salting problems in the wheatbelt between 20 and 30 years after clearing was the factor which caused the greatest concern. 56

Graeme Robertson notes that the 1970s saw ‘the end of the dream that agricultural technology could turn any and all land into profitable farming country’. 57 As the WA Soil Conservation Act of
1945 was not effectively able to deal with salinity, it was revised to broaden its scope and powers. One of the key features of the amended Act of 1982 was to encourage greater involvement of the farming and pastoral communities in land conservation by providing for the establishment of Soil Conservation Districts and associated committees. A key difference between this and past group approaches is that local communities decide the boundaries for the proposed district, which means that districts range from small local areas with acute problems to whole shires such as Esperance with 600 land users and roughly two million hectares. Since 1982, some 137 Land Conservation District Committees (LCDCs) have formed to cover all of the pastoral land in Western Australia and 80 per cent of the agricultural land. These are complemented by more than 200 catchment groups operating under the umbrella of LCDCs.

The process of forming an LCDC starts with a public meeting usually convened by local landholders to assess local support, who then elect a steering committee. The steering committee nominates the boundaries and composition of the District Committee. Committees must have representation from producer organisations and local government, and a Department of Agriculture employee representing the Commissioner for Soil Conservation who is usually a local agricultural or rangeland adviser. Other government agencies such as the Department of Conservation and Land Management, the Water Authority and the Environment Protection Authority are represented if they are able to contribute locally relevant support. Initially, committees were intended to be largely advisory, but it soon became apparent that they were willing and able to play a more active role, so in the 1988 amendments, the roles and responsibilities of LCDCs were broadened to include ‘... to develop, promote ... and implement programs within Land Conservation Districts’.

The basic institutional rationale for working with voluntary groups of land users was outlined by Graeme Robertson and John Riches in a paper to the Fifth Australian Soil Conservation Conference held in Perth in 1990:

*Land degradation prevention and control requires a different problem solving and adoption process from that of adoption of single technical practices that may enhance production. It involves the adoption of complex inter-related activities usually requiring a change in attitudes to the management system. The following are key elements:*
Farm Land Use

Beef cattle, with beef cattle in many areas
Dairy cattle
Sugar cane
Wheat and other dryland cereals

Distribution of Landcare Groups

Moist temperate with hot summers
Moist temperate with warm summers
Winter rain with dry summers
Semi-arid with winter rain
Arid Interior
Semi-and with summer rain
Moist tropical
Vegetation Change 1788 to 1988

Broadacre Farms: Farm Business Profit 1989/90 to 1991/92 Local Averages

Key:
- no data
- less than -20800
- -20800 to -18600
- -18600 to -16500
- -16500 to -14800
- greater than -14800
A big country: 'jump up' country north of the Tanami desert (NT).

Major Mitchell's 'Australia Felix', fine wool growing country near the Grampians (Vic).

ANDREW CAMPBELL
Mary River flood plains east of Darwin.

ANDREW CAMPBELL

Spinifex country in Central Australia.

ANDREW CAMPBELL
1. An understanding by the land user of the physical and biological processes and the interactions involved...
2. Land degradation can only be solved by land users.
3. Project/program relevance is maximised if land users develop and implement more effective projects/programs, ie 'participatory decision making' by those who 'own the problem' is fundamental to developing optimal solutions.
4. Groups of landholders with a common problem will develop and implement more effective projects/programs than individual land users, or individual land users working with a government agency.
5. Attitudes usually change slowly: Group dynamics provide for accelerated development of new approaches and systems across a community.

The growth in the number of Land Conservation District Committees and their activity far outstripped departmental expectations and placed great stresses on the bureaucracy in Western Australia, which is still struggling to cope. More of that later.

Meanwhile, in Victoria, a parallel revolution was occurring. In 1980, the Garden State Committee, a quango set up by the Hamer government in 1977 to achieve better coordination of government and private efforts to conserve and establish native vegetation in Victoria, hosted a landmark 'Focus on Farm Trees' conference in Melbourne. An initiative spurred by this conference was the establishment of Farm Tree Groups, jointly sponsored by the Garden State Committee (GSC) and the then Victorian Farmers and Graziers Association (VFGA). The first groups in this program were at Bairnsdale, Hamilton, Rochester and Wycheproof. It was intended at the outset that they should be led by farmers and consist mainly of farmers and representatives of relevant government departments, and that their main aims would be to gather and disseminate information about trees on farms, and to promote rural tree growing and protection of remnant native vegetation.

The Farm Tree Group program blossomed, growing to embrace more than 50 groups by the late 1980s. Groups were involved in running field days, establishing demonstration sites to illustrate how trees can be successfully re-established, initiating trials, publishing their own newsletters and in some cases operating their own nurseries and hiring out revegetation equipment. Their activities boosted the momentum of, and were in turn encouraged by, a
general increase in environmental awareness throughout the population during the 1980s, and increased enthusiasm for planting trees as a symbol of environmental repair—a reverse in the trend of degradation and degeneration of rural landscapes.

In an attempt to sort out the somewhat messy, ad hoc and often adversarial bureaucracy associated with public land management and rural land conservation in Victoria, the new government in 1983 brought five agencies (National Parks, Fisheries and Wildlife, Soil Conservation, Lands and Forestry) into one department, the Department of Conservation, Forests and Lands. One of the early divisions of the new department was the Land Protection Service, made up of elements of the Soil Conservation Authority, the extension section of the Forests Commission, some wildlife people, and people dealing with vertebrate pests and weeds from the Lands Department. Each of these agencies had administered incentive schemes for farmers, so there was a move to bring the various incentive schemes into one program to reflect the integrated approach to land management of the new department and to give staff from a diverse range of disciplines and former allegiances a common focus.

From its inception, the Land Protection Service attempted to develop an integrated approach to land degradation control and rural revegetation, including control of pests and weeds.

The emergence of dryland and irrigation salinity as a serious environmental threat during the 1980s was a further stimulus to this approach, as it was obvious that the complexities of salinity could not be resolved in a piecemeal way. A major initiative of the Cain government in Victoria was to establish the Salinity Bureau, a small unit within the Department of Premier and Cabinet, which was to play a crucial planning, coordination and communication role, focusing on salinity as the state's single most important environmental issue. The Salinity Bureau reported directly to a Cabinet sub-committee consisting of Ministers Kirner, Walker and McCutcheon—capable, committed and credible people whose influence resulted in unprecedented budget allocations of more than $20 million per year for developing and implementing a strategy to control salinity. A key focus of the Salinity Bureau was community education and community involvement.

Throughout the early 1980s, farmers and other rural land users had already demonstrated their willingness to get involved in land conservation activities through the Farm Tree Groups. In early 1986, Joan Kirner, then Minister for Conservation, Forests and Lands, requested the Land Protection Service of her department
to establish a new land protection program based on the following principles:

- that it be community based—ie, not focused on individuals;
- that it should tackle a range of land protection issues (soil, weeds, trees etc) rather than single issues;
- that the community should be actively involved in planning and implementation of the program.

A group of staff including Horrie Poussard, Rob Joy and Bryan O'Brien drafted a proposal for a program based on neighbourhood groups, with an official recognition/accreditation process, overseen by Regional Advisory Committees. They also tossed around some names and proposed to Joan Kirner the name 'Total Land Care'. The story goes that Joan Kirner retorted that she did not want to be known as 'The Minister for TLC', so it became simply 'LandCare', a name registered in Victoria in 1986. The Minister was also instrumental in securing support for LandCare from the Victorian Farmers Federation (VFF) through its then President, Heather Mitchell. Both Joan Kirner and Heather Mitchell were prominent in their joint support for LandCare and played crucial roles in the early years of the program. At the first Community Land Care Conference in Bendigo in 1987, Joan Kirner offered the name 'LandCare' to the then Federal Minister for Resources, Senator Peter Cook, suggesting that it become a national program.

There is a clear message here about 'bottom-up' versus 'top-down'. Neither approach is likely to work on its own; they are mutually dependent. The value of such high-profile commitment by political leaders to grassroots initiatives and of their support for community participation is profound. It is unlikely that the LandCare program would have grown so quickly, with the same degree of support from government and farmer groups, without such obvious commitment to it right at the top. The roles played by Joan Kirner and Heather Mitchell in LandCare were also probably a major factor encouraging the active participation of women, characteristic of Landcare in Victoria.

The first Victorian LandCare group was formed at Winjallok, near St Arnaud in the Wimmera, in 1986. The main focus of the group then (and still today), was to blend soil conservation and productive farming by establishing deep-rooted perennial pastures on the bare hills of the district. Re-establishing trees and shrubs to protect eroded creeks and gullies is a lesser priority of the group and its pioneering leader, Terry Simpson. The launch of the
Winjallok group attracted considerable publicity, and it was soon followed by other similar launches, invariably involving Joan Kirner and/or Heather Mitchell. By the end of 1986 there were about ten LandCare groups in Victoria, a number which had grown to 30 by the end of 1987.

Landcare groups are discussed in detail in later chapters but, briefly, the main differences between these new groups and the old soil conservation catchment groups or the farm tree groups are:

- Landcare groups usually form to tackle a broader range of issues, not just fencing off gullies or planting trees.
- Landcare groups tend to be based on neighbourhoods or catchments with contiguous boundaries, rather than on peer groups of farmers with a common interest.
- The main impetus for forming Landcare groups comes from the community, although the explicit support and endorsement of government remains critical.
- The momentum and ownership of the program is with the community rather than government. From the outset, LandCare groups assumed much greater control over their activities and direction than previous programs, which had been directed by government agencies.

So, by 1988, voluntary groups of farmers were a major focus of the land conservation efforts of two states—Western Australia and Victoria. As is traditional in the Australian Federation, the two states were acting quite independently of each other, in different administrative and legislative environments, although senior and middle level managers within the respective bureaucracies had a fair idea of the policy direction in other states. The Western Australians had legislated to create a legal framework for the operation of their Land Conservation District Committees, whereas the groups in Victoria had no legislative basis and were far less structured.

However, the groups in Victoria and Western Australia were not the only voluntary land conservation groups to emerge during the early 1980s. Soil Australia had had statutory Soil Boards since the 1940s, but these were largely inactive by the 1980s. There was a range of community-based farm tree groups and special interest groups (such as Bird Observers Clubs, Field Naturalists Clubs and 'Friends of' groups) in all states, some of which (for example the Yass River Valley Revegetation Project near Canberra, the Bathurst Trees on Farms group in New South Wales, the Midlands Tree Committee in Tasmania) had many of the characteristics of Land-
care groups. The Lockyer Valley Watershed Management Association in south-east Queensland was one of the earliest Landcare groups in Australia, but it was an isolated example within Queensland.65

Despite the differences in their physical, legislative and administrative environments, some striking similarities between the groups in each state and their activities were already apparent. The number of groups and the enthusiasm of farmers and other rural people for the voluntary group concept grew much more quickly than had been foreseen by government agencies, with minimal financial inputs from government. Extension experts, administrators and policy makers began to see the potential of the voluntary group approach as a key feature of an overall strategy to develop more sustainable systems of land management.

Leading groups were extremely active in getting things done in their local district—whether spreading the word about good land management, or healing sore spots in the landscape. Groups achieved some notable successes where previous extension work had failed, particularly on difficult issues such as rabbits and weeds in districts with a lot of absentee landholders, and in preventing wind erosion and coordinating water management in cropping districts. The enthusiasm for land conservation within these groups was a marvellous springboard for land conservation efforts. Leaders of the early groups were typically highly committed and talented people (recognised as leading farmers) who were clearly influential in changing attitudes and improving land management in their local districts and at a wider level.

Another similarity between Victoria and Western Australia during the mid- to late-1980s was the importance of dryland salinity as a galvanising factor in the development of voluntary land conservation groups. When you have a rising tide of salty groundwater beneath your farm, it is obvious that: (a) you need to act, and (b) you cannot solve the problem unless other people also act, so that cooperative efforts at a catchment or district level are essential. This awareness tended to reinforce the development of farm and catchment planning processes which also occurred from the mid-1980s, in parallel with the emergence of voluntary groups.66 Even groups which started with a focus on a single issue, such as salt or rabbits; broadened their outlook to consider the full range of land conservation issues, from erosion and soil acidity to tree decline, water quality and wildlife conservation.
AN UNHOLY ALLIANCE

Suddenly the level of attention to Landcare increased dramatically. In mid-1988, an historic partnership was forged between the National Farmers Federation (NFF) and the Australian Conservation Foundation (ACF) or, more particularly, between their respective Directors, Rick Farley and Phillip Toyne. These two organisations probably disagreed on most issues, but they shared the view that land degradation is Australia’s biggest environmental problem. They also agreed that the overall level of government funding allocated to this issue in Australia was pitiful, and that this was due in large measure to the fact that it was not perceived as a political vote-winner. In the words of the then Minister for the Environment, Senator Graham Richardson, ‘it’s just not a sexy issue’.

This was undoubtedly true. Soil is not cuddly or furry, or rare or beautiful like reefs, rivers or rainforests. The Hansards of state and federal parliaments over more than half a century have been littered with eloquent descriptions of the scale and severity of land degradation and stirring calls for something to be done about it, but despite the consistent efforts of Primary Industries Minister, John Kerin, by 1988 the budget for the National Soil Conservation Program (which had existed only since 1983) was still of the same order as the landscaping budget for the new parliament house.

Rick Farley and Phillip Toyne had both visited local land conservation groups in Victoria and Western Australia during 1987 and 1988. They had been impressed by the enthusiasm, activities and potential of these groups, and by the emerging concepts of farm and catchment planning in which farmers themselves were the key planners. Farley and Toyne were convinced that, if they could place this issue more firmly on the political agenda, greater levels of national funding could become available. They were also sure that there was plenty of enthusiasm and commitment already existing within rural communities to form the basis of an active ‘bottom-up’ program. By this stage the potential of the liaison between the ACF and NFF had already been recognised by the then Minister for Resources, Senator Peter Cook who, in an astute move, created a Ministerial Soil Conservation Task Force involving himself, Rick Farley, Phillip Toyne and Dr Geoff Evans, the Chairman of the National Soil Conservation Advisory Committee (SCAC), which advised the Minister on soil conservation issues. While the exact role of the Task Force was never clearly defined, it had rich political symbolism.

The NFF and ACF jointly held a seminar in the sparkling new
parliament house in September 1988, at which key thinkers in land conservation were asked to put forward ideas about how Australia could improve the management of its rural lands. Jock Douglas of the Queensland Cattlemen's Union had developed a discussion paper in 1988 proposing a system of district committees and property planning. This paper was influenced by Professor Brian Roberts from the University College of Southern Queensland in Toowoomba, who was aware of the farmer group activity in the southern states, and had challenged farmer organisations in the north to demonstrate their land conservation credentials in a constructive way, or risk greater government regulation of land management. This paper was a basis for the development of the ACF-NFF proposal for an ambitious National Land Management Program, the key elements of which were funding for Landcare groups and property planning.68

Rick Farley and Phillip Toyne lost no time in securing support for this proposal from John Kerin, then Minister for Primary Industries, and Graham Richardson (Environment), before presenting it to the Prime Minister. Prime Minister Hawke presented a major environment statement in July 1989, announcing that the 1990s would be the Decade of Landcare, supported by a $340 million funding program based to a large degree on the NFF-ACF document. He publicly acknowledged the value of the contributions of Toyne and Farley. The joint thrust of two powerful lobby groups, unlikely bedfellows from opposite ends of the political spectrum, presented a fascinating image to the media.

The potent political ingredients of perfect timing, a discrete package with broad voter appeal, against a background of exponential growth in community awareness of environmental issues, ensured that Landcare became 'flavour of the month'. With the Commonwealth signalling its endorsement of the concept of community Landcare groups in such a tangible way, the stage was set for accelerated growth of the group programs in Victoria and Western Australia, and for extremely rapid establishment, growth and resourcing of group programs in other states.

WHAT IS A LANDCARE GROUP?

A Landcare group is basically a group of people concerned about land degradation problems, who are interested in working together to do something positive for the long-term health of the land. Most Landcare groups are rural, although there is a rapidly growing number of groups along the coast and in urban areas concerned
The National Landcare Program

The administrative umbrella for the Landcare movement at a national level is the National Landcare Program (NLP) within the Department of Primary Industries and Energy. The overall goal of the NLP is to achieve efficient, sustainable and equitable management of natural resources in Australia.

The NLP has three components:

- a community Landcare component established to assist community groups to work towards the sustainable management of land, water and vegetation resources in their local area;
- a commonwealth/state component where partnership agreements between the commonwealth and the states and territories provide a strategic framework for commonwealth funding of integrated projects within the states, emphasising institutional reform and planning; and
- a national component which funds commonwealth initiatives for integrated land and water management.

Programs from other commonwealth agencies which support community activities also form part of the NLP. These are the Save the Bush and One Billion Trees programs administered by the Australian Nature Conservation Agency (the OBT is delivered by Greening Australia), and the community component of the Natural Resources Management Strategy for the Murray-Darling Basin administered by the Murray-Darling Basin Commission.

The National Landcare Advisory Committee (NLAC), established in conjunction with the NLP, provides a forum for community views on landcare issues to be presented to the commonwealth government. Through its membership, drawn from farming, conservation, national, state and local governments and Landcare and community groups, NLAC advises the Minister for Primary Industries and Energy and the Minister for the Environment on national natural resources and environment issues.
with protecting sand dunes or improving the management of creeks, parks, public reserves and other open space. The focus of these groups is as diverse as the landscape itself. The case studies in the next two chapters complement this composite picture of Landcare groups.

The distinguishing marks of Landcare are that it is voluntary; the agenda of each group is set very much by the people within it; each group operates in a way that best suits it; there is no one looking over their shoulder to check that they do things absolutely by the book; there is no book. Landcare groups allow people to see that they have the capacity within their own community to deal constructively with issues that seem too big for individual families. It is no longer sensible to say, 'We've got a problem, let's get so-and-so to fix it for us'. There are resources and skills within each community, each member of a Landcare group has different skills to offer—women, men and children.

There is really no such thing as a 'typical' Landcare group. This is a key to the strength of Landcare. The diversity reflects that groups are addressing the issues that are most relevant to them in the manner which suits them best. However, many groups do go through a similar evolution, which is worth sketching briefly. We must emphasise that this evolution is not necessarily linear. It is not uncommon for groups to become dormant or much more active with the departure or addition of a key person or a change in the type and level of external support.

Usually Landcare groups start when someone—a farmer, local activist or government officer (or any combination of these)—sees a land management issue, feels that a Landcare group is the way to go, talks it over with friends, neighbours and perhaps extension staff from the government, or someone from a neighbouring Landcare group, and calls a meeting. The meeting elects a steering group, which investigates local problems, interest, resources and available assistance, then calls another meeting to launch a group and elect a committee, although sometimes this happens at the first meeting. The committee may be the entire group, or be an executive subset of the group.

The group then decides on its name, defines its problems and what it knows about solutions. Boundaries, goals and membership are determined. The group identifies sources of assistance, usually becomes incorporated (for legal and insurance purposes) and maybe puts in a submission for government funding, often depending on the level and type of input from local government extension staff. The local community becomes aware of the group, which
grows quickly and develops relationships with local and state government agencies and other sources of assistance.

As the group consolidates, it usually develops a plan of action to progress towards its goals; or proceeds on a bright ideas basis from meeting to meeting, or is essentially directed by the government agency. The first scenario is obviously preferable, but the majority of Landcare groups in Australia usually have elements of all three. The group may have a part-time coordinator and usually develops a reasonably clear understanding of its relationship with government agencies. Some of the people involved with the early development of the group and some people on the fringes of group activity become less active, but membership continues to grow.

Early activities of Landcare groups often include:

- field days/farm walks/bus tours;
- meetings, some with guest speaker(s);
- production of a simple brochure about the group, or an occasional newsletter;
- development of funding submissions;
- demonstration projects—usually repairing land degradation on a prominent site in the local area;
- flights over the group area and/or a bus trip to Landcare groups in other regions;
- identification and mapping of land management issues at a district or catchment scale.

After a year or so, during which most of the above activities have either taken place or been talked about, the group has settled down. Natural leaders and future leaders, talkers, workers, followers, sleepers and hangers-on have become apparent. Some turnover of members is common. The group has a clear understanding of its role and goals and is well known within the local community. The group has developed ongoing relationships with state and local government, with local businesses, community groups (including neighbouring Landcare groups), universities, researchers and consultants, schools and other landholders. Ideally, the interaction with government staff for technical advice remains high, but reliance on the state for stimulus and financial support has dwindled.

Regular activities of mature Landcare groups include those listed above and various combinations of the following:

- development of a catchment or district plan which identifies land degradation problems, discusses the challenges of achiev-
ing sustainability (see Chapter 8) in the local context and sets out a coordinated approach to move towards sustainability, tackling land degradation along the way;

- facilitating the development of individual property plans within the context of the catchment plan, by employing consultant(s), running workshops, short courses, coordinating incentives and resources such as aerial photos;

- active involvement in natural resource monitoring programs, often in conjunction with other land users, schools, state agencies and scientists from CSIRO or universities;

- developing local inventories of natural resources (eg remnant vegetation, seed sources, endangered species, soil maps, water quality) and documenting local knowledge about land and its management;

- demonstration projects and cooperative works organised and/or supported by the group;

- actively drawing from a wide range of support—government and non-government—local, regional, state and national;

- involvement with local schools in an extension role and in group projects;

- short courses or seminars, in which the group gathers expertise from a range of sources;

- development or purchase of equipment for hire to members and other land users;

- study tours to other regions—occasionally in other states;

- research and development trials with state agencies, universities, agribusiness, CSIRO;

- involvement in state and local government planning processes;

- exhibits at local shows and field days;

- production of educational pamphlets, videos, manuals.

Of course not every Landcare group is a winner. Some groups fizzle out fairly early in their existence or never really get off the ground. This may be because they formed for dubious reasons; for example, solely in order to get a grant, or simply to be seen to be doing something constructive about conservation in the face of perceived long-term threats to farmers' rights in the form of urban conservationists. Other groups may be initially vigorous and operate successfully for a few years, but then the original reasons for formation of the group seem less pressing to the majority of members, key individuals (possibly including government staff) run out of steam or move away, meetings become less frequent, membership declines, and new blood and new ideas fail to emerge. Such
Landcare groups may go into recess or disband, or perhaps change direction as issues of concern or personnel change.

As with most areas of human activity, there is a range of performance, and some groups are more effective than others. We are starting to get a handle on what factors influence the effectiveness of Landcare groups. This is the first step in determining the most effective ways to support them.

**WHAT MAKES AN EFFECTIVE LANDCARE GROUP?**

Years of documented extension experience and the rapidly-growing body of practical knowledge emerging from the Landcare movement have crystallised some general characteristics which are common to effective Landcare groups, and conversely some problems common to struggling groups.

Briefly, we know that effective groups:

- have a clearly defined and understood problem or goals, shared throughout the group;
- have good leaders, with vision, who delegate, share responsibilities and workload, involve members in planning, making decisions and activities;
- know where they are going and have a clear, achievable plan of how to get there;
- enjoy constructive relationships with land conservation agencies;
- tap local resources first, before seeking state or national government grants;
- have interesting meetings with a clear purpose;
- provide satisfaction, fun and fulfilment to group members;
- involve women, and not just as secretaries and tea makers; and are generally seen to be accessible by a wide range of people within the community;
- get practical things done locally;
- have credibility in their local community, reinforced by a group identity and recognition of members;
- have appropriate boundaries for the physical and social landscape and a sense of territoriality, of identification with their group area.

Anna Carr from the Centre for Resource and Environmental Studies at the Australian National University in Canberra, has been looking in depth at Landcare groups in several states, as part of her
research towards a PhD. She has developed a checklist of positive factors in group dynamics (see Table 3.1) at each stage in a simple chronology of Landcare group development which she defines as 'before' (the early stages of group formation), 'during' (the peak period of group activities) and 'after' (the conclusion of the main phase or the transition to a new phase of activity or new membership). Together with the above characteristics, this list is useful for people in Landcare groups and people working with Landcare groups as a rough guide to progress and effectiveness in group process and for initial troubleshooting if and when problems emerge.

Table 3.1  Positive dynamics of group process

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<td>• Self-reliance</td>
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<td>• Networks</td>
<td>• avoiding burn-out</td>
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<td>• Motivation enlightened self-interest</td>
<td>• Action focus</td>
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<td>• Team building</td>
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<td>expression of problems</td>
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<td>• Finding resources</td>
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<td>• Shared vision, common</td>
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<td>• Belonging and cohesion</td>
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<td>• Participative planning</td>
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While each of the characteristics of successful groups can be reversed to generate a list of negative characteristics, ineffective Landcare groups usually have some combination of the following factors working against them. These groups may:

- be too big, or have boundaries which don’t reflect social groupings;
- have not defined their problem, or members don’t have a common understanding of it;
- have formed for the wrong reasons—as a Trojan horse for an adviser, to get a grant, to form a bridgehead against the greenies, to be seen to be doing something;
- be paralysed by the enormity of problems and feel solutions are out of their hands;
- lack leadership, lack sufficient committed people, or lack access to responsive technical, financial or administrative support;
- leave all the work to a few, or be dominated by the personal agenda of one or two individuals;
- lack clear goals or an achievable plan of attack;
- be ‘clubbish’, in that membership is perceived to be by invitation only, or confined to a particular group within the community—eg, men only, or established farmers only;
- be inactive, apart from regular tediously boring meetings run according to formal meeting procedure, in cold halls, with officials up front and everybody else facing them like schoolkids, at night when everyone is tired, when most time is spent dealing with correspondence and the minutes of the last meeting, and the only useful interaction occurs over a cup of tea afterwards.\(^{71}\)

The ‘wrong’ reason for group formation need not be a constraint, providing some of the other characteristics of effective groups are present. Some of the most successful groups have formed for dubious reasons, or in response to external stimuli. In some cases the external influence has been an enthusiastic extension agent, in others it has been the threat of regulation or the promise of funding. These external catalysts for group formation have not prevented some groups from subsequently developing autonomy and self-reliance. On the other hand, many groups which have relied on external support from their beginning often have difficulties weaning themselves from this support and, in the absence of external resources, have tended to be ineffective.

Much of the Landcare Program seems at first glance to be disjointed and informal, but this is not to say that it is inefficient or
ineffective. As the environment movement matures, it is becoming clear that problems and approaches are highly localised and flexibility is essential. The impacts of landcare groups are summarised and their role in Australia's overall quest for more sustainable systems of land use and management are discussed in more depth in Chapters 8 and 9. But first and more important, let us look at the activities of some real Landcare groups.
There are about two thousand Landcare groups in Australia, so a handful of case studies can never represent the full range of Landcare groups in all the major land use/land type zones. We have tried to select a few groups which illustrate the diversity, enthusiasm, vigour and commitment characteristic of Landcare. We have not focused entirely on the most highly publicised groups and award winners, which means that many groups which have achieved a great deal and which deserve acclaim are not featured. For each group featured here we could have selected dozens more with an equally interesting and impressive story. Furthermore, among the case studies there is a preponderance of Western Australian and Victorian examples. This is a conscious reflection of the longer history of voluntary land conservation groups in those two states. We are also keen to illustrate the degree of diversity in the Landcare movement within biophysical and political/administrative environments, as well as between groups from quite different places.

**CASE STUDY**

**KALANNIE–GOODLANDS**

If you stand in Perth with your back to the Indian Ocean and head east, you quickly cross the coastal sandplain, then climb through the Jarrah forests of the Darling Scarp and into the wheatbelt, an area as big as England and Scotland combined.
As mentioned earlier, the Western Australian wheatbelt is one of the areas where the impact of European farming systems has been most damaging to natural ecosystems, so it is appropriate to look at what groups can achieve in such a challenging context. The Kalannie-Goodlands Land Conservation District Committee was recognised in the National Landcare Awards in 1992 and they are a fine example of a high-achieving group. But before we focus on the group, let us review the physical background against which their story is being played out.

The Western Australian wheatbelt lies over the Precambrian (ie older than 2500 million years) granites and gneisses of the Yilgarn Block. The landscape is consequently mature—gently rolling slopes with little relief between the valley floors and the divides between major drainage lines. Most soils have formed from the weathering products of deep lateritic soil profiles developed during a wetter climatic period ten to forty million years ago. Dissection of this lateritic surface and subsequent redistribution by wind and water has resulted in the mosaic of sandplain, sandy loams and gravelly sands present today.72 The climate is Mediterranean, with an average of 350 mm of rain annually, about three-quarters of which falls between April and September.73 Decaying tropical low pressure systems from the north often pass over the region from February to May, bringing high winds and occasional storms of high rainfall intensity at the time of least vegetative cover, under conventional crop and pasture systems.

Questions of sustainability

The wheatbelt of south-west Western Australia is one of the last areas of Australia to be ‘developed’ by modern agriculture, although it supported mobile Aboriginal communities for at least 40 000 years prior to European settlement. Eighty per cent of the region’s nineteen million hectares have been cleared of their original vegetation for agriculture, most of it since the Second World War.74 European settlement has seen the almost complete displacement of an extraordinary diversity of unique flora and fauna, with monocultures of wheat, lupins and annual pastures grazed by sheep, transforming the landscape from a mosaic of woodlands, mallee and heath.
communities to a vast riverine plain dominated by annual grasses and herbs.\textsuperscript{75} This impact is even more startling when the brevity of European settlement in Australia in ecological terms is considered.

The wheatbelt of Western Australia has the highest number of rare and endangered plants in the world and, of 46 species of native mammals, thirteen are no longer found in the region and only twelve are common.\textsuperscript{76} Of 192 species of birds, 50 per cent have decreased in abundance and three have disappeared. The Western Australian Department of Agriculture in 1991 estimated that subsoil compaction affects 54 per cent of the cleared land in the wheatbelt, with an annual cost of $153 million in production losses alone; water repellence affects 32 per cent of cleared land ($150 million pa); salinity affects three per cent of cleared land ($105 million pa); soil structure decline affects 22 per cent of cleared land ($70 million pa); and waterlogging of crops and pastures affects eleven per cent of cleared land ($90 million pa). Erosion and acidification problems are relatively minor by comparison, bringing the total annual cost to $615 million, or seventeen per cent of the Gross Value of Agricultural Production for 1988–89.

The vast majority of wheat and wool produced in the region is exported, making the regional economy extremely sensitive to world commodity prices and the trade policies of other countries. Declining terms of trade have seen the number of farms decline from 12,000 down to 10,000 between 1980 and 1990.\textsuperscript{77} Given the overwhelming reliance of the region on wheat and wool, it is likely that the social impacts of rural decline discussed in Chapter 2 are being felt more keenly in this region than most.

The following box draws on material provided by Ted Lefroy, after a fascinating workshop organised by CSIRO and hosted by the Tammin Landcare Centre (in particular the indefatigable Jos Chatfield), which brought together ecologists from all over the world to look at the wheatbelt as an example of a severely disturbed ecosystem, and to examine the potential to restore ecological integrity to such a landscape. A feature of this workshop was that it enabled the ecologists to mix with farmers from local Landcare groups, touring the area around Tammin together, with each group learning from the insights and experience of the other.
**Can agriculture pay?**

It's simply unrealistic to expect agriculture to pay for the restoration of the landscape. What you need here is a quick burst of mountain building. Nothing short of that is going to be of much help. But seriously, the very age of this landscape, its low relief and infertile soils, suggest to me that the problems of land degradation you are facing in the wheatbelt cannot simply be overcome through improved farming methods.

That was the opinion of British scientist Gary Fry, one of 35 ecologists from around the world who met in the wheatbelt town of Tammin in Western Australia in September 1991, hosted by local landcare groups and the CSIRO, to discuss the restoration of fragmented ecosystems. Among them was the well known American ecologist Paul Erhlich from Stanford University.

By the term ‘restoration’, the group did not mean a return of the original condition prior to agriculture. Instead, their aim is restoration of basic ecosystem functions such as water and nutrient cycling that have commonly been disrupted through the practice of agriculture, and preservation of as much of the native biota as possible.

The sentiments expressed by Gary Fry were echoed by many of the ecologists present, who have lived in and studied ecosystems in areas as diverse as southern USA, Canada, Scandinavia, Great Britain and Australia.

On returning to his home in Florida, Dan Simberloff wrote to the organiser, Denis Saunders from CSIRO Division of Wildlife and Ecology in Perth: 'I learned a great deal during that week, and the work we saw on the field trip being carried out by local farmers was truly inspiring ... The meeting itself was very interesting, if depressing, because it was largely about how to restore a landscape that I believe can't be restored ... it's all so sad.'

Such pessimism may seem surprising from people who had spent only five days in the region. To see and hear their reactions was certainly a sobering experience for those who work there. On reflection, however, that short sharp exposure to a foreign environment probably helped to throw the facts into stark relief: the scale of land deg-
radation, the continuing high level of extinctions of plants and animals, and the declining fortunes of agriculture. Without massive investment from outside the region in revegetation and in the development of new forms of land management, perhaps their pessimism is justified.

On a positive note, it was apparent by the end of the week that, despite their diverse backgrounds, this group was able to derive some basic principles of ecosystem restoration. These principles are contained in the proceedings of that week’s discussions at Tammin, published as the book *Nature Conservation 3: Restoration of Fragmented Ecosystems, Global and Regional Perspectives*, edited by Denis Saunders, Richard Hobbs and Paul Ehrlich, and published by Surrey Beatty and Sons, Chipping Norton, New South Wales.

This workshop was a great example of the possibilities for two-way learning between farmers and scientists which are being experienced by numerous Landcare groups. Farmers from Landcare groups around Tammin were able to challenge the expertise and insights of international ecologists, and to see their own landscape from a new perspective. The scientists were confronted with the realities of trying to make a living from such a landscape, with some of the human dimensions of degrading and degraded ecosystems, and with the inspiring commitment and practical nous of farmers battling against seemingly overwhelming odds.

**Enter a dynamic Landcare group**

The change to group operation under the Landcare banner coincided with a few wet years in our district, and we could see patches that were going to salt which never had before. Because the community was more aware of the environment we started to address these issues. For example, 30 years ago everyone was burning their stubble. I did too, but only lightly, leaving plenty of stubble. For this I was criticised for badly managing
the land. Now, we almost become offended when a neighbour burns the stubble. Now, when people visit properties they are not only shown the areas that the owner is proud of, but also the areas in need of attention. And usually with the proviso of ‘What do you think about the salt patch down there?’

With those words, Don Stanley, a tall, rangy character, trained as a forester, who now farms a large cereal and wool growing enterprise near Kalannie, sums up the circumstances stimulating and supporting the Kalannie–Goodlands Land Conservation District Committee. Don was instrumental in the formation and subsequent direction of this successful LCDC and remains its President.

Kalannie–Goodlands is about four hours drive north-east of Perth. The LCDC was formed in 1988 out of a collective concern about waterlogging, erosion, salinity and surface run-off. Roughly 100 farmers are involved covering 300 000 hectares of gently undulating land with broad flat valleys, receiving 300 to 350 mm annual rainfall. About ten per cent (30 000 hectares) of the LCD is affected by obvious land degradation—salt, waterlogging, wind and water erosion and soil structure decline. Several ancient drainage lines which are now salt lakes occur in the area. Grain is the main produce. The group is conscious that a far greater area could become degraded in the foreseeable future unless farming systems are changed.

The LCD incorporates seven sub-catchment groups. The farmers decided to approach their problems collectively to obtain the benefits of scale, to simplify group administration and to enable more effective field days, seminars and projects, with the ultimate aim of accelerating the adoption of better farming practices.

The major project of the Kalannie group has been to prepare a plan for their whole district which ensures that individual farmers’ actions make sense when considered at the catchment level. The first steps have been to identify and quantify the major land management problems. The planning process has been supported by the National Landcare Program and will total $100 000 by the time it is completed. To match this input by the commonwealth, the Kalannie–Goodlands LCD devised a conservation rating system for all landholders in the LCD, using a mechanism established in
the Soil and Land Conservation Act of Western Australia. Over $100 000 is being raised over three years which can be used in the production of the catchment and farm plans, and in attracting other sponsorship for landcare projects. In other words, local dollars are matching government dollars. Because of the urgency to complete the plans, the conservation levy was unanimously supported by the LCD members and was introduced by the Dalwallinu Shire Council in accordance with the Soil and Land Conservation Act and the approval of the Minister for Agriculture.

According to Don Stanley:

> I could see that if we wanted to attract funds to do the landcare projects then we would need to have a secure income of our own. The conservation rating system allows everyone to participate, whether they are keen on landcare or not, and provides a legal obligation to pay the rate. If a person does not pay, the amount is deducted from the price when the land is next offered for sale.

The Kalannie–Goodlands land conservation levy is the first of its type in Australia, and it sets an extremely significant precedent for Landcare group funding in all states. It amounts to only 10.3 cents per hectare per year, and is based on the unimproved capital value of the land, as are shire rates.

The approach to farm and catchment planning which Kalannie–Goodlands is developing is discussed in more depth in Chapter 6, in a box in which Viv Read describes the subtleties and impacts of the type of planning in which the group is engaged. Viv Read is a land management consultant employed by the LCD to oversee and coordinate the catchment planning project. Viv and Noel Dodd, a trained Community Landcare Technician (see Chapter 5), provide the technical expertise and support to help farmers design and implement their own land management plans. The group started by buying aerial photographs (at a scale of 1:25 000) and doing a reconnaissance survey of their district. Ninety-eight per cent of the local land users bought an aerial photograph, at a total cost of around $20 000. Details of the natural landscape, agricultural systems, land units and existing and potential land management problems were mapped and prioritised for planning. Sites were identified and representa-
tive soil cores were taken to allow the formal description of the soils. After these surveys, three workshops were held covering:

- identification of land units and their significance in the landscape;
- mapping land management hazards;
- developing sustainable agricultural systems for each property and sub-catchment.

Don Stanley comments:

*The workshops were organised so as not to put pressure on anyone ... but to use the time to get to know each other better and to have a broad overview of the group area. We cut up aerial photos and joined them together to form a complete picture. Then people had to prioritise their ‘worries’ and sort out what could be done to improve the situation. As a result of the workshops, farmers, particularly the young ones, are now more interested in the causes and cures of land degradation.*

In addition to these group workshops, sixteen farmers are participating in a CSIRO research project evaluating the use of remote sensing, in this case satellite imagery, for assessing and monitoring land condition, and for use in land management planning. Twenty-eight group members participated in one of the two-day ‘Know Your Soils’ courses which have been presented by the Agriculture School at the University of Western Australia for several years and which are very popular with farmers. The group also initiated and hosted a media management seminar conducted by the Rural Department of the Australian Broadcasting Corporation (ABC) for Landcare groups. Education and local ownership of information is a key priority of the Kalannie–Goodlands LCDC. They use this information in very direct ways, not just in their own backyard. The group prepared two submissions to the WA State Parliamentary Select Committee on Land Conservation, culminating in a visit from the committee to the group in June 1990.

Recognising the demands which producing 100 farm plans and a catchment plan would create for data gathering, analy-
sis and mapping, the Reynolds family purchased a Geographic Information System, and a new local business was created. Simon Reynolds has used this system to digitise the farm plans of 40 of the members so far, so the group has made a significant contribution to his business. This benefit works both ways, as the LCD now has access to specialised services related to the overall planning process, and independence in its management of information—a critical point emphasised by Viv Read.

Kalannie—Goodlands is not just involved in planning. They also have some more immediate and tangible runs on the board—for example, the investigation and demonstration of salinity control options. Several hillside seepage sites were chosen, a variety of tree species were planted on the seepage sites and the watertable monitored. Thirty-six thousand trees were planted in 1991 at 40 seepage sites, and by the end of 1992 the tree program had trebled. The trees are effectively intercepting water which would otherwise be contributing to the loss of productive land.\(^7\)

The group has been entrepreneurial in purchasing a tree planter. To match the $7500 grant from the State Landcare Program, the LCD sold shares at $100 each. The shares entitle the owner to one half day use of the planter per year for four years. Over 85 000 trees have been planted using this machine, on the way to a target of 160 000 trees by June 1993. Most of the trees are produced by local farmers, Angela and Max Waters, from locally collected seed.

**Group management**

Communication between members has been a major concern of the group. Although the committee consists of seventeen farmers and meets bi-monthly, a part-time coordinator keeps members up-to-date on group activities. This is done through phone calls, meetings, and a regular newsletter. Each sub-catchment is represented on the general committee. In June 1992, an executive committee of five members was set up to ease the pressure on the secretary/coordinator and to deal with the huge volume of information that was being produced monthly. The group has also developed a cabinet portfolio system, with individuals responsible for group activities and projects dealing with areas of interest such as tree planting;
the production of a newsletter; water harvesting; organising field days and so on. As yet, women are not heavily involved in the organisation and management of the group, although Deloraine Anderson played a key role as a paid secretary in the early years of the LCDC.

One of the strengths of the Kalannie–Goodlands system of committee and coordinator has been the delegation of responsibility based on individual strengths, knowledge and experience. Other factors are:

- meetings last only three hours, as part of the working day—between 3 pm and 6 pm;
- formality is used in controversial situations with a majority agreement required for decisions;
- the group is and has always been on good terms with the local shires, the Department of Agriculture and research institutions;
- the group recognises that it is evolving and does not become fazed at adopting new processes.

According to Don Stanley:

> We have been able to achieve a lot in a short time and have spread the load, which also protects the group against grinding to a halt if a key member is unavailable. The biggest challenge is to ensure that farm plans are not put in the bottom drawer and forgotten about. This is being achieved by the permanent marking out of engineering works on the ground with a grader blade after the farm plan has been compiled. Another challenge is to have people want to use a farming systems approach in conjunction with the engineering component to achieve sustainable agriculture. Before I die, I would like to see substantial parts of the area changed from enormous sweeps of bare country to multiple rows of trees meandering in a systematic way throughout the landscape and achieving all the goals that we have set out: lowering the ground water tables; preventing water tables from rising; providing for wildlife; each farm using a systems approach; control of salinity, wind and water erosion.
In order to finance all the work required, Don Stanley is advocating tax deductibility of 150–200 per cent on approved landcare work; ‘The cost is then shared equally across the nation’ to encourage farmers to allocate funds to land conservation, especially in good years. Overall Don feels that the greatest thing that has happened since becoming involved in Landcare is the changes in attitudes that have occurred in all age groups, owing to the participation of all the landowners in the group and increasing awareness of the need to change.

The group has been very active in the early stages with planning and carrying out works, but attendance at recent group events has dropped off a little, although a recent field day on implementing farm plans attracted 97 people. Maintaining a high level of group momentum and activity over more than five years is extremely challenging, particularly in periods of financial crisis. The Kalannie–Goodlands group is a great example of a group which has taken a very thorough and systematic approach to working out a coordinated approach to achieving more sustainable farming systems in their district. But when they had substantially completed the first phase of their catchment planning process, they came to the sobering realisation that implementing the plans required works costing well over $1 million, hard cash which is simply not available in most farming communities in the 1990s.

As we discuss later, the risk of burnout among the leading members of Landcare groups in Australia is quite high, and human resources are spread so thinly in the bush that worn out, disillusioned people are well nigh impossible to replace. We are still coming to grips with the management issues involved in sustaining Landcare groups, as they work to sustain the land.

This is an issue that Australian society can ill afford to dodge. It is not good enough to simply hand over responsibility for land conservation from government to groups of farm families, in effect saying, ‘It’s your problem, you fix it’. Many land degradation problems were caused by farmers carrying out government policy or working to regulations within legislative frameworks set by government. The benefits of agricultural production and export earnings have flowed throughout society, but the full environmental and social costs are not reflected in the prices paid for agricultural produce. It is simply inequitable to expect the current generation of farmers to foot the bill. We need more sophisticated ways of accounting for
public and private benefits and costs, so that we can develop responses which more accurately reflect the value to society of having a rural sector which is ecologically sustainable, socially just and economically viable. Leaving the future of rural Australia to the unfettered whims of markets which are anything but ‘free’ is in effect making a conscious decision that natural resources and rural communities are expendable.

CASE STUDY

Gunnedah

Landcare got off to a late start in New South Wales, but the recent growth in the number of groups has been explosive, reaching 500 groups in late 1993. The groups which have developed on the rich, rolling, red and black basalt country on the western slopes of the Great Dividing Range west of Gunnedah in northern New South Wales, typify the spread of Landcare in this state. Rather than focusing on one group, we will touch briefly on a few groups and initiatives which represent a slice of the Landcare action in the region.

New South Wales has developed a strategic umbrella of Total Catchment Management (TCM), which is aimed at better coordination of the activities of government agencies, development of TCM strategies for each of the six major catchments in New South Wales, consideration of TCM in all environmental planning processes and fostering the involvement of communities and individuals. Each catchment is overseen by a TCM Committee, consisting of landholders, community representatives, and representatives of local and state government agencies, which are responsible for developing TCM strategies that will influence the activities of, and the resources available to, Landcare groups throughout New South Wales over the next decade.

Sheila Donaldson, from Mary’s Mount, twenty kilometres west of Gunnedah, was appointed to the North-western Catchment Management Committee in 1989. Sheila grew up on a farm near Moree and studied Rural Science at the University of New England before working on soils research at the Gunnedah Research Centre of the Soil Conservation
Service. She and her husband Ken run cattle and cashmere goats and grow wheat, sorghum, lots of trees and saltbush on their Mary’s Mount property. Sheila and Ken won the NSW Farmers’ Association Farmer of the Year Award in 1990. After her first TCM meeting, at which she was exposed to the concept of TCM committees being an umbrella for coordinating the activities of community-based local Landcare groups, Sheila was enthusiastic about the formation of a Landcare group in her district.

The farmers at Mary’s Mount, besides working together in Bush Fire Brigades over many years, had already united in a common cause when a coal mine started tunneling close to their properties in the 1980s. Sheila, Ken and Chris Frend invited farmers within the Mary’s Mount catchment to an initial meeting to discuss the possibility of forming a Landcare group. As is common on such occasions, the prime movers got landed with the main jobs, Chris Frend being elected Chairman and Ken Donaldson secretary. Chris Frend is a third generation farmer at Wahroonga, Mary’s Mount, who runs sheep and cattle and grows wheat, sorghum and sunflowers. There are 35 members of the Mary’s Mount group, managing 17,000 hectares of highly productive basalt country.

As with many areas along the western edge of the Great Divide, revegetation has become a major concern of the current land users. About 80 per cent of the native vegetation has been cleared from the area over the last hundred years, increasing the potential for salting on the plains, particularly as agricultural land use has shifted over the years from an emphasis on grazing perennial pastures to cropping. Cropping, with its reliance on annuals and a consequent reduction in plant water use, tends to increase accessions of rainfall through to the groundwater, thus raising watertable levels.

The Mary’s Mount group had an initial focus on tree planting. It received National Landcare Program funding for a mechanical tree planter with a direct seeding attachment, and has been involved in direct seeding trials for three years in an effort to reduce the cost of revegetation. The group also ran a series of property planning workshops to assist members to develop plans which make sense in aggregate at the catchment scale, as well as meeting the immediate goals of individual farmers.

Dryland salinity proved to be more of a problem than was
first appreciated. Tony Preston and other group members are assessing the extent of salinity in the catchment with an electromagnetic induction meter (EM31) mounted on a four-wheel motorbike. This survey will reveal a picture of existing and potential salting ‘hotspots’. According to Tony, who moved into the area only in 1991, ‘I bought a problem and landcare is a vehicle to attack it’. New owners are often able to look at their land with a more open mind than people who have lived and worked on the same land all their lives, particularly when it comes to considering insidious problems such as salinity which tend to creep up slowly and subtly. The group has also installed a network of piezometers which they monitor every month to build up a database of groundwater levels and water quality information.

Partly in response to this information, there has been a swing back away from cash cropping towards more perennial pasture, which now occupies about 40 to 50 per cent of the catchment, the remainder being sown mainly to wheat and sorghum.

As the knowledge of the group develops, their concerns are likely to broaden, according to Chris Frend: ‘Having a land degradation issue that affects everyone provides a catalyst to form a group. Then as time passes and the group matures, it starts to broaden its horizons and look to other issues such as marketing.’ Since 1992, many more Landcare groups have formed on the Liverpool Plains, and Mary’s Mount is now only one of 23 groups in the larger Liverpool Plains catchment. These groups have since formed the Liverpool Plains Land Management Committee, of which Chris Frend is Deputy Chairman, to ‘scale up’ to consider issues at a regional level which are too big for a single Landcare group to take on. The Mary’s Mount group is also linked to 49 other Landcare groups and various sources of technical information around Australia through LandcareNet (see box in Chapter 6).

In the same district as the Mary’s Mount group, Australia’s first ‘Bearcare’ group is in action. The group aims to protect and enhance koala habitat, while at the same time working to prevent further increases in salinity. The Gunnedah koala population is the largest in New South Wales west of the Great Dividing Range. Although the natural vegetation still clings to the basalt-capped sandstone rises, there are no permanent reserves set aside solely for nature conservation in the area.
The ‘Bearcare’ group involves representatives from local government, local coal mines, schools, townspeople, farmers and state government agencies. Its aim is to link the establishment of new koala habitat (and protection and enhancement of remnant vegetation), with replanting of trees and shrubs to assist in restoring a hydrological balance. A joint project between the NSW National Parks and Wildlife Service and the Department of Conservation and Land Management (funded by a national Save the Bush grant) has been conducted with the support of the Bearcare group.

Schools were visited, mail surveys carried out and on-ground investigations pursued to identify koala habitat and potential ‘koala corridors’ which could double as revegetation areas to increase plant water use. The coal mining companies were keen to contribute, as a significant part of their mining areas contain significant remnant vegetation. The sixteen landcare groups on the Liverpool Plains are developing catchment plans which include provision of koala habitat as an aim. Primary schools, encouraged by National Parks ranger Martin Smith, have raised up to $500 to buy seedlings of koala food trees which they plant with landcare groups to link riparian vegetation used by koalas.

According to Chris Frend, ‘The koalas helped unite the whole community to work together ... The response to the survey was astounding, as is the work resulting from it. Without Martin Smith’s enthusiasm with the school children the momentum would not really have got going.’

The group has produced a resource plan of the area which can be used by community groups and land users, including government agencies, to integrate nature conservation with other aspects of resource management—for example, by including koala habitat species in shelterbelts, woodlots and minesite rehabilitation plantings, advising which trees should be established in which places and noting where corridors of koala habitat would be most effective. The plan is accompanied by a report which recommends the setting aside of timbered areas critical to the survival of the koala, incentives for farmers to set aside areas on their own properties, rezoning of important koala habitats for environmental protection by the Gunnedah Shire Council and roadside warning signs to help motorists prevent road kills.

The Department of Conservation and Land Management’s
Senior Landcare Specialist, Stuart Bray, reckons the Bearcare project is 'truly a whole community response to major issues of concern with several landcare groups cooperating to protect koalas and fight land degradation.'

**CASE STUDY**

**MEMANA**

Flinders Island is a cool, green, secluded haven in the wild waters of Bass Strait off the north-east coast of Tasmania. The climate and landscape are more like England than the Western Australian wheatbelt, with an average rainfall of about 800 millimetres. Flinders Island is a great place for escaping from the hassles of modern life, growing wool or fishing—or any combination of these.

The major agricultural development on Flinders Island occurred in the 1950s, when many soldier settlement blocks were released. This development involved major clearing and drainage works to promote grazing. The Memana Landcare group was formed in 1990, originally to deal with the devastation caused to pastures by cockchafer grubs. The group has evolved to deal with four issues—cockchafers, Ryegrass, drainage and trees.

Cockchafers cause immense problems, lowering pasture production and thus sheep carrying capacity, wool production and consequently profitability. The cockchafers sub-group, initiated by long-term resident Dennis Cooper, has been experimenting with various methods of control over the last two years. According to Dennis: 'all the people working on the chafers are really committed to finding out how to beat them. We meet in each other’s homes to talk over strategies around the kitchen table.'

Traditional cockchafer control involved using chemicals such as Lindane, an organochlorine pesticide, to kill the grubs (and other organisms) in the soil. Concern over pesticide residues in food has meant that organochlorine pasture sprays, including Lindane, have been banned. There is a general move towards more biological control of insect pests in Australian agriculture, usually within the context of an integrated pest management strategy. The Memana group has
switched its energies into attracting the female moths to lights during summer, and trapping them in tubs placed below the lights. A system of three 240 volt lights and three 12 volt lights was devised by scientists from the Tasmanian Department of Primary Industries and the CSIRO Division of Entomology. Six sites on five farms have been actively testing the technique. After each season the technique is refined and neighbours are constantly discussing how to improve ‘the catch’.

Dennis comments:

It is very specific. We have to catch the female moths before they lay their eggs, virtually over a two-to-five day period. It wasn’t as simple as that! The first breakthrough came when we discovered that the scarabs that were swarming around the house and getting into the blankets (nectar scarabs) were not the ones causing the pasture damage (pasture scarabs). We accidentally discovered the light attracting technique by observing how these moths were attracted to lights placed around several water tanks. The moths would fly around the lights and then suddenly fall into the water. So we experimented with different frequencies and types and found that ultra-violet is the best. Also white coloured tubs, usually 44 gallon drums, work really well with a bit of diesel or kerosene covering the water surface so that the moths cannot take off again. Now we have developed a portable, solar-powered UV 8 watt, 12 volt system which is just as effective as the 240 volt mercury vapour light system. It attracts enough moths to achieve 95 per cent control of the cockchafers. We have tried to set up the systems so that no-one has to put his/her hand in their pocket, but it does cost time and a few local inputs like batteries, 44 gallon drums, fly screens, etc.

When most of the Flinders Island blocks were settled, low lying areas were mostly swamps. Major drains and feeder drains were dug to get these areas into production, drains which need regular maintenance to remain effective. But with the low profitability in farming now, it is more economical to concentrate on small surface drains just to remove surface water.
Erosion in the Victoria River District (NT).
Sheep stations north of Carnarvon (WA).

Left: A farm of yesteryear, York (WA).

Opposite page: Rolling wool and beef country in south-west Victoria.
Gordon Ford from Hughenden Station demonstrating to other members of the Hughenden Land Care Committee in central Queensland the benefits of deep ripping to enable water to penetrate compacted soil after years of grazing.

Below: A Landcare group and their demonstration site, Denmark (WA).
Group President Norrie McNamara notes:

*To locate where to build these drains we just look at the area in winter and notice where the water lies. Using basic surveying techniques, drains can be built in spring to drain these areas ... With drainage, we have ignored farm boundaries, we have developed a system for the valley.*

Norrie has devised a tractor-mounted ditch digger to dig the shallow drains which are so effective on the island. About twenty kilometres of these simple drains have been constructed so far to alleviate waterlogging and salinity.

Members of the group are planting trees to re-establish shelter, provide wildlife habitat and prevent erosion. Locally collected seed is trialed using direct seeding or planting seedlings grown from locally collected seed. It is an activity which all the family can share and enjoy, even when it is raining—not uncommon on Flinders. According to Memana group secretary Vic Epstein: ‘We are trying various land preparation methods for establishing trees from seed, including banking up soil for drainage, herbicide sprays to remove grass competition, mouldboard ploughing and scalping the topsoil.’

When we visited Memana just before summer, Vic and six adults and fifteen kids were potting up the remainder of the seedlings, in the rain, so that they could be planted next autumn. The shadehouse was chock-a-block with repotted plants and little helpers with watering cans ‘looking after’ them. Memana is a group with 35–40 members and participation is obviously enthusiastic.

‘The group has trialed direct seeding, both by hand and using the Weatherly Ecoseeder. Now the group mostly plants open-rooted seedlings. As well as establishing trees and shrubs, many stands of remnant vegetation on members’ properties have been fenced with conventional or electric fences. Vic again:

*Like everywhere else, fencing is expensive. But on Flinders it is worse because of the added freight from either Melbourne or Tasmania. We are persisting with local species because we know they are adapted to the conditions here and will not keel over after ten or*
twenty years, which happens on the mainland when they plant species from the west in the east and vice-versa.

The activities and interest stimulated by the Memana group have encouraged two other new Landcare groups to form on the island, each operating according to their own priorities in their own situation. Although isolated, the Memana group has attracted assistance from CSIRO, local and state forestry agencies, Landcare organisations and funding from the National Landcare Program.

Retiring Memana group secretary Wendy Bowman, an ex-school teacher posted to Flinders Island seventeen years ago, now married to grazier and woolclasser Geoff, has been the scribe of the group and has compiled impressive albums of photographs and newspaper articles capturing the achievements of the group. Wendy has some interesting comments on the growth and success of this group:

The whole farm planning course was the best thing I went to. It provided a framework for our work. Both men and women were invited to attend together or separately—and the majority of the group did! Here on Flinders, women are involved a lot in the Landcare group. Because Flinders is a bit isolated, people are very independent and willing to try something different ... We will only know in about 30 years time if we have really been successful. The things we are doing as part of Landcare, we would have done in the long term. Landcare focused us on these issues. The most valuable asset has been the list of phone numbers I have compiled from all the visitors to the island ... from entomologists, foresters, Landcare coordinators and others from Tasmania and elsewhere.

Norrie sums up Landcare on Flinders Island:

I don't know all the details of why Landcare is working in our group. I think it's because we have let people pursue their own interests. Everyone has a job and everyone is happy doing it. We don't have many meetings because on Flinders there are far too few
people and you just get the same ones coming along. We only have meetings when it's needed. Someone feels that something needs to be done, they ring around, have a meeting, approve a strategy, and it gets done.

It's costly to live on our isolated island. But because we are shut off, we do a lot of reading, we are innovative and eager for information and always asking questions. There is a lot of action in our small community. The best thing we did was the group whole farm plan. I wish we'd done it earlier. It makes people more aware and that keeps the impetus going in the group. We have got all the maps and air photos and have a forward plan for the whole district, not just property by property.

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**CASE STUDY**

**TRAGOWEL PLAINS**

Over the longer time frames of geology or ecological succession, one could anticipate that Australian landscapes will eventually reach some form of dynamic equilibrium in response to the changes induced since European settlement, just as they did with the firestick farming and hunting of the Aborigines. In most regions, however, such equilibria are a long way off and we are only beginning to appreciate the impact and the ecological ramifications of European settlement, whether clearing, irrigation and cultivation or the introduction of exotic plants and animals. But there are some regions where land degradation became apparent long ago, and where communities have been responding to the direct impacts of land degradation on their livelihoods for several generations. It is instructive to look at Landcare in such a context.

Tragowel Plains, on the lower reaches of the Loddon River before its junction with the Murray River in north central Victoria, is one such example. The story of the Tragowel Plains is well summarised in an aptly titled chapter, 'Historic Misjudgments', in Neil Barr and John Cary's book *Greening a Brown Land*. Any story of the Tragowel Plains is bound to start with the classic quote from Major Thomas Mitchell, when in 1836
he stood on the granite outcrop which he named Pyramid Hill, and surveyed the flat plain which extended as far as he could see in all directions:

... the view was exceedingly beautiful over the surrounding plains, shining fresh and green in the light of a fine morning. The scene was different from anything I had ever before witnessed, either in New South Wales or elsewhere. A land so inviting, and still without inhabitants! As I stood, the first European intruder on the sublime solitude of these verdant plains, as yet untouched by flocks or herds, I felt conscious of being the harbinger of mighty changes; and that our steps would soon be followed by the men and the animals for which it seemed to have been prepared ... this seemed to me a country where canals could answer the better distribution of water over the fertile plains. 

Barr and Cary note that the Major saw the land in full bloom in a good season, but the drovers who followed in the 1840s soon appreciated the more sobering realities of long dry summers and a lack of permanent water, punctuated by flooding in wet winters. As for the land's potential for irrigation which so tempted Mitchell: the fact that the natural vegetation in the region until the 1860s was salt-tolerant pigface and saltbush (*Dysphyma* spp and *Atriplex* spp) indicated a high level of natural salinity in the soil profile; the natural floodplain with its extreme flatness made drainage difficult and rising watertables potentially more damaging. These characteristics might have deterred experienced irrigators. But, as in so many other instances, the physical characteristics of the landscape were to be a minor consideration in the development of the region compared with the demands of local settlers for assistance to safeguard their livelihoods, the political attractiveness of water supply development, the national inclination to 'develop' land and the drive of agricultural science to improve production. And of course hindsight provides a privileged vantage. Barr and Cary trace the succession from the squatters of the mid-1800s to the selectors in the closer settlement schemes of the 1870s whose wheat crops had exhausted soil nitrogen by 1880, then to the emergence of
waterworks trusts in the early 1900s and the jerky evolution of irrigation infrastructure and irrigation practices which has occurred since. 84

Before irrigation, the watertable was eight to ten metres below the soil surface, by 1900 it was only two to three metres down, by the 1920s the first salting was visible on the soil surface, by the 1930s salinity was a serious problem across irrigation country of the Tragowel Plains and around Kerang, by the 1960s the last fruit trees disappeared, by 1988 only twelve per cent of the northern third of the Macorna irrigation district could grow white clover (compared with roughly half the land south of Pyramid Hill) and by 1989 one-third of the land could support only the most salt-tolerant plants such as saltbush. 85 Today the area is one of the most salt-affected irrigation districts in Australia. Although it is more than 200 kilometres from the sea, it smells briny, redolent of the salty morass just beneath the soil surface over much of the area.

Ken McDougall is a farmer and founding member of the Tragowel Plains Landcare group, and also Community Salinity Education Officer for the area. The Tragowel Plains group has a gutsy slogan—‘Challenge of the Plains’, reflecting their view that it is not helpful to consider salinity in the district as a ‘problem’, it is more useful to think in terms of a challenge.

The current phase of European settlement of the Tragowel Plains could be summarised as ‘learning to live with salt’. The community, under the aegis of the Victorian Salinity Program, has developed an impressive salinity management plan to help farmers farm in the saline environment. Local farmers have been trained to use EM38 meters (a device more or less like a metal detector which uses the electromagnetic flux of the soil to measure salinity) so that they can map the salinity in their area cheaply. This has several advantages. It enables an appreciation of just how much land is salted, something which neither farmers nor advisers had previously been able to determine reliably from a visual appraisal, and which proved to be significantly underestimated. Salinity was more widespread and serious than previously recognised. On a given farm, it is possible to map the salted land which is uneconomic and the less salty land worth concentrating on, thus highlighting farms which are not viable under current forms of agriculture. The group is involved in an extensive EM38
Landcare mapping program and its members are exploring all sorts of options from brine shrimp and algae farming in evaporation basins to a solar-powered desalination plant.

This exemplifies a striking thing about Landcare—the defiance, optimism even, of people in the face of seemingly impossible odds. The strength of Landcare as a movement is that it gives vent and credence to that inventiveness and resolve. The following words of Ken McDougall highlight this combination of defiance and community spirit, and some of the complexities of tackling salinity in irrigation regions:

*Extension officers from Kerang would come down here, and then after about six months they would throw their hands in the air and withdraw back to Kerang. Then there was a sociological survey done in the area and at the same time we got a community research and demonstration block going with government funding. There were a number of us who had tried to be fairly aggressive when it had come to farming, and in the early 80s we borrowed heavily and started to lay the drains for [water] re-use systems and this sort of thing. It nearly drove us broke doing it. I was one of these people suffering and was particularly annoyed about what was happening. So we started up Tragowel Plains.*

*The sociological survey became a fairly important tool in developing a plan for this area. It showed that between twenty and 40 per cent [of the population] were living below the Henderson Poverty Line. We had to develop a plan which recognised that the farming community didn’t have the ability to pay. So a plan was developed that required farmers’ physical input, but not financial input. The survey also found that the farmers’ income was directly related to the amount of salinity on a farm. We didn’t have a method of measuring it before the EM38 meters. There are 100 000 hectares of irrigated land in the area and we have 60 000 hectares done. It’s done by local people. There are teams of locals, trained to use the meter, paid by the Department of Agriculture.*

*... We have taken all the components of the plan and we are trying to implement them on the research*
and demonstration farm to demonstrate to farmers how they can learn to live with salinity. This is step one. We’ve got to get the community together taking one step. Then, and it’s happening, they are becoming hungry for more information.

Five years ago, if you mentioned evaporation basins, you were canned. Now at the official opening of the evaporation basin we had over a hundred farmers. When I started kicking up a fuss they were saying I was going to degrade land prices by saying we had a salinity problem. With these EM38 maps, farmers are actually sitting down and looking at the earning capacity of their land.

The main gist of it is helping farmers to manage their land in the saline environment. There is definitely still a future for farming. You’ve got to break it down into small community groups like we’ve got, where the community has got ownership, where the community feels they are making the decisions. Farmers don’t mind working, if you can get them motivated.

I’ve learned through bitter experience that you can’t become too emotionally attached to anything, because things change. If you become emotionally attached you can lose so much energy by trying to hang on that, when you do eventually lose it, you feel so dejected and yet you’ve got to get out and keep on living your life. You’ve got to do something about it. Walking away from it is not going to achieve anything.

In the Tragowel Plains things can’t get a lot worse, but there are many areas to the south that can.

There are inherent tensions in this situation between the determination to maintain community viability and as many farms as possible, and the physical and economic reality that many farms are simply not viable with current farming systems. Barr and Cary note that the vision embedded in the community salinity plan sees a patchwork of permanent green pasture (more precisely irrigated with more efficient water use) and greyer dryland saltbush, on a plain much better drained than at present. They contend that, even with this
prognosis, the longer term will see continually rising watertables and salinity levels, and declining profitability, ensuring 'that this land may return to being nearly as empty as when Mitchell saw it ... At best, local landholders can hope their strategies will slow the inevitable.' They go on to caution that every prescription to date for more sustainable farming systems on the Tragowel Plains has proved inadequate, that many of the currently proposed solutions for land degradation are untried or unprofitable, and that it is arrogant of people promoting such solutions with evangelistic fervour to assume that they have the answers.86

The Tragowel Plains case demonstrates the resilience of the fundamental Landcare principles of voluntary and cooperative learning at a community level, showing how environmental issues which ultimately affect everyone may be approached in a constructive atmosphere in which local people seek to develop solutions to their own problems with the endorsement and some financial and technical assistance from government. It casts doubt on the suggestion that Landcare will wither as farm balance sheets turn a deeper shade of red. If anything, Tragowel Plains suggests the opposite. Perhaps the experience of working cooperatively to develop constructive options to tackle a complex environmental challenge will underpin a more overt move into social and economic issues, such as local processing and marketing of products, including the new enterprises based on salt.

**CASE STUDY**

**NERIDUP**

We now travel from Tragowel Plains, a long-settled district where land degradation has been evident for several generations, more than 3000 kilometres west to a pioneering district which was first 'opened up' for farming by Europeans in the 1960s, and which has seen spectacular changes in its landscape over the last 30 years.

The Neridup Landcare group consists of 23 members, covering an area of 45 000 hectares about 40 kilometres east of Esperance on the south coast of Western Australia—at the southern extreme of the wheatbelt. The Neridup group is a
sub-catchment within the Esperance Land Conservation District, which covers roughly two million hectares and 600 farms. It is common in Western Australia for Land Conservation District Committees to have several sub-catchment groups within their district, operating under the umbrella of the LCDC, but focusing on a particular local area, usually a water catchment consisting of between ten and fifty farms.

Water is the real issue for this Landcare group. Farm management in this area means water management, as the topsoils are very sandy and lie on top of impervious clay subsoils. In 1992, just as in 1989, the area received over 600 mm of rain, 50 per cent more than average. In 1989, extensive flooding and waterlogging led to huge losses in production. In a little over three years, many group members had constructed drains (usually less than one metre deep) across their country in a systematic fashion which helped everyone, at a total cost of about $200 000. During the 1992 rains, drainage lines were able to divert water from flooding the most productive areas and transport it safely to the main watercourses. The Neridup group is enthusiastic about the value of farm and catchment planning because the benefits of a coordinated approach across farm boundaries are already obvious.

The group formed in February 1989 after young farmers, Marg and Rob Agnew and Chris Reichstein, started to discuss the amount of salinity showing up on farms in the area. A meeting was arranged in Marg and Rob's home with a guest speaker, a member of the Esperance Land Conservation District Committee (LCDC) who had recently toured Victoria looking at land degradation, salinity and Landcare activities. During the meeting eleven farmers at the top of the catchment agreed to form a group to jointly tackle the problem of salinity. Marg and Rob recount:

*After the floods of '89, the farmers in the southern end of the catchment wanted to join. First, we got all the members together at the top end of the catchment and followed the drainage lines through each farm. Each farmer then knew where the water was coming from and what it was doing to his/her downstream neighbour. Now we have 23 farmers, covering the whole catchment. A lot of us have attended farm planning workshops run by the LCDC and we have all benefited.*
Most of the Neridup area was released by the state for private ownership in the 1960s, and the regulations required applicants to clear the land to obtain ‘Conditional Purchase’ freehold. Consequently the group is essentially made up of ‘pioneering’ farmers, a mixture of old and young, locals and people from other states and from other parts of Western Australia. The Agnews are one family who moved west from the cool and moist orchard districts of Victoria to Esperance in the 1970s. They are energetic and keen to manage the land wisely, to work together with their neighbours in improving the district. In many ways, the communities of the south coast (and other recently cleared areas) are pioneers, conscious that they are still developing a farming system and perhaps more open to new ideas than fourth or fifth generation farmers in south-eastern Australia who have to struggle with the mental straitjacket of ‘the way we’ve always done it’. They also tend to be more used to working together as a community, having had to cooperate to establish the school, the hall, sporting facilities and many other ‘basics’ of rural communities which tend to be taken for granted by subsequent generations.

Some of the original blocks (‘original’ in that they were opened up in 1961) are now being managed by the sons and daughters of the people who cleared the land. Management is slowly changing as people take on a whole-farm and whole-catchment approach to their planning and management. Fortunately, most properties retain patches of the original native species such as banksia, wattle, ti-tree and mallee eucalypts in some paddocks and along the creeklines. However, the ecological integrity of this remnant vegetation has been corrupted by the effects of grazing by sheep and cattle. This practice is changing as the farm planning approach encourages crop production on only the best soils, grazing on the most appropriate areas, and protection and enhancement of native vegetation in order to try to restore a hydrological balance, and to provide shelter, wildlife habitat and landscape improvement.

On one property in the group more than 60,000 trees have been planted with assistance from Greening Australia, in an attempt to lower watertables and to establish agroforestry on 180 hectares. This experience has taught all members of the group the basics of revegetation. Rob Agnew says: ‘One thing we have learned as a group is that with care and hard work on
site preparation for trees and shrubs, you get it all back.' Marg continues, 'It's a crop, so treat it like one and you will get great results'.

One of the first major projects of the group was to establish a demonstration site to show the benefits of tree and shrub planting on a low-lying, waterlogged and salt-affected area of 70 hectares. It also shows the various types of fencing that can be used in tree planting and protecting conservation areas. The various fencing options tested by the group are described in Chapter 6. Marg Agnew describes the establishment of this site:

Mr and Mrs Green have lived in the area for many years. They have worked closely with us in setting aside the area. It was originally a paperbark swamp in three depressions, which had become very degraded, now it is part of a fourteen kilometre drainage line. After consulting with the Department of Agriculture and tree specialists from Conservation and Land Management, we planted 2500 trees, shrubs and grasses (a mix of eucalypts, she-oaks, wattles, Tall Wheat Grass, Puccinellia and saltbush) on the slope to intercept the moisture. We fenced the boundary (two kilometres) during one working bee. Fodder species (eg Acacia saligna) were planted on the perimeter. The wavy leaf and quail saltbush were planted with existing farm machinery. It's not a Department of Agriculture demonstration site, it's our site which is broadacre, practical and using species which are proven for the district.

The demonstration site has had a few setbacks, like a grasshopper plague soon after planting in 1990; the attack of the sawfly larvae and the dying off of some of the saltbush. Landcare groups learn as many lessons from these experiences as from successes. Green's demonstration site is now used by local farmers, other Landcare groups, schools and TAFE (Technical and Further Education for both trades and professions) as a field study site.

Over the last few years, the group and the local community, with technical and financial support from government and industry, have:
• designed a coordinated drainage system (over 40 kilometres of drainage lines have been built);
• used satellite imagery to get an overall perspective of their area;
• installed observation wells (piezometers) to monitor groundwater levels and quality;
• planted hundreds of thousands of trees as well as 270 hectares of tagasaste, 80 hectares of saltbush and 300 hectares of perennial pastures;
• developed agroforestry trials;
• changed farm management techniques—for example by adopting low or minimum tillage practices; fencing salt creeks and remnant vegetation; and farming to soil types and land capability;
• constructed contour banks for control of erosion and waterlogging;
• implemented deep water pumping on some properties;
• conducted trials on strip grazing;
• initiated a schools education program and awareness programs for the wider community.

In all this activity the Neridup Landcare group has attracted $22,379 from the One Billion Trees Program; $4,875 from the National Landcare Program to survey the lower portion of the catchment; State Landcare Program funding of $6,300 for the demonstration site; and $3,590 from the National Landcare Program for a laser level to assist with surveying and constructing drainage works.

Many of the members of the Neridup Landcare group attribute the group's continuing progress to Marg and Rob Agnew. But the Agnews respond that the group would not function without all the members helping out and being involved in their own and group projects. This point highlights how Landcare group members value each other's contribution, but in reality a few key people initiate and organise most activities. When these people burn out, the group faces a critical time—either new leaders surface or the group stagnates. This is one of the key concerns and points of intervention for landcare facilitators, discussed in Chapter 7. Other members share their reflections on the dynamics of the Neridup group:
John Wallace
I could see areas [on my place] degrading. Some areas had not been used for ten years. The group has been a resource of information giving me more knowledge and confidence to do things on my property for my benefit and for the district’s benefit. I have turned the problem salt area into an asset by planting Puccinellia and saltbush and allowing some grazing. Diversity is the key, and creating an example for the rest of the community. If we get on top of problems in this 30-year-old country, then it won’t get as bad as the wheatbelt in one hundred years. We cannot just keep expanding and buying additional properties when production falls and degradation rises on our original properties.

Ken de Grussa
The best thing about the group is sharing information; doing farm walks which gives inspiration to do things on your own property. We have half-day farm walks throughout the year and meetings every month. Being Treasurer, I have learnt a lot. Most meetings we get seventeen to twenty members and Rob always organises an interesting speaker. At other meetings we watch videos such as the Potter Farms series. I have been focused on salinity and water pumping, but now I can see other issues that could affect us all.

Audrey de Grussa
Before we had our Landcare group we did not know the Agnews. Now we know everyone in the group more or less and it’s wonderful for support.

Mr and Mrs Green
The advantage in the group is that the drainage has been done through coordination and cooperation. The demonstration site was a group effort. We had been wondering what to do about it for a long time. The Landcare scheme helped us to make the best use of the area for us and the community. We could see we had a problem and the members in the group gave us plenty of ideas on how to treat it.
Chris Reichstein
I think the reason that the group has done so much in such a short time is because people have wanted to become involved. We are lucky that we have a strong group due mainly to the enthusiasm of Rob, Marg and all the members. Although the meetings formally end about 10.30, we socialise until midnight on most meeting nights.

ABORIGINAL LANDCARE

The term Aboriginal Landcare sounds tautological. In over 50 000 years of evolution with the Australian landscape, Aboriginal communities did not see themselves as separate from, but as a part of the land. Looking after the land meant looking after themselves. Of course their use of fire in mosaics of small patches, and their hunting and farming practices altered the landscape, favouring some species over others, and it is likely that Aboriginal land use had other ecological impacts of which we are only dimly aware. But the overall impacts of Aborigines on the landscape were sustainable, or at least vastly more so than many of the land uses which displaced them. However, the impact of European settlement was probably even more devastating on the Aboriginal population than it was on the landscape, and a great deal of detailed knowledge about Australian ecosystems and about traditional Aboriginal practices has been lost.

Given the changes which have occurred in both the Australian landscape and Aboriginal communities over the last 200 years, landcare is just as relevant to contemporary Aboriginal communities as it is to other Australians.

The complexities of reconciling traditional Aboriginal beliefs with non-Aboriginal concepts of good land management practices, and translating these into practical activities, are daunting. The picture is further complicated by: the perception among pastoralists that Aboriginal communities already have access to too much government funding; language and cultural differences; and the impacts of tourism (actual and potential) on both the land and Aboriginal communities.

The substantial levels of commonwealth funding which have been directed to Aboriginal organisations until the early 1990s were directed mainly towards health care, education, land claims and legal work and, more recently, towards attempting to retain
and record a dwindling cultural identity. These priorities are changing, however, as Aboriginal organisations now recognise that active involvement in land management is an important step for Aboriginal communities, whose cultural and spiritual identity is intrinsically interwoven with the land.

According to research carried out for the Australian National Parks and Wildlife Service (now the Australian Nature Conservation Agency) by Elspeth Young, Helen Ross, Judy Johnson and Jenny Kesteven, Aboriginal people have been hampered in their landcare initiatives by their difficulties in qualifying for funding under the ‘mainstream’ land management programs: National Landcare Program, One Billion Trees Program, Save the Bush Program and the Murray–Darling Basin Natural Resources Management Strategy. This research found also that, while the Aboriginal Affairs portfolio has neglected the funding of land management, many activities relevant to land management are actually being financed by this portfolio and the Department of Employment, Education and Training under other guises.90

The main factor restricting Aboriginal access to these funding programs is that they have been targeted towards tackling the problems associated with more conventional land uses, in particular degraded agricultural land in long-settled areas, and for a clientele of commercial land users. These programs and their funding guidelines were designed with the remedies appropriate to these areas in mind, and they assume that commercial land users have the ability and responsibility to contribute financially and practically to the solutions. Little Aboriginal land is located in the target areas, the types of degradation and their remedies may differ, and most Aboriginal groups lack the independent finance to contribute a share of the cost of redressing degradation. Promotion of the mainstream programs, advice to Aboriginal applicants and Aboriginal representation in decision-making processes were also poor when the reasons for their lack of funding success were analysed in 1991.91

While structural problems may remain, these funding programs have been significantly broadened and made more flexible and accessible to Aboriginal communities since 1991. As the area of Aboriginal land is increasing substantially, it is very important that the land conservation ‘system’ is able to assist Aboriginal land managers and that it is relevant to the different demands placed on the land by Aboriginal communities. Recent purchases by Aboriginal communities of eighteen pastoral leases totalling 58 879 square kilometres, supported by federal government funding, have
brought the total number of Aboriginal cattle enterprises in the Northern Territory to 29. Twelve per cent of Australia (including 34 per cent of the Northern Territory) is now in Aboriginal ownership. 92

Until recently, the planning of land management on Aboriginal lands, as on many pastoral stations, has been ad hoc, depending on access to funds and expertise, rather than on a long-term strategy. Aboriginal pastoral leases face land management challenges similar to those of other pastoral leases throughout the Australian rangelands, including:

- actual and potential rangeland degradation on an extensive scale, caused by land uses (past and present) which rarely generate sufficient cash to support rehabilitation works;
- insufficient land inventory or rangeland monitoring information;
- limited technical resources within government. Human resources within the rangelands are so sparsely scattered that group activities are infrequent and expensive.

In the rangelands as a whole, issues such as land tenure, lease regulations and administration have more influence on land condition than Landcare groups. However, the objectives, ownership structures and decision-making processes of Aboriginal land managers differ from other pastoralists, and there tends to be a greater number of people living on Aboriginal stations, so there are many opportunities to develop new and more appropriate approaches to land conservation on these properties. 93

The purchase of cattle stations is only one aspect of a move back to the bush among Aboriginal communities. Throughout the 1980s, in response to social pressures and problems such as inter-tribal conflict, alcohol and petrol-sniffing, family groups have moved away from larger settlements into outstations or homeland areas. This migration has solved some social problems, but many land management issues remain in these outstations, which are often located in harsh, semi-desert environments where rainfall is spasmodic (usually less than 200 mm per year, but unreliable), evaporation is huge and temperatures range from 50 degrees Celsius in summer to freezing in winter. Soil erosion, dust problems, lack of reliable water supplies and increasingly scarce fuelwood are issues facing these remote, often tiny communities. 94

There is still a long way to go in developing appropriate mechanisms to respond to the particular needs of Aboriginal communities on their own lands in the arid zone, but we have several promising
initiatives from which to learn, and progress is being made. The following cases illustrate the complexities, the timescale and the rewards implicit in Aboriginal landcare.

**CASE STUDY**

**PITJANTJATJARA**

The Pitjantjatjara Aboriginal Land Council covers hundreds of thousands of square kilometres of arid Australia, in a region encompassing the intersections of Western Australia, South Australia and the Northern Territory. It stretches from the Tjirrakali community near the Warburton Ranges, east to the Kulgera; and from the Tjukula in the north to the Iltur communities in the south. The arid climate, the sparseness of vegetation and animals, and the extreme isolation of its far-flung communities are the main landcare issues confronting the Pitjantjatjara Council.

Prior to 1973, Aborigines came under state or territory control via missions. During 1973, the development of Aboriginal Land Councils started with the granting of land rights, Pitjantjatjara being one of the first. Pitjantjatjara land is designated freehold and is unalienable. The development of the Councils has been gradual. Their aim has been to retain the heritage and cultural identity of Aboriginal communities, while improving the quality of life and opportunities for Aboriginal people in a way which enhances their autonomy and self-reliance.95

To improve communication between people, government departments and major centres, the Pitjantjatjara Council set up a Resource Centre in Alice Springs to provide health, legal and administration services, and an air service to remote communities.

Mike Last, an easygoing, slow talking, patient bloke, heads the projects section of the Pitjantjatjara Council Resource Centre. Mike has worked in the arid centre of Australia for about 25 years; first with the Ernabella community and for the last thirteen years with the Pitjantjatjara Council in Alice Springs. With others on the Council, Mike has worked to develop a repertoire of ideas and techniques for management of Aboriginal lands and communities which draw on both Abo-
original and European ideas. Aboriginal landcare did not occur overnight, but as a result of perseverance over many years under conditions of isolation, lack of funding and, until recently, little government recognition. Mike describes the essence of the Pitjantjatjara approach:

Overall the Pitjantjatjara Council and the projects section have been designed to have low overheads in order to survive and operate indefinitely. Hence we have small numbers of skilled people working from the Centre. A four-stage reafforestation and horticulture program has been implemented after years of designing, which is meeting the needs of the Aboriginal communities in regard to their living conditions, health and the quality of the wider area in which they live ... It [the program] has been designed to be achievable by the local people.

The Council is mainly concerned with vegetation and soils which are rehabilitated by: growing trees, shrubs and ground cover around houses and within the community or homeland to provide shade and shelter and stop the soil blowing away; planning the effective use of land within and around the homeland; direct seeding where tree, shrub and ground cover planting is uneconomic; building ponding banks, spirals and staggered furrows to reduce water erosion problems; and, where necessary, patch burning to control the amount of fuel in the associated rangelands. This sequence essentially follows the principles established by Bill Mollison and David Holmgren, known under the broad term of Permaculture. To meet the needs of remote communities, Mike and others have put a lot of effort into the plant nursery located on the outskirts of Alice Springs. Producing plants that can survive the climate and which can withstand travelling to the homelands is vitally important. So, too, is the training of Aboriginal people in operating the nursery as a resource for remote communities. Mike reflects:

People are far less stimulated when they live in open and unshaded outstations and communities. The first thing we needed was a nursery. People had never grown any plants in a nursery before. After setting it
up they learned very quickly. Many went out and dug up river red gums and saltbush and replanted them near their houses. During the 70s we developed many different techniques to suit the environmental conditions and the social climate. In the 80s much time was spent on finding the most appropriate plant stock suitable for planting around houses and in the community areas. Semi-permanent forms of agriculture using fruit trees, mulch systems, vines and integrating native systems were also developed. The nursery became a full blown concern and was a catalyst in the development of the resource centre.

The nursery is the nucleus of the reafforestation and horticulture program. Nursery staff help people to plan their tree planting around the houses and yards of outstations. Fruit trees and vines on trellises provide shade and fruit. The design of trellises to maximise growth, while allowing people to sit under the shade of the vines, has been a very important consideration, as part of the overall planning of the location of buildings to optimise climatic factors, harvest water and reduce the potential for erosion, dust and run-off.

Different strategies are used in the zone within three kilometres from the community. In Mike’s words:

_This is the area where people normally have harvested heaps and heaps of fuel (timber and shrubs) over the years for domestic use. In some places the vegetation in this area has all but disappeared. Indigenous people harvest mulga and any other vegetative material for their use just like we demolish mountains of iron ore to make steel._

Direct seeding, rather than bagged seedlings, is the major method of revegetation used in this zone. Contour banks have been used to encourage regeneration and to collect rainwater. Contour bank construction started in 1972 with assistance from Bob Keetch of the Conservation Commission of the Northern Territory. Demonstrations were set up in the Warburton area to show the benefits of contour ponding to harvest water where it was needed and to encourage regeneration and
growth of new seeds. Light seed is dispersed from seed boxes mounted on tractors, but heavy seed (e.g. Acacia) is spread by hand. The community collects the seed locally for the nursery and for distributing in the contour ponds and thus is involved throughout all stages. Mike describes the long-term nature of this process:

*This development has been happening since the 70s. People enjoy their nomadic lifestyle, which is part of their culture. Change is gradual as people adapt to a changing environment. In Central Australia, regeneration of degraded areas is usually very slow. Often the lands are not seen as being degraded, just being used for a purpose. It’s only when people start to suffer from the dust, dirt and flies that the changed areas are thought of as being degraded and in need of rehabilitation.*

The Pitjantjatjarra Council is also developing environmental management programs for planning towns, roads and airstrips to avoid water and wind erosion, planning natural regeneration programs using patchwork burning, and conducting awareness and education programs in land management with Aboriginal people. Two themes which underpin this work are the need to assist people to make best use of local features when building settlements, and the requirement to allocate limited resources to programs that are workable and sustainable, so that communities become self-reliant in improving their local environment.

**CASE STUDY**

**TJUWANPA**

Another innovative Landcare group is based around a resource centre which services the needs of the Aboriginal communities living on the Tjuwanpa Home Lands in Central Australia. The resource centre is located close to Hermanns-
burg Mission, which lies about 140 kilometres west of Alice Springs. It is valuable not only to Aborigines but also to the whole community in terms of a centre for search and rescue, fire control, and a contact point in a landscape characterised by isolation.

The centre is seen to be a place ‘in which to gather things’ according to Glen Auricht, the centre manager. The resource centre is named after the Ironwood eucalypt native to the area. According to Glen:

This tree is very important to the people out here. From the tree Aboriginal people gather wood for their fires, timber to make traditional tools, seeds to eat, shade under its canopy. The tree also provides shelter and food for birds and other animals. The centre is like the tree. It’s a resource for people to live on the land. Not just by food gathering but by gathering what they need. They come and gather their pay to go shopping, or welding skills so they can fix their machinery and fences, or mechanical skills to repair their vehicles. They come and choose their skills, their employment, their building materials, their trades—people. The resource centre is on their lands and not in the Hermannsburg town. It is supporting people on the land by expanding their income base, through constructing buildings on the outstations, contracting, arts and crafts, stock work, purchasing of items, etc.

Glen has lived in the area all his life and knows the environment intimately. He has compiled photographs of all the trees, shrubs and herbs that occur in the area, noting times of flowering, uses of the plants by Aborigines, and their Aboriginal names. He is fluent in both Aranda and Luritja, of the Western Desert Aboriginal language group.

Alan Keeling has worked in the north of Australia for 25 years but has been at Tjuwanpa for about six. He has worked to organise and improve land management activities. He could see that no useful pasture growth was occurring after good seasons; saw the haphazard way of mustering horses; and the need for the community to form a distinct legal entity to attract support and finance for landcare work: ‘We saw a need.
It grew. People enjoy the work, love to go out camping and working with the land, enjoy management by burning and looking for different plants, relating to how it was in the old days.

Several changes have occurred over the years which have led to the current practices on the Aboriginal Lands Trusts. The Hermannsburg Mission lease was handed back to the Aboriginal people in 1981. Literally overnight, the people around the mission resettled their homelands, leaving the mission to be run by a few people with limited business and management skills. For the 30 years before 1981, the area was overgrazed. There were about 9000 cattle and 200 horses. Since 1981, 2000 brumbies (feral horses) have been trapped. Cattle now number about 300, in isolated small groups. Overall, there has been excellent regrowth of the vegetation over the last ten years, with only fire and horses the main ‘problems’ on the homeland areas. According to Alan, ‘One hundred years of cattle has irreversibly changed the country. No two ways about it. We have lost a lot of grasses, ground creepers and berry species. Because of this we have lost a lot of small marsupials.

Currently the resource centre is run by Glen and his team, supported by an elected Aboriginal Executive. According to Glen, ‘The Aboriginal community decides where every dollar goes. We supply the budget, they (the outstation bosses) decide what to do with it.’

The major land management issues faced by the Tjuwanpa Aboriginal Landcare Group have centred on: weeds (Athel Pine, Castor Oil, Prickly Pear and now Mexican Poppy); people management in relation to neighbouring national parks; establishing living areas and outstations; feral animals; management of the resource centre; and fire management.

The Tjuwanpa Landcare Group’s efforts are starting to be recognised in the form of supporting grants from federal and Northern Territory funding sources. Planning and monitoring studies have started and the Conservation Commission (NT) has helped by setting up education programs at local Aboriginal schools. A Contract Employment Program for Aboriginal people in Cultural Resource Management is in progress, funded by federal programs administered by the Northern Territory Department of Primary Industries and Fisheries.

People from the Tjuwanpa Home Lands are contracted to
assist in land management and prevention of land degradation in the national park containing the Finke River which adjoins the Land Trusts. The aim is to reduce the impact of the thousands of visitors that are coming to the national park each year by developing trails to concentrate human impact on to well-prepared areas, thus protecting more sensitive sites. Glen points out the issues involved after people began to leave the mission and return to their homelands:

When Aboriginal people started the move back to the bush we did a lot of research on the social impact of this move. When establishing their outstation living areas they need education facilities, health facilities, houses, bores for water, jobs. But what was the impact going to be? Fortunately, these communities are small, and in isolated areas. When building houses you need the skills for clearing of the area, siting of the houses, bores for domestic water which make it suitable to have horses (but horses attract flies and cause dust which affects health). Firewood is initially collected close to these living areas. With four-wheel drive vehicles, firewood collection is sustainable for one thousand people living in 35 homeland centres and the Hermannsburg community in an area of over 6000 square kilometres. When establishing these outstation living areas, lengthy on-site discussions are held on the siting of buildings, wind direction, use and siting of fruit trees and vines for shade and food (much the same as are held on the Pitjantjatjara Lands). On Tjuwanpa Lands there are opportunities for those involved to work on the projects and to earn a wage while building progresses.

After several good years, in 1988 the Alice Springs Regional Bushfire Council indicated that a bad fire situation was forming owing to the tremendous growth of vegetation. They sought the views of the Tjuwanpa people about the situation on their lands. It was agreed to use fire as a management tool, in the traditional way, which the community readily identified with and got involved in very quickly. A fire program was developed, which considered the needs of native flora and fauna and of the Aboriginal communities. Over the whole region,
fire management has centred on burning areas in a patchwork quilt fashion, for biological reasons and for emergencies such as bushfire control, search and rescue, gas pipeline management and safety for isolated communities.

Alan Keeling hopes that in the near future landcare and land management activities will develop into major work programs under their Tjuwanpa Community Development Employment Projects, the major source of income for the Aboriginal people living in this remote area with few other employment options. The Tjuwanpa Landcare Group is an example of how Aboriginal people can earn a living by land management, demonstrating to others, including pastoralists, land management practices appropriate to the rangelands, and developing practical measures for dust suppression, erosion control, and provision of shade and fuelwood which can measurably improve the quality of life in remote communities.

CASE STUDY

TANGENTYERE

The Tangentyere Council operates with communities west, north and south-east of Alice Springs within a 600 kilometre radius. It was formed in response to social needs within town camps around Alice Springs. As with the Pitjantjatjara and Tjuwanpa communities, it started work on housing and providing trees and shrubs. Landcare projects include dust suppression and revegetation to establish woodlots for fuel, shelter and landscape improvement in the town camps. Advice is provided to one hundred communities and outstations and more than 10 000 trees are delivered to these communities each year.

Assisted by funding from the National Landcare Program, Community Aid Abroad, One Billion Trees Program and corporate sponsorship, the Tangentyere Council has developed a public awareness and education campaign including television commercials and a video called 'Aboriginal Landcare, Let's go!', which is used in workshops throughout Tangentyere lands. This video won the 1991 Landcare Education Award. It shows how people can be involved in landcare and the various methods for improving the environment of communities and
outstations. It details the various initiatives and successful methods undertaken by all three councils mentioned above to improve living conditions and land management practices.

The Landcare education workshops are intended to assist people living in these communities to identify the land management problems that they face and to devise appropriate ways of tackling them. The emphasis is on 'two-way learning', with local and traditional knowledge given equal value to the knowledge and skills of the workshop facilitators. The goal of the workshops is to develop a spirit of community ownership of their problems and solutions, and local commitment towards implementing solutions.

An obvious theme running through Aboriginal landcare projects and efforts is that it is increasingly difficult to separate landcare from the social and economic issues which also influence the lives of these communities. These themes of local ownership and commitment, overlain with an intricate web of biophysical, social and economic issues, are touchstones for Landcare throughout Australia.

CASE STUDY

TUMBY BAY

Tumby Bay is a pleasant town on the eastern coast of South Australia's Eyre Peninsula, with a population of 1100 people, of whom 700 are retired. The Eyre Peninsula is infamous as a degradation 'sore spot' on the Australian landscape, with a history of erosion on a grand scale and, in recent years, the emerging spectres of dryland salinity and waterlogging. Rainfall on the Peninsula varies from an annual average of 875 mm in the south near Port Lincoln, to less than 250 mm in the marginal northern and western cropping areas, which peter out into pastoral sheep country on the edge of the Nullarbor Plain. Water is thus a significant constraint, the main source being artesian limestone basins which feed large pipelines extending 400 kilometres north up each side of the Peninsula. The main agricultural crops currently produced are wheat, barley, grain legumes, sheep for wool and some prime lambs.
There are a few cattle, and in recent years a small number of deer have been farmed.

The Tumby Bay and Hills Landcare Group was formed after an initial public meeting in 1989, which brought about 70 people together to discuss what could be done about the emerging salinity and waterlogging problems in the area, and long-standing erosion and tree decline problems. The landcare challenge on Eyre Peninsula is described in more depth in Chapter 6, where we discuss the efforts of Lyn and Barry Stirling, founding members of the Tumby Bay group, on their own property.

The Landcare group has a committee of 22, made up of farmers and townspeople. It has about 50 active rural adult members and about 120 schoolchildren regularly involved in activities, and 300 of the Tumby Bay older people have offered to help and be involved in group activities. The Tumby Bay group is an inspiring example of the way in which Landcare can bridge the gap between farmers and townspeople, involving all sectors of a community in tackling an issue which affects everyone.

The group has National Landcare Program funding for a full-time coordinator, which it uses in an innovative way, with three days per week for a permanent person and the other two days flexible, so that the regular coordinator can work extra days according to demand, or additional people can be employed at peak times. In practice this arrangement works very well.

The Tumby Bay and Hills group has been working on a wide range of projects:

- formulating a district environmental plan, considering farmland, swamplands, the town surrounds and the coastal zone including mangroves, and participating in roadside conservation planning with other relevant authorities, with salinity control and planning as a priority issue;
- involving schoolchildren in identifying native tree species, collecting seed and propagating 10,000 seedlings per year;
- direct seeding of roadsides with indigenous vegetation and helping members with their own seed collection activities;
- involving local schools and Landcare members in Frogwatch (see Chapter 5);
- running farm planning workshops, at which 45 property
management plans have been developed so far;
- rehabilitating a 300 hectare natural wetland adjacent to Tumby Bay which had previously been drained;
- making a conscious effort to involve Jobskills (underemployed) people, senior citizens and jail inmates in Landcare projects.

Founding Chairman Barry Stirling sums up the Tumby Bay approach:

At Tumby Bay, we are pursuing a policy of environmental responsibility without being seen to be radical, and not losing sight of the economics of our situation. The good thing is the way farmers and urban people are working together. Our farmers, now within the catchment planning phase, are looking past their own boundaries and we have a new level of acceptance for other people's rights and ideas.

The Tumby Bay Landcare Group shows what can be achieved when the full spectrum of human resources in a rural community—older people, schoolchildren, unemployed people and even jail inmates—are given practical opportunities to be involved in landcare projects appropriate to their capacities and their situation. Groups which involve only full-time, middle-aged male farmers are missing out: on ideas, on energy, on intellectual horsepower, and on a wide range of skills, from writing submissions to compiling and drafting maps, to identifying plants, birds and insect species.

CASE STUDY

CLONCURRY

Now to one of the most isolated Landcare groups in Australia, exemplifying the issues facing Landcare groups in the rangelands, and to one of the many extraordinary individuals sprinkled throughout rural Australia who are now finding an outlet for their environmental convictions and energies through Landcare.

First, the setting. Cloncurry is 400 kilometres below the
Gulf of Carpentaria in north-west Queensland, 1500 kilometres as the crow flies north-west from Brisbane, and almost 2500 kilometres by the main roads. The Cloncurry Landcare Group basically covers the shire of Cloncurry. Cloncurry is one of five north-west Queensland shires which together cover an area the size of Victoria. Most now have landcare groups trying to come to grips with working in groups over great distances with, until recently, little high-tech communication. Satellite television became available in 1987, followed in 1989 by an automatic telephone network allowing the use of facsimile machines, home banking and computer marketing of livestock.

This rangeland grazing country consists of Mitchell Grass Downs (a very productive native species) in the east, through mixed land systems including riverine channel country, west to hills covered with native trees, spinifex and grasses, but which are gradually being overtaken by the introduced Buffel Grass. The spread of this plant is gradually raising pastoral productivity in the hills. Beef cattle properties range from about 15 000 hectares to more than 200 000 hectares. Rainfall varies from 550 mm in the north of the shire to 300 mm in the south. When it does rain (not every year by any means), it is likely to be during summer.

Daniel 'Bood' Hickson's family took over Melinda Downs, a 15 000 hectare station about 140 kilometres north of Cloncurry, in the late 1960s. Since his early teens, Melinda has been Bood's base, but he did a science degree in Sydney in the late 1970s, became a computer consultant in the early 1980s and has travelled widely throughout Australasia and South-East Asia. Since the late 1980s, Bood has maintained a consultancy business from his base at Melinda, and has pursued a passionate interest in information technology and participatory democracy. He defies easy categorisation. Bood can be as parochial as a pastoralist, as cosmopolitan and politically agile as a seasoned diplomat, as smooth and hip as a computer salesman and as spiritually contemplative as a Buddhist monk.

Bood is one of the founding members and inaugural secretary of the Cloncurry Landcare Group, his Landcare roots. He is also a former member of the Queensland Land Care Council, convenor of the national Landcare Information Technology Taskforce, and coordinator of the Australian Rangelands Society Kangaroo Policy Group. He has been
known to hitch hike from Cloncurry to Canberra to make personal contacts within the bureaucracy and to make his point face-to-face, and he has demonstrated consummate skills in extracting money or in-kind support from several government agencies for Landcare projects. Bood was awarded a Churchill Fellowship to study the potential use of telecottages by farmers and remote communities in Europe and North America during 1994.

Thus far we have talked about Landcare groups, but of course these groups consist of individuals, families, neighbours, relatives, locals and blow-ins, and long memories. The dynamics of any community group are complex and rarely transparent to outsiders. This is probably so to an even greater degree in the more remote Landcare groups, which are made up of fewer individuals and families, who have often had to interact (or avoid contact) over many issues over many years. Attitudes, judgments and opinions formed through these processes tend to harden with the passage of time to the point of inflexibility and brittleness, making the sort of paradigm shift and lateral thinking which Landcare is trying to encourage all the more difficult to achieve.

Conservatism and tradition notwithstanding, rural Australia is dotted with non-conformists, people who think ‘outside the square’, and who perform a valuable function within Landcare groups. They stretch the boundaries of people’s thinking, they challenge social norms and question assumptions about possible and preferred futures. Bood Hickson is a classic such case. However, such people tend to find groups frustrating, and the feeling is often mutual. There are inevitable tensions between pushing the frontiers of convention and waiting for people to catch up, or accepting a less ambitious course of action for the sake of group consensus and cohesion.

Of course Bood is unique and by no means a typical Landcare group member, or even a typical group leader. But in an important sense he does exemplify a breed of people on the land who are not content with the status quo, who are prepared to work hard to look for more sustainable ways of living with the land rather than from it, and for whom Landcare is an outlet for intellectual energies and a platform for generating momentum for change. We need these people, and we need to ensure that Landcare continues to support them and be open to their inputs, without stifling them or burning them
out with the sheer hassles of keeping a group functioning under great stress with meagre resources.

The Cloncurry Landcare Group was initiated by the Cloncurry Shire Council when they sought community interest about landcare. At the initial meeting a steering committee formed, convened by Bood. A second meeting in November 1989 resolved to form the Cloncurry Landcare Group. The group operates with an executive committee and a series of subgroups which focus on particular issues, allowing people to get involved in issues which concern them without having to come to every committee meeting. The executive committee links with other Landcare groups, the National Landcare Program, Landcare Australia Limited and other external sources of support. The initial subgroups focused on stocking rates and kangaroos, land rehabilitation, weeds, cane toads and wildlife, education and awareness, and recycling. Well over half the land users of the shire are involved in the group, as well as all the relevant government agencies.

Bood continues the story:

We don’t charge a membership fee. We decided after much debate that we should not tax people who are trying to do the right thing. Only half our committee are graziers. The group grew very quickly to 150 members, few of whom are very active in attending business meetings, but most are pursuing landcare on their own properties and they do turn up to field days/demonstrations etc. In general we have seen a slow decline in the number of people coming to events, even though the group is still expanding its membership. This declining attendance caused several of us to re-examine the situation. We concluded that Landcare does not have the resources in the rangelands to deal with our problems. The chronic shortage of people means that the same people are committed to several different organisations, for example the Country Women’s Association, Cattlemen’s Union, United Graziers Association, Show Society, Rotary, Isolated Children and Parents Association etc, and simply have neither time nor resources to give meaningful support to another organisation.
Our group now concentrates on three key areas: communication; stocking rates, total grazing pressure and land reclamation; and weeds.

Communication is very difficult up here. We have contacted people in the NT and in WA who are facing similar rangelands issues. I am currently discussing the value and suitability of the 'crocodile' seeder with the Tangentyere Council near Alice Springs. We have also talked to a Landcare group at Moonambel in Victoria about the suitability of Neem trees in our area to diversify income and to address land degradation [see below]. This type of contact could expand in the future as LandcareNet [see box on pages 107–8] develops and Telecottages (telecommunication-based resource centres) become established.

The issue of stocking rates is critical in the rangelands. We have not progressed very far in resolving it, even though I have communicated with many people in Queensland, via newsletters and the Australian Rangelands Society. The problem as we see it, is that graziers only control domestic grazing species, but we need to think in terms of total grazing management, because the increased populations of kangaroos and feral herbivores under pastoralism are also overgrazing some areas and leading to land degradation. Over the last year the idea of harvesting kangaroos has gained currency. Management systems for kangaroos still need to be refined, but in the long term such systems appear to offer a way to make a living from this country from a native product which can provide incomes and assist land rehabilitation.

Some of our group members have seen it as a threat to their beef production, but others are interested in terms of total resource management. This is a complex issue, especially with vested interests in urban communities, animal welfare organisations and conservationists in conserving the various kangaroo species. Some members are reluctant to open the debate to the larger community for fear that it will be hijacked, and the real issues of total grazing management and sustainable resource management will not be resolved.

It is complex because quotas are set over the whole
state, yet there are massive discrepancies of kangaroo numbers between regions within states. I have been promoting a regional approach to 'roo management. Numbers could be monitored in each region and I would like to see the industry become more professional. One approach is to make the products more commercial, and any returns to the landowners can have 50 per cent ploughed back into land rehabilitation or other landcare activities.

There is a chronic weed problem across northern Australia with species such as Prickly Acacia, Rubber Vine, Mesquite, Parkinsonia, Mimosa and Chinee Apple. None of these occur evenly throughout the area. A project was put together between the Cloncurry, McKinlay, Richmond and Flinders Landcare Groups and the Lands Department to employ a weeds extension officer to increase awareness of the weed problem, and to involve the farmers in mapping the weeds and devising weed management strategies. During its short operation to date this project has helped to generate a phenomenal change in attitudes about weeds. Most properties in Cloncurry Shire now have active weed management programs and all relevant government departments are now involved. But unfortunately the Department of Lands slashed their funding which has created a major problem for this project.

I did not think we would succeed with the issue of weeds. Yet it is our greatest success, probably because it is a relatively simple issue. We can’t afford to ignore it. It is an awesome problem. We have been trying to get the areas mapped, raise awareness and encourage land managers to stop its spread, coordinated at a catchment level. Land systems mapping is critical to the long-term management of this part of the country. The mapping of the target area has been well received by the majority of the group and we hope to expand the numbers involved in this project.

The Cloncurry Landcare Group is also rehabilitating grazing-induced scalded areas, using various pieces of equipment such as crocodile seeders for ponding water and encouraging
The Centralian Land Management Association inspecting Terry Karger's homemade seed harvester for land reclamation.

ANDREW CAMPBELL

Viv Read discussing soil types with the Kalannie-Goodlands group.
Kalannie group members working on their farm plans.

Dennis Cooper and the solar-powered cockchafer catching contraption developed by the Memana group on Flinders Island.
Don Stanley and a young tagasaste planted on his property for fodder and to lower the watertable.

Members of the Memana group potting up local trees and shrubs.
An aerial view of the Neridup group's demonstration site (centre) showing the waterlogged, saline area and the bare landscape, cleared for agriculture in the 1960s.
regeneration. They have had some success on slopes of one to two degrees using introduced grass species as the initial coloniser. After three years, native perennials are starting to return and the grasses, such as Buffel, are starting to spread between the small contour banks that retain ephemeral rainfall on these formerly bare areas.

The group is investigating the potential of the Neem tree for essential oils, shade, timber, crop, drought fodder and the production of an insecticide (azadirachtin, lethal for the locust family but harmless for vertebrates) which would be very useful for locust control and dips for stock, without leaving chemical residues. They hosted a workshop in August 1993 which was attended by people from Queensland, New South Wales and Victoria. One of the major outcomes was not that Neem should be planted everywhere (as it could potentially become a weed), but the workshop process which drew issues out into the open in a way which encouraged rational discussion. It highlighted that a collaborative, community-based approach is more likely to get results than if each individual had to secure information and funds and overcome legislative hurdles independently. At least a dozen Neem plantations have been established locally and the group is monitoring their growth and production.

This is a fine example of the potential of Landcare groups in the rangelands, where their real value is likely to be as a forum, a source of information, and support for finding ways of improving land management, rather than as a focus for cooperative work across property boundaries, as is more common down south and around the coast, where properties are much smaller and issues such as salinity demand a coordinated effort. That is not to say that there are no grounds for coordinated effort in the rangelands. Management of weeds, kangaroo populations and feral animals also necessitates cooperation across property boundaries. However, in the rangelands there is not the same incentive for working with one's neighbour, who may live several hours away or, even worse, in a remote capital city, where major land management decisions are made around boardroom tables, leaving a local manager to carry out instructions.

From his unique perspective, Bood lists some of the impediments to Landcare in this extensive environment:
• Landholders are geographically remote from decision-making processes at regional, state and national levels.
• Very few people live in the area permanently. Over the entire Australian rangelands there are more than 50 square kilometres for every person. Landcare depends on the voluntary effort of very few people, many of whom may pull out of landcare unless we see a genuine commitment from government to give authority and responsibility to such self-help programs.
• State government administrative regions are not coordinated or integrated. We have to deal with different regions on different issues, basically integrating the various government programs ourselves, which is difficult.
• Landholders have been given the responsibility for land management for the last 200 years. Now the blame for degradation is being put back on us, especially in the case of weeds. Once these same species were advocated by government. We need to find mechanisms for the whole of society to look at these issues and determine responsible outcomes.
• We need to develop information resource systems because there are no repositories for local information, for example basic land resource information such as soils, vegetation and topography. The information available tends to be in an unusable form for the landholder, or out of date. If this is not addressed, I can't see rangelands landcare getting very far. I am aware of only a handful of the 75 Landcare groups in the arid zone operating effectively.
• There has been conflict about the most appropriate mapping systems for the group, who should hold the information and who should carry out the mapping of the land systems in the area. This has still not been fully resolved, although the group has carried out the first stage of a mapping project.
• My major disappointment is the lack of broad community ownership and participation.

The last point sums up Bood's frustrations. But the achievements of the Cloncurry group and other rangelands groups need to viewed in the context of the constraints Bood has already identified. Throughout the Landcare movement it is common that rela-
tively few people are questioning the status quo and really catalysing change, and this situation is magnified in the rangelands by the sheer emptiness of the landscape. The 'goers' like Bood will almost inevitably be frustrated by the pace and the depth of change, but Landcare does give them a chance to influence others, and to appreciate the concerns of others, in a way which would be much more difficult otherwise.

**CASE STUDY**

**MOLYULLAH TATONG**

Molyullah Tatong is an excellent example of a Landcare group which started with a particular focus, in this case trees, subsequently evolving to consider wider issues. Molyullah and Tatong are two small communities to the east of Benalla in north-eastern Victoria. The group covers an undulating 600 square kilometres in 800 mm rainfall country which is well suited to growing wool, milk, beef and trees. There are 325 farms in the group's area, 186 of which have paid the five dollar Landcare membership fee. Many more participate informally. Most of the members are cattle and sheep farmers, with an average farm size of 300 hectares.

The main environmental concern for this group is dryland salinity, primarily caused by the replacement of native bush with annual pastures that has occurred over the last century. Salt has already rendered 500 hectares of once good agricultural land useless, and has the potential to ruin much more of the fertile flats and valleys in the district.

Bill Willett is a jovial sheep and cattle farmer, and part-time coordinator for the group. He describes the salinity problem as a catalyst for the group, which aims to raise awareness of the problem and to develop and apply solutions:

*I didn’t know that there was such a thing as salt here until 1986. I thought it was an irrigation problem. I didn’t know anything about salinity, but by gee we do now.*

*I used to drive the school bus from Molyullah to Tatong. When you are up in the school bus and look out you can see white and glistening salt crystals on*
the top of the ground. We’ve got one place with 60 acres [24 hectares] in one spot. It’s like this [kicking the concrete].

The other problem the farmers of Molyullah Tatong face is that of all Australian woolgrowers in the 1990s—the relentless squeeze of rising costs and declining returns, which Bill Willett describes resignedly:

I averaged $31 for my lambs two years ago. Last year I averaged $11.50. At the same time the costs went up. That means devastation for farmers around here. People are hanging on. In the last two or three years everything has gone down together. Wool’s been down, feed lamb has been down, cattle prices have been down. We’ve had a drought. We’ve had three bad seasons in a row and it has all got on top of us. People have been forced off the land. The property price has been down.

We’re at the stage now that people who have been on the land for two or three generations are advising their children not to become farmers. From an economic point of view you’d have to be stupid to be a farmer.

The Molyullah Tatong group hopes to contain salinity by planting trees and deep-rooted perennial pastures that use more water (and make more money) than annual pastures. The group planted more than 10 000 trees last year, and is mapping the whole area to ensure strategic planting. On-farm timber production may become an important income earner for sheep farmers of north-east Victoria in the future, but the trees are also part of an ambitious fourteen kilometre wildlife corridor network. This is part of the group’s plan to protect a sixteen hectare ironbark (Eucalyptus sideroxylon) stand which is the home to 35 pairs of the Regent Honey Eater, Australia’s largest colony of this endangered bird.

The Molyullah Tatong group has an executive meeting once a month and holds at least five public meetings a year. In 1991 it was host to fourteen bus loads of farmers from as far afield as Western Australia. The group runs a demonstration block and information shed to display various tree and pasture
species and planting techniques. Watertable levels are monitored nearby and the results prominently displayed. The group holds an annual bush dance, the ‘Tree-Prickers Hop’, to round off days in the nursery preparing tree seedlings for planting. All this is co-financed by government, group members and by sponsorship from local companies.

Bill’s modest salary is paid in part by government funding and in part by the group. The group raises the money by selling the trees it grows from local seed. The tree nursery is on the site of the Molyullah school which was closed in 1979. The Landcare group has in many ways replaced the school as, in Bill’s words, the ‘centre for congregation of the whole community’. The fact that a Landcare coordinator’s salary can now be paid in part by money raised by the sale of trees grown by farmers, for farmers, says a lot about the way in which attitudes towards native vegetation have changed, at least in southern Australia.

We all know now that our forebears just went too hard with the axe. If they had just taken a third of what they did clear, they would have got more production. It was something they knew nothing about. It was something that the government encouraged us to do and we just went along with it.

... Attitudes are changing all the time. Mum and Dad were married in 1940. They milked 40 cows by hand, night and morning, and in the daytime they went out and cleared scrub. But now they’re giving us money to put the trees back.

We made about $5000 out of trees last year. That gave us some independence. We have money of our own now. The local farmers pay one-third of my wages, NSCP [now the National Landcare Program] pay the other two-thirds. We pay the farmer contribution through the money we make on the trees. I get paid $4 per hour by the farmers, which doesn’t have to be paid until they get a grant. That can come out of the tree money so that members don’t have to put money in themselves.

The Molyullah Tatong group gets most of its technical advice from the Department of Conservation and Natural Resources...
**Landcare Australia Ltd and the Landcare Foundation**

Do you want to help tackle land degradation in Australia but do not know where to start?

Landcare is not just for farmers or people living on the land. We can never hope to heal the wounds on the land caused by past mistakes, nor can we develop more sustainable land use systems, without the assistance and commitment of the 85 per cent of Australians who live in cities. If you live in an urban area you can support Landcare in several ways: by acting to change your own lifestyle, reducing, reusing and recycling, conserving energy and water, becoming a discerning, environmentally conscious consumer; by joining a City Landcare group, or forming your own group to look after creeks, parks or dunes in your area; or by making a tax-deductible donation to the Landcare Australia Foundation. The money raised by the Foundation is used in Landcare education and awareness projects, and to help the Landcare movement.

The Foundation was established by Landcare Australia Limited (LAL), a non-profit public company under the patronage of the Governor-General, which was set up by the federal government in 1989 with two broad aims:

- to encourage a Landcare ethic among all Australians; and
- to seek corporate sponsorship and private donations to complement government funding, by providing direct assistance for the work of Landcare groups and supporting the promotional activities of Landcare Australia Limited.

Many Australians are already familiar with the Landcare logo of cupped hands forming an outline of Australia, and the slogan 'Let's Landcare Australia', which have been promoted by LAL in national television commercials featuring Lisa Curry-Kenny and Grant Kenny, in the Landcare stamps issued by Australia Post, and the $1 Landcare coin produced by the Royal Mint. Since it was formed in
1989, LAL has been able to secure sponsorship from several large corporations to support Landcare group projects and various education and awareness raising projects.

The National Landcare Australia Awards, administered by LAL and held at Parliament House in Canberra each year, highlight the Landcare achievements of groups, individuals, schools, business, researchers, media and local government in the presence of the Governor-General and the Prime Minister. These privately-sponsored awards provide national recognition for outstanding efforts, and an opportunity for the winners from each state to get together with like-minded people from other states, extending the Landcare network and fostering the feeling of belonging to a national movement which goes well beyond parochial concerns.

or the Department of Agriculture in Benalla. Bill acts as mediator between the departments and the group. He organises the group extension events, while they supply technical advice and help with grant applications and procedures. Molyullah Tatong is one of 40 Landcare groups in the Benalla region. Between the two departments there are some seven extension staff servicing groups full-time and a further six providing back-up technical advice. Bill sums up the way in which the relationship between farmers and government is changing through landcare, and some of the value of the Molyullah Tatong group:

*The Landcare movement has taken the ownership of the problem away from the government and put it squarely back on the farmers. You’ve got to work from the bottom up, not from the top down. If people have had an input into it and something goes wrong ten years down the track, then they can say, ‘Well, it was partly my fault’. If it works out they can get the congratulations. You can’t ask for anything more than that.*

You won’t get change if you don’t make it fun. No matter how good a group, you’ve got to enjoy what
It is critical that Australia makes the most of this climate of goodwill, cooperation and commitment. We will return to this theme in more depth in later chapters. For the moment, though, we note that these attitudes among land users are a necessary, but not sufficient condition for the development of more sustainable land use and management. Other sectors of society have critical roles to play, important responsibilities. Without complementary initiatives and support, it is difficult to see how voluntary groups of people working at a local scale with minuscule resources can bring about the fundamental changes which are necessary to reverse catastrophic rural decline, socially, economically or environmentally.

But let us not get too maudlin too soon. Landcare is much more than just small groups of farmers, and its impacts extend more broadly than is immediately apparent. The next chapter draws together a range of examples which add new dimensions to the Landcare picture.
Involve me and I'll understand

Tell me and I'll forget;
Show me and I may remember;
Involve me and I'll understand.

This adage has appeared in agricultural extension and educational literature for many years and has been attributed to various sources including old Chinese sayings. Regardless of its origins, it is apt for the Landcare movement, in which an overriding theme is the direct involvement of local people in seeking better ways of managing the natural resources on which they depend and in which they live.

We have provided a few glimpses of some rural Landcare groups in action. But Landcare is not just rural, it is not exclusive to farmers, nor to adults. There are hundreds of Landcare groups along the east coast and close to major towns and cities for whom the focus is not on improving farming methods, but rather on working towards more sustainable use and management of natural resources—for example, coastal dunes, wetlands, bushland reserves, or rural residential areas. These groups contain a great diversity of people, and full-time farmers are usually in the minority.

One of the most exciting and potentially most powerful dimensions of Landcare is land literacy. Land literacy and Landcare in school programs are involving a broad spectrum of people from local communities in monitoring and learning about the natural resources in their own backyards.

LAND LITERACY—MAKING IT VISIBLE

Land literacy refers to activities designed to help people read and appreciate the signs of health (and ill-health) in a landscape, to understand the condition of and trends in the environment around
them, and to make the invisible become visible. The idea is not new. For most of human history the ability to read and interpret the signs of nature has been an art or craft crucial for survival. However, since the agricultural revolution, and particularly since the industrial revolution, humans have become progressively more insulated from the immediate need to be able to read and understand nature in order to eat, be clothed or find shelter. Such skills still reside within some indigenous communities and are being relearned and rediscovered by people seeking alternative forms of land management.

The personal and direct involvement of people in gathering and interpreting information about the health of the land around them as an everyday activity seems to be inextricably linked with an accompanying ethic of land stewardship and respect for and humility towards nature. Such an ethic both underpins and is invigorated by contact with, and understanding of, the natural world. Such an understanding comes with direct involvement in gathering and recording information about vital signs such as water quality, the extent and status of indicator species, problems such as soil salinity and erosion and so on. A land ethic alone may be insufficient to guarantee sustainability, but it is a hell of a good start. Sustainability is a pipedream without a land ethic as a foundation stone. Passionate and eloquent calls for the nurturing of such an ethic and for curbing the destructive tendencies of modern agriculture have been made for well over a century by people such as Emerson, Thoreau, Marsh, Muir and, more recently, Aldo Leopold, Wendell Berry, Wes Jackson, and (in Australia) Brian Roberts. Land literacy provides a link between the development of an ethic and practical actions to understand, and then improve the human management of, natural resources.

Many of the most important land degradation problems in Australia are complex, insidious and not startlingly obvious. Or, when they do become obvious, it is often too late to do much more than take graphic photographs and contemplate the horrendous cost (and often ecological ineffectiveness) of rehabilitation. For land degradation problems, it is wise to assume that prevention is always cheaper and more effective than cure. But it is difficult to get people excited about prevention if they cannot see or appreciate the problem.

More enlightened regulations fostering a 'cooperative adjustment' in land management standards will only be feasible if the condition of natural resources is well understood by the people managing those resources and by anyone proposing to specify and
enforce standards of management. So land resource assessment and monitoring land condition are complementary to any improvement in regulatory systems. They are also complementary to the effectiveness of Landcare groups in generating commitment to sustainability at an individual and community level.

Land resource assessment and monitoring land condition does not have to mean highly specialised survey teams using complex instruments with unpronounceable names, producing beautiful maps which then reside in government map files, never to be seen by the people who actually live on and manage the land. There are much more exciting and useful ways to generate and use information about the condition of natural resources, ways which may even improve the management of those resources.

You travelled [on a bus] through familiar territory from the top of your catchment to the bottom. What did you see? Well, that would depend on a number of things, who you are and who you sat next to.

If you travelled with a geologist you may have seen for the first time the evidence of past ice ages, inland seas, volcanic explosions, tilts, faults, uplifts, inversions. The familiar ups and downs of life on a huge and unfamiliar scale of time and space ...

You get a chance to talk to a local historian, a Koori, a poet, an artist, an angler and an apiarist ... It seems that every time you look out of the window you see more richly, more deeply ...

Viewed from the inside, where flesh and spirit, feeling and meaning are perfectly conjoined, these conversations with passengers are experienced as ripples on the surface of the eardrum, skin and retina ...

You take a light aircraft ... You see your whole catchment for the first time. It has a definite shape. There is so much potential information bouncing off your retina from here that it's as though the surface of the catchment is criss-crossed with uncountable spreading and overlapping wavelets [like] a pond in a hailstorm.

Culture reduces this complexity to manageable proportions by treating different things as instances of a class. The concepts, values and specialist vocabulary that you became familiar with as a result of conversations on the
bus help you to scale, select and differentiate.
... the world is made of signs.

You are in the watercycle, part of it in fact. You steam and
the earth steams as the world positions itself to take more
advantage of the sun's incoming energy.

Below, between the clouds, the catchment quietly ab-
sorbs the incoming light, heat and water, broods on its
implications and finally buds, blossoms and flowers in the
form of birds, bandicoots, bacteria, books, bandaids,
batteries, and butchers shops.

In the street behind the butcher's shop is your house ...

This quote from the introduction to Terry White's stimulating
paper on land literacy presented at Greening Australia's Catch-
ments of Green conference in 1992, captures some of the subtle-
ties of the interaction between humans, our environment, and our
perceptions of it. This interaction is fundamental to the challenge
of developing more sustainable systems of land use. Terry White is
a pioneering thinker and innovator in this field, who coined the
term 'land literacy' during his days as the architect of Saltwatch in
Victoria in the mid-1980s. Terry was also instrumental in the devel-
opment of the Ribbons of Blue and Water Watchers projects in
Western Australia.

Community action research

Land literacy programs such as Saltwatch, Drainwatch, Ribbons of
Blue, Streamwatch and Watertable Watch democratise technology,
putting scientific techniques into the hands of the public, involving
school students, land users and local residents in gathering natural
resource information, storing it on computers, processing it
(usually assisted by government agencies), interpreting the infor-
mation produced and acting on it in their own community.

Saltwatch began in Victoria in 1987. By 1992, more than 900
schools and 50 Landcare groups were involved in gathering and
analysing tens of thousands of water samples from creeks, rivers,
reservoirs, irrigation channels and bores in Victoria, South Aus-
tralia, New South Wales, Queensland and the ACT. Each school or
community analyses its data and sends it to a central agency for
processing, receiving in return a computer-generated overlay map
of water quality in the district—which may be placed in the school,
the store, or the hall, ensuring that the whole community 'owns'
the problem. Data is stored on school computers as well as in
government agencies, and groups are encouraged to look at trends
over time within their catchment. The composite maps are used for
interpretation, discussion and planning further action such as ex-
cursions, revegetation or creek fencing projects, or displays for lo-
cal shows and festivals.

Drainwatch successfully involved 2500 farmers and their fam-
ilies in collecting water samples from the drains flowing from 6000
irrigation farms in Victoria, South Australia and New South Wales
in November 1990. Schoolchildren assisted with testing samples
for their salt content.

Streamwatch involves schools within the Sydney Water Board
area, in investigating water quality using nine basic tests. These are
used to generate a water quality index, so that water quality can be
compared across networks of schools and water catchments.
Schools are provided with water testing equipment, and training
for teachers in the use of the kits and in computer networking.

Ribbons of Blue in Western Australia involves students in gath-
ering and managing information on water turbidity, pH, tempera-
ture, sediment, biological oxygen demand, nitrogen, phosphorus
and conductivity. It also pioneered the involvement of local
government as sponsors and recipients of survey information and
reclamation suggestions. These water quality monitoring programs
are linked internationally through GREEN (Global Rivers Envi-
ronmental Education Network) which involves Australian, North
American and German high school students.107

Watertable Watch is a great example of making the invisible vis-
able. In irrigation areas where rising groundwater is a major, but
insidious problem, auger holes are dug and lined with slotted plas-
tic pipe (a basic piezometer), into which is placed a light rod with a
float at the bottom and a flag at the top. The rod is painted red at
the bottom, orange in the middle and green at the top. As water-
tables rise, first the orange part of the rod, then the red appears,
signalling danger to irrigators—once again, making the invisible
visible. Another trick used by many Landcare groups with
piezometers on low-lying discharge zones is to use clear plastic
pipe for the aboveground section, so that any positive groundwater
pressure can be easily seen by the level of water in the pipe.

Ken Warren is one of the pioneers of Watertable Watch. He de-
scribes its evolution and relationship with wider Landcare issues thus:

I realised that we had a salinity problem on the farm about
four or five years ago. We used to tell a lot of people, but
no one believed us. Then we had a field day at my place
which really ... got people going because they actually see
what it does to the ground. It ruins the structure of the
soil. Instead of being a clay soil it's nearly like talcum
powder. It just stuffs it.
That quickly motivated a few people into gear. We
formed a committee and sub-committees for drainage, trees
and watertable watch. There are about 60 active members,
covering an area of about 75 square miles [194 square
kilometres].
We got a community salinity grant in the first year and
spent that putting some test wells in on farms and got the
farmers to read them on the first week of every month.
They send the information in to us so that it gives us an
indication of what the watertable is doing on separate
farms. It gives the farmers a good indication of what their
watertable is doing. Last year when it was wet, we went up
in an aeroplane and took some aerial photographs, then we
had a public slide night and showed everyone where their
farms were. Some of them had a bit of a shock. Especially
in the hall with all these pictures of waterlogged paddocks
hanging there with their names. Sometimes shock tactics
are the best.
It's got a lot of primary producers interested. You see a
lot of them coming on bus trips now having a look at other
areas. It's hit a raw nerve.
When you work in groups you seem to be able to get
further with government departments. They'll listen to a
group, but as an individual there isn't much point.
The kids show a lot of interest, especially with the test
watch. Farmers' kids, they run around and they do a lot of
reading of test wells. Once you put it in graph form, they
can start to see it. A kid plants a tree and he can see it
grow. He can see those changes. It's really a family thing—
it gives them some enthusiasm and some ambition to get
out there and do something around the farm.
The government over the last couple of years has put a
lot of money into it, but unless you can get the community
awareness right across the general society (and that means
city people, because that's where most of your votes are),
you're not going to get that funding through.
I worry about agriculture. I don't think we've hit the
bottom of the trough yet with salinity. It's going to get a lot
worse before it gets better.
Ken's words should concern irrigation people all over Australia, or anywhere where irrigation infrastructure has been badly planned with insufficient attention paid to soil type, efficient water use or drainage, where water pricing policies have not encouraged best irrigation practices, where short-sighted politics have allowed agriculture to externalise ecological and social costs—in short, in many irrigation areas in many countries.

**Putting technology to work**

Throughout the history of agriculture, farmers have relied on direct contact with their land to keep them in touch (literally) with its condition. Daily appraisal of sights, sounds, smells, tastes and the feel of the earth and animals and plants, reflected upon and set against expectations based on a storehouse of past experience, folklore and cultural norms, have been the traditional tools of land managers. Modern technology has done much to insulate farmers from direct contact with their land. Sitting on suspension seats several metres above the ground, in air-conditioned cabins surrounded by stereo sound and communicating with home by two-way radio is a far cry from walking behind a horse or buffalo over freshly turned earth. Similarly, mustering stock by motorbike (or helicopter in the rangelands) both muffles and shortens the time available for observing the many ecological signals ever-present on farmland, compared with traditional shepherding or droving on horseback. Hand weeding, companion planting, intricate rotations, close attention to detail and hygiene in orchards and market gardens has been replaced by ready access to toxic chemical quick fixes. The ever-increasing farm size and decreasing number of people working on farms compounds this estrangement.108

This is not a preamble to a nostalgic call for a return to the horse-drawn plough. Rather, it serves to point out that much of the traditional intimate contact between farmers and their soils, vegetation and water has been corroded by the technological development of industrial agriculture. Technology is not inherently evil, of course. It can be used creatively and constructively to help people to gain a better appreciation of the environment in which they live much faster and less expensively than would otherwise be possible.

Landcare groups and some individual land users in Australia are starting to collect and monitor information with technology which was largely the province of specialists five years ago. For example, like Kalannie-Goodlands, several groups are using Geographic In-
formation Systems (GIS) for recording and storing information about natural resources in their area, and for property and catchment planning. Global Positioning Systems (a navigational tool which uses satellites to locate one's position on the globe to within fifteen metres or so) are used by Landcare groups such as the Mary River group in the Northern Territory to plot the location of weed outbreaks. They have even more potential when used in conjunction with a GIS for mapping and visual presentation of data. Neutron moisture probes are being used by the North Burnett Landcare Committee in Queensland to monitor the efficiency of irrigation practices in horticulture, in order to minimise water use and prevent salinity problems. Piezometers and conductivity meters are widely used by Landcare groups in all southern states to monitor watertable and salinity levels. Several Landcare groups have been involved in the use of remote sensing to detect potentially saline areas—either through aerial magnetrometric surveys or by ground-based electromagnetic detection, as at Tragowel Plains and Cunnedah. Once again, the output from such surveys can be stored and mapped on a GIS and integrated with other natural resource information such as soil types, vegetation, topography and land use, and potentially with socio-economic data to better inform regional land use planning.

Technology enables Landcare groups to gather, record and own information which would otherwise be too expensive to obtain, or would be inaccessible to ordinary members of the public. Furthermore, when Landcare groups become involved in monitoring activities as simple as groundwater sampling, the total sum of knowledge of a problem can increase exponentially at very little cost, to the benefit of government agencies as well as community groups. Having thousands of sites monitored by hundreds of people allows for much greater mapping resolution than institutions can usually achieve with professional staff, often with little penalty in terms of accuracy of the data. Direct experience in monitoring can prompt much better questions of ‘the experts’ and also assist Landcare groups to design more appropriate projects (according to the problems they wish to tackle) and to write better submissions for funding.

Possibly the greatest potential impact of technology on Landcare in rural Australia will occur through the communications revolution. One of the best ways to enhance Landcare group effectiveness is to provide opportunities for groups to see what other groups are doing and to talk to people who may be a bit further down the track. Bus tours to other areas,
regional and state workshops and conferences, newsletters and guest speakers from other districts can all help to put groups in touch with what others are doing. Face-to-face contact with other groups while visiting projects is obviously the best form of communication, as it is immediate and enables dialogue to occur—questions, responses, discussions, conclusions. Newsletters and videos are not immediate and are not interactive. Information is usually at least several weeks old, and is usually background material about what is going on, rather than directed to answering specific 'how to' questions. The other key problems with communication in landcare are distance and state boundaries. Most information seems to flow up and down local, regional and state government hierarchies.

But this is changing, and the pace of change is accelerating. We saw in the case of Cloncurry how technology we take for granted, such as automatic telephones, satellite television and electronic banking, only reached remote areas in the late 1980s. This is only the tip of the iceberg. Information management will become the biggest challenge for land users and Landcare groups by the end of the 1990s. LandcareNet, a groundbreaking project which is exploding the potential horizons of some Landcare groups, exposing wrinkles in available technology and exploring what rural users need, is described in the box on pages 107-8.

Farmer fly-overs

Enabling farmers to see their farm and its place in the landscape from the air, at times when land degradation trends are most visible, can profoundly influence their perceptions of the scale and severity of problems, and of the necessity of working at a catchment level to tackle these problems. Several Landcare groups participated in fly-overs organised by the Victorian Farmers Federation and the Salinity Bureau in 1990, to great effect. However, such events need not be confined to farmers only. Barry Clugston is a farmer, naturalist and artist, and Chairman of the Wimmera Catchment Coordinating Group in western Victoria. He used a small grant to fly various groups of people over the catchment—farmers in one group, artists and photographers in another. Some of the paintings and photographs inspired by the trip were displayed at Victoria's first 'Reading the Land Festival' in Stawell in 1991.
LandcareNet—linking groups across the country

LandcareNet is a computer-based communications network designed to enable people interested in landcare to exchange information. A joint project between the University of Melbourne and Pegasus Networks at Byron Bay, funded by the National Landcare Program, it enables rural people to access relevant information about landcare issues and to discuss it among themselves. It employs the latest in communications and information technology for use on home computers connected to the network by telephone lines and modems. LandcareNet is interactive—participants on the network ask for the information they want, or initiate discussions on topics of interest, and others on the network respond. This differs from other electronic services which simply feed out information.

The network provides access to a series of landcare-related conferences, as well as to over 2000 conferences on other subjects ranging from health and hobbies to human rights and the environment. Users may also send and receive electronic mail and have access to Internet; a global network of over one million computers and databases.

Usage of LandcareNet is increasing gradually as subscribers become aware of the facilities available and grow more confident in using the new medium. By October 1993 there were 135 LandcareNet subscribers (plus over 2000 Pegasus subscribers with access to LandcareNet). These included Landcare groups (28 per cent), government officers, including landcare facilitators (27 per cent), non-government organisations (17 per cent), interested individuals (13 per cent), education and training institutions (9 per cent) and demonstration/facilitator accounts (6 per cent). These are distributed fairly evenly around Australia, although Queensland (possibly due to ‘the Bood factor’) has a greater number of individual subscribers than other states and has also taken the lead by putting all its regional Landcare facilitators on-line.

LandcareNet has not been without teething problems and ongoing hassles, including technical difficulties with older modems and outdated rural telephone exchanges, and the user-hostile DiscoveryTM interface, which led to
such frustration that some Landcare groups gave up while others paid for direct Austpac access to LandcareNet. Perhaps an even greater challenge has been to achieve a shift in thinking from regarding computers as computational tools to regarding them as communications devices as essential as the telephone.

Many of these pioneering users are still getting used to being on-line but, gradually, a few have started to contribute to the network. Interaction in the public conferences is building up. To assist in this process, Janet Hoare, the LandcareNet Facilitator based in the School of Agriculture and Forestry at the University of Melbourne, seeks out information in response to unanswered questions and provides guidance for those learning to use the databases and other facilities on the Internet.*

There are a growing number of success stories in which LandcareNet users have found information through the network that has saved them time and money in their Landcare projects. Often, this has occurred between widely separated groups who would not have been in contact by any other means. Recent examples include the exchange of tree seedlings and information about new grass species between Landcare groups in Victoria and at Cloncurry, as described in Chapter 4, and communication between the Nagambie Land Management Group and Agrecon satellite imaging, potentially reducing the costs of the group’s proposed land resource survey enormously.

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Organisms as indicators—the canary in the coal mine

We can study any organism and gain a better understanding of the whole. Frogs are very good biological indicators of catchment conditions. Their thin skins make them extremely sensitive to environmental insults of all kinds.110

Frogwatch is now involving students from Victoria, New South Wales and South Australia in recording details of the presence or absence of frogs (using a field guide and tapes of frog calls to be-
come familiar with local species), and investigating local environmental conditions. Seeing things from the frog's perspective makes people far more sensitive to the presence of poisons and destruction of habitats in their local environment. The South Australian Wormwatch program provides a kit with illustrations of worm species and information about their life cycle and crucial role in soil structure and fertility, and asks rural and urban students to find, identify, count and record the worms in their localities. This information is used in a CSIRO Division of Soils research project on earthworms and sustainable agriculture.

**Making the invisible visible**

Publications which better assist land users to recognise emerging problems, such as the Department of Conservation and Natural Resources' field guide 'Spotting Soil Salinity', used in Victoria, and the Farm Monitoring Handbook produced by Natalie Hunt at the University of Western Australia, are extremely useful aids which can stimulate land users to take preventive steps before problems become intractable or prohibitively expensive to tackle.

The soil structure assessment kit produced by Shelley McGuiness at the Centre for Land Protection Research in Bendigo, and the process used by Shelley to develop the kit, exemplify the emerging participatory approach. Shelley presented technical information on soil structure to fifteen or so farmers, and asked them to tell her in their own language what they thought about soil structure. They then went out into the paddock and farmers showed Shelley practical aspects of soil structure. She combined her technical research with farmers' practical knowledge. Farmers are using it because it is written in a language that they can understand and the content is relevant to them. They can now assess their own soil structure using a straightforward, practical tool, with a readable guide to help them interpret the results.

**Listening to the land**

Just as art galleries supply audio tapes to enrich the experience of people by giving them new insights as they move from painting to painting, Terry White conceived the idea of interpretive tapes to assist people to understand the environments they are travelling through. The first such tape, produced by Carri Tiffany of the Department of Conservation and Natural Resources in Victoria, based on interviews with Landcare members from the Warrenbayne
**HEAL—bringing the world to see landcare in action**

If you are interested in finding out more about how Landcare works, visiting some Landcare groups and outstanding environmental farms, staying in farm homesteads and/or talking to local experts on nature conservation and sustainable agriculture, then HEAL is just what you are looking for.

HEAL stands for Hamilton Environmental Awareness and Learning, an innovative project based in western Victoria, which aims to provide interested people with first-hand contact with exemplary rural environmental projects, and the farmers, community groups and scientists involved.

The Hamilton district, in the heart of what Major Thomas Mitchell called 'Australia Felix'—'a finer country could scarcely be imagined'—was one of the first areas of Australia to be opened up for grazing, one of the first to notice land degradation (salt, erosion, soil compaction and native pasture decline in 1853), and one of the first to see widespread efforts to change land management practices in more sustainable directions, long before 'sustainability' entered the lexicon. The region now contains some 'living treasures' in environmental education. Individual farmers such as John Fenton and Neil Lawrance have been involved in revegetation, tackling salinity, careful creation of wildlife habitat and agroforestry since the early 1960s. They were pioneers in the Glenelg Farm Tree Group, which formed in 1980, and which is made up of many members whose properties are inspiring for rural tree growers. The fifteen farms in the Potter Farmland Plan farm planning demonstration project are all within 45 minutes of Hamilton, and the works undertaken during that project become more striking each year.

The Hamilton Institute of Rural Learning, with its significant area of protected original native grasslands, is now the centre of research and community efforts to save the Eastern Barred Bandicoot (*Parameles gunnii*). The Department of Food and Agriculture's Hamilton Re-
search Institute (particularly through the work of Dr Rod Bird and Keith Cumming) has been a leader in agroforestry and direct seeding research, with large-scale field sites throughout the region. The 33 hectare Peter Francis Arboretum at Coleraine contains the largest range of eucalypt species on a single site in the world with hundreds of species of acacia, banksia, casuarina, hakea and callistemon, all labelled and growing in their natural associations.

There are dozens of Landcare groups in the district, including innovative and well-established groups such as the Dundas–Black Range Corridor Project. The extraordinary botanical richness and rugged grandeur of the 250 000 hectare Grampians National Park, and the Aboriginal interpretation centres at Halls Gap and Condah which provide fascinating insights into the Aboriginal heritage of the area, complement the environmental potpourri offered by HEAL.

Sue Marriott, a farmer and environmentalist from near Branxholme, is the dynamo behind HEAL. Sue plans and organises tours—including meals, transport, and homestead or motel accommodation—tailored to the needs of the visitor, whether traveller, farmer, scientist, student or urban dweller needing fresh air. HEAL brings local experts and visitors together in workplace settings, always with an emphasis on the practical and positive things which are being done to improve productivity and the ecological health of the landscape. HEAL was subsidised by Greening Australia for its first three years from September 1989, but it is now a commercial enterprise, which provides a small income for the farmer hosts. Reduced rates are available for educational groups. Sue can be contacted on +61(0)55 78 6223, fax 78 6206.

Boho area, will hopefully assist travellers along the Hume Highway from Melbourne to Sydney to gain much more from the trip than stress and fatigue.

*An estimated 90 000 urban coach travellers will be able to loll back in air conditioned comfort and watch the rolling hills of north-eastern Victoria slip past as they listen to the*
voices of men, women and children of the area talk about their land and their hopes and dreams for it. This is land literacy that is caught but not taught. The gentle empathy that builds up as one human being talks to another about what they value most.111

Other states have followed suit and there is now a range of brochures and tapes designed to help people read and listen to the land.

The data from land literacy programs can of course be integrated with the practical experience and intuition of land users in preparing farm and catchment plans, ensuring that these plans recognise the ecological impact of farming practices. However, the major value of such programs is the speed and effectiveness with which they transmit local environmental knowledge through communities, teaching people to observe and monitor the health of the land around them. Much more data can be gathered from more sampling points this way than is conceivable for government agencies paying professional staff, and a demand is generated for the analyses and interpretations of this data. People involved in gathering information are more interested in finding out what it means and taking it seriously. They feel some ownership of this information, some commitment to dealing with its implications, and are less overawed by the language and the aura of science and bureaucracy.

Land literacy and the case studies discussed below are consistent with the concept of ‘second order science’ or ‘post-normal science’ proposed by Silvio Funtowicz and Jerome Ravetz. They contend that environmental issues have exposed severe limitations in the traditional scientific problem-solving methodologies. For example, the scientific response to climate change has been to construct elaborate computer models which are inherently untestable, and thus of little use in resolving decision-makers’ dilemmas. ‘For second order science, facts are uncertain, values in dispute, stakes high and decisions urgent. Such sciences are important when, paradoxically, “hard” policy decisions depend on “soft” scientific inputs.’112

Funtowicz and Ravetz assert that methodologies for this post-normal science will involve extended peer communities (not just scientists), and extended facts (for example, anecdotal experience and not just the results of empirical scientific research), thus leading to greater democracy in scientific endeavour. Such methodologies are also needed to create the social involvement, ownership and commitment required to enable difficult political decisions to be made and implemented.

This makes a lot of sense when we consider issues such as the
history of water (mis)management in Australia and the contemporary challenge of trying to improve water quality, halt degradation and deal with intractable management problems. Difficult and politically volatile decisions will have to be made. This will be possible only if ordinary people are sufficiently involved in the issue to enable public decision making to reflect larger concerns than the immediate vested interests of those who stand to gain or lose most from changes in the status quo. Landcare and its associated land literacy programs are a great start in getting ordinary people involved alongside scientists and policy makers in developing a better understanding of complex environmental issues.

The following case study combines land literacy programs with an approach to extension and catchment planning characterised by open ears, open minds and a willingness to 'have a go', laced with a generous dash of common sense, and a conspicuous lack of formalised strategic plans, systems analyses and statistical surveys.

CASE STUDY

COMMUNITY CATCHMENT CENTRE—
THE NEIGHBOURLY APPROACH TO LANDCARE

The Peel-Harvey estuarine system is a shallow coastal lagoon of about 133 square kilometres, located 70 kilometres south of Perth in Western Australia. Excess algal growth has appeared since the 1960s and blue-green algae was first noticed in 1974. Severe blooms of algae have appeared each summer since, disturbing both the ecology and the amenity of the beautiful and biologically diverse estuary. The basic cause is an excess of phosphorus washing from the coastal plain, which is used for broadacre agriculture, intensive animal industries, horticulture, smallholdings, and growing urban communities. More than 50 000 people live in the catchment. As it is less than an hour from a city of one million people, many more use it for recreation and tourism.

For many years, the traditional government approach to complex resource management issues was imposed on the Peel-Harvey: undertaking extensive research, commissioning consultants' reports, setting up inquiries, holding numerous symposia and developing lots of policies incorporating technical and legal prescription. This process produced a pile of
Landcare documents 1.6 metres high, which did little to reduce the amount of phosphorus reaching the estuary or the stink at Mandurah in summer. A different tack is now being taken, based upon innovative catchment communication, planning and management.

Since 1990, Keith Bradby and others from the Peel–Harvey Community Catchment Centre in Pinjarra have adopted a more flexible approach, which Keith simply describes as: 'Why don't we just go down there to talk and work with the locals? The strategy that emerged was a simple one: work with the landholders through the key issues; support them; provide scientific stimulus and encouragement and see what happens. We all knew the general direction—reduce phosphorus loss from the catchment.'

The following quote sums up Keith Bradby's philosophy and gives a hint of his personality, which has had a not inconsiderable influence on the progress in moving from years of conflict, frustration and expensive official obfuscation to a cooperative, community-based, 'can-do' spirit to improve catchment management.

My great-grandfather was, for a while, a navvy working on the roads around Ballarat. Embedded in the family mythology is his version of how to get a long hard job done day after day. If you have to shift a mountain of gravel with a shovel, the first step is to park your empty wheelbarrow pointing in the direction you want to take it when full. Then you start shovelling at the loosest and easiest part of the pile, and create an edge so that the gravel almost falls onto your shovel.

It has been my experience that this technique works just as well with sand, sawdust, bluemetal, sheep manure and catchment management. Work out your general direction, warm up on the easiest part of the job, and the rest tends to fall into place.

The Community Catchment Centre and the personal support of Ernie Bridge, the Minister for Agriculture, have been key elements in this approach. Implicit in the community catchment approach is the concept that catchment management does not need to be complex and controversial. 'It's about neighbours helping neighbours and implementing a diversity
of low-tech strategies, each of which is capable of improving the quality of the catchment by a little bit.'

The Centre, which Keith coordinated until April 1992, contains people from the Western Australian Departments of Conservation and Land Management (CALM), Agriculture (DAWA), Water (WAWA), Environment Protection (EPA), plus two shire councils and Greening Australia, all working under the banner of the Peel–Harvey Catchment Support Group. The Centre is funded by the Department of Agriculture for five years, costing between $400 000 and $600 000 per annum. According to Keith Bradby:

Our efforts are directed at supporting landholder efforts and not in enforcing regulations and strategies developed in Perth offices. It's the first time people are on the ground setting up demonstrations; looking at problems; rolling up their sleeves and doing something. Farmers had the finger pointed at them as being the major contributors [of phosphorus] . Government departments in Perth were producing all sorts of directives and legislation to force people to act. Normally the results of these measures are that the alleged offenders put up the shutters.

In setting up the Centre, Ernie Bridge stressed that it was going to be a catchment approach, not just DAWA or the EPA. The community was so antagonistic towards the individual government agencies' approaches to extension that an integrated effort was the only acceptable way to go.

The selection of the building—a red brick house on the banks of the Murray River and on the main road in Pinjarra—was crucial in encouraging participation from throughout the community. 'It fosters a warm and friendly atmosphere in which to discuss issues of concern. It has a distinctly non-departmental air about it. It is just the home base for the overall catchment management and a place to hold public discussions.'

The Centre works in close cooperation with the nine local authorities, three Land Conservation District Committees, numerous catchment groups, progress associations and other landholder committees. Feedback to government is achieved through the government officers technical advisory group, which meets every four to six weeks, and through major forums of landholder groups twice a year.
Until the Centre came into being, many studies had been completed on the catchment, but nothing substantial had been done on the ground to prevent further degradation of the estuary. The opening of the Centre signalled a change in emphasis from measuring the problem to initiating activities to reduce its major component—nutrient levels.

*We didn’t have to listen to people in the catchment for very long to realise there was extreme unease about the monitoring data that had previously been presented. Most interested locals knew that there had been a steady stream of people taking water samples for nearly ten years, and that these samples went into a ‘scientific black box’, which seemed to bear some resemblance to a scientific black hole.*

A group of women started the Serpentine Water Watchers (see box on p. 121), which soon involved students from five local schools in measuring water quality. Any measuring or monitoring is now being done using low-tech, site-specific techniques involving the local community. The experience in the Peel–Harvey is that measurement soon becomes management. This negates impressions within the community that decisions are being made in remote offices on the basis of remote experimental evidence. In the past, local use of monitoring data has been severely limited because of local attitudes such as, ‘but that is there, my place is different!’, or ‘I’m not doing anything until you prove it!’.

A guidebook is being written on the range of initiatives developed and operated in conjunction with landholders. According to Keith Bradby: ‘The art of public listening involves extensive use of ears unencumbered by preconceptions or a vision of yourself as an expert source of information ... Many of the initiatives in the guidebook are a direct result of our lending a greater ear to the local voice.’

**Water management**

The Peel–Harvey coastal plain has an extensive artificial drainage network—in fact more than one-third of the catchment is within 100 metres of a drain. The drains are intended to drain the area of excessive winter rains, which they do effectively, but they also remove valuable spring, summer and
autumn rains, dumping nutrient-rich water into the estuary before much natural filtering can occur. Most of the drainage system is owned and operated by the Water Authority.

One of the farmer groups was keen to reduce the flows in some drains before the spring flows stopped. After talking to the Water Authority they felt the matter was still up in the air. Keith and farmers then proposed some action to the Minister for Agriculture who gave his blessing in writing. Soon after dawn the next morning, sandbags were in place on the Mealup Drain. 'The farmers reckoned that if catchment management meant major changes to the way they farmed, then government agencies needed to make some changes as well. The Water Authority was not amused, but the farmers were ... The farmers were right, and it was our job to listen to them, and support them.'

As a result, two linear wetlands extended over three kilometres upstream from one property. The catchment centre people suggested the landowner should talk to his neighbours and explain what was going on. He did so, despite some reservations. To his surprise, his neighbours were delighted with the intervention, and keen to form a small group with the aim of managing the drain more actively. 'A series of locks are presently being built along the whole fifteen kilometres of drain, to keep the water and nutrients in the landscape and to reduce maintenance costs. This spring the Water Authority launched the program by funding and constructing a permanent, adjustable lock on the drain. The farmers and Authority workers are getting on fine.'

Initial tension between the Water Authority and farmers has become meaningful dialogue; funding and expertise has been made available for further drain modifications to assist other farmer groups, and an overall review of drainage is under way. Water management now ranks with fertiliser management as a key element of the strategy to reduce nutrient loads in the catchment. Recent data indicates that these drainage modifications are as important as fertiliser management in reducing nutrient loads. And results are faster. Farmers are claiming increased summer pasture growth, habitat for waterbirds has improved dramatically, attracting flocks of ducks and spoonbills, and a shallow watertable rich in phosphorus is remaining under pasture and trees where it belongs. Greening Australia funding has been obtained to 'streamline' eleven kilometres of drain in the sub-catchment.
On the lighter side, word has spread and project officers at the Centre receive phone calls from other locals asking where they too can get sandbags.

**Streamlining**

A simple method for creating windbreaks, wildlife corridors and woodlots for timber, while providing a vegetative filter to trap nutrients before they reach drains and watercourses, has caught the imagination of the Peel–Harvey community. Streamlining simply means fencing off a creek or a drain, leaving enough room to establish some trees and shrubs on each side, and scalping shallow parallel surface drains inside the fence adjacent to the main watercourse to divert light flows of water into nutrient-filtering wetlands. More than 30 kilometres of revegetated and fenced drains have been created recently in the Peel–Harvey.

**Red mud**

One of the primary reasons for nutrient enrichment of the Peel–Harvey estuary is the low phosphorus retention capacity of the soils of much of the catchment, many of which have a phosphorus retention index (PRI) of less than two. However, the aluminium producer Alcoa produces fourteen million tonnes per year of a substance called ‘red mud’, the clay-loam material left over after processing bauxite mined in the Darling Range. Red mud has a PRI between 850 and 1000. The use of red mud added to soil had been discussed and researched in the past, and rates of application of 200 to 2000 tonnes per hectare were proven to lift pasture production and reduce nutrient losses, but at a prohibitive cost for farmers. But when the farmers, researchers, Alcoa personnel and catchment project officers got together over some tea and cakes in 1990, things suddenly looked more feasible. The costs of spreading the red mud were reduced by using farm machinery (instead of large contract earthmoving equipment), as was the cost of mixing the red mud with gypsum to reduce the alkalinity. Alcoa have now put in $100 000 for research and there are 35 trial sites using red mud.

Red mud is being used at various sites as a broadacre soil supplement, to treat paddock drains and sumps, as a piggery
effluent treatment, and as an ingredient in horticulture potting mixes. Results from pilot projects indicate that red mud is very useful in reducing nutrient loss and relatively low rates can significantly increase pasture production. Giving Bradby the last word again: 'Scientific and engineering expertise alone could not have achieved this, nor could practical farmer know-how. But it's a powerful mix.'

**Soil testing and mapping**

A soil testing database has been established and a soil testing-based fertiliser advisory program is continuing. Demonstrations of alternative fertiliser techniques are being held. The entire catchment has been mapped for land capability, and everybody has access to the Geographic Information System at the Community Catchment Centre, which is being used for storage of data, presentation of nutrient load maps and catchment planning.

**Listening to the people**

Contact with a wide range of people throughout the catchment, both formal and informal, is critical to the success of the Community Catchment Centre. Seminars covering wetlands, perennial pastures, red mud, grasshopper control and water watching have been held, as well as several field days, EPA open days, and displays at local fairs. Two forums were held to assist government authorities develop workable planning guidelines.

The value in having project officers living in the catchment area is not only having people 'at the coalface', but ensuring better feedback into regulatory processes. For example, there has been a regulatory move by the EPA to force all dairies to treat their waste water before returning it to the river or watertable, at an estimated cost per dairy of $40 000. Project officers at the catchment centre have devised ways which will meet the same health criteria for $5000 per dairy. The fear of legislation is reduced by devising practical, cost-effective measures. A concentrated regulatory effort to have all dairies adopt the more expensive option would probably yield less cooperation in implementing voluntary nutrient management practices.
As a result of the interest and input by various sectors of the community, there are now at least fourteen landholder groups working on aspects of the catchment management program. A draft catchment plan has been produced and is being revised. According to Garry Heady, Project officer for the Mealup Catchment Group, the policy of community consultation and cooperation, rather than a more regulatory approach, has paid off, as the number of people doing practical things to improve catchment management has exceeded all expectations.

An interesting aspect of this part of Western Australia is that, perhaps because of the diverse land uses in the catchment, it has been more difficult to establish Land Conservation Districts than in the wheatbelt and the pastoral zones. Rather, smaller localised groups such as bean farmers or piggery operators have formed, and they have been a successful medium for dealing with the nutrient issue. They are mainly self-motivated but require occasional inputs from staff at the catchment centre.

The Slug and Slugbusters

Even after years of research, most shires and landowners did not know the rates of phosphorus loss from each soil type and farm enterprise. For example, in the 90,488 hectares of the Serpentine-Jarrahdale Shire, there were no monitoring points when the Community Catchment Centre started.

Most of the nutrients which enter the groundwater and streams do so during the first few heavy rains of autumn, which quickly leach fertilisers and manure and other effluent from the sandy soils. To make this problem more visible and the concept easier to grasp, the catchment centre developed the image of 'the slug', a green slimy mass of nutrients, which is likely to appear under certain conditions, threatening the whole catchment. A 'slugbuster' campaign was launched, drawing the link between nutrient loss and water movement, with 2000 posters and 10,000 leaflets being distributed primarily to urban dwellers, warning of the conditions favouring the appearance of the dreaded slug. 'This is the first stage in a campaign to make catchment management much more fun than it was in the past', says Keith Bradby with a smile.

The 'slug' is now a recognised cartoon character and has also been adopted in the Goulburn Valley salinity campaign in
Mrs Cheryl Green measuring quail saltbush (one-year-old) sown by seed on the demonstration site.

Members of the Neridup group examining aerial photographs during a property planning exercise.
Tangentyere Council members at their nursery in Alice Springs.

Pipalayjarra people collecting Acacia murrayana for propagation in their nursery.
Bood Hickson of the Cloncurry group and Graham Thomas of the Richmond group in north-west Queensland.

ANDREW CAMPBELL
Waterwatchers and slugbusters in action.

Aldgate Primary School students collecting water samples.

LANDCARE AUSTRALIA LTD
Victoria. Projects aimed at preventing the appearance of the slug are called 'slugbusting' and the participants are 'slugbusters', introduced in the Water Watchers box below.

Water Watchers

Water Watchers started out as a women’s group interested in getting to the bottom of what was causing the blue-green algal blooms in a coastal town of Western Australia. They believed that the government, through the media, were blaming farmers higher up in the catchment, for 'polluting' the estuary with phosphorus from fertilisers.

Water Watchers aimed to: collect data on the water quality in the creeks and drains in their area; raise awareness about the health of waterways in their community; involve a wide range of people in their project; and create a base for community action plans to prevent further pollution of the estuary.

They did this by involving schoolchildren from five local primary schools who went out in search of ‘the slug’. This was no ordinary slug, but a word used to describe the first mass of phosphorus coming down the creeks and drains after rain. Water samples were taken, the speed of flow was estimated and drain profiles were recorded to describe the area where samples were taken.

The results of Water Watchers monitoring activities exceeded their expectations. Not only did they achieve everything they set out to do, but they did more. In their words:

*It has fired up other monitoring groups to do something, do it quickly, and get their figures into a form which actually means something for others.*

*We found that wetlands were stripping phosphorus from the water.*

*It has shown up terrible problems in the government’s monitoring programs. Many of their statements were based on assumptions, not facts.*
Water Watchers did not just institute an environmental education program in their local community. They also contributed to accurate data analysis of water quality in their area. This case shows that community groups can contribute very effectively to action and education on important environmental issues in their local area. The case of Water Watchers has been studied in detail by Anna Carr, of the Centre for Resource and Environmental Studies at the Australian National University in Canberra, and is described more fully in Carr (1992).

**CASE STUDY**

**LANDCARE IN SCHOOLS**

Some of the most exciting and potentially influential Landcare work is occurring in schools. This has been touched on in the land literacy discussion, and is elaborated later in this chapter. However, it is worth focusing on a single school to see how a range of Landcare activities can be integrated into school curricula with the support and commitment of parents and teachers.

Aldgate Primary School in South Australia won the 1991 Landcare Australia Telecom Education Award for a comprehensive and innovative integration of landcare into school activities. A consistent thread running through the Aldgate program is that Landcare is not just tacked on as an afterthought to other subjects, but interwoven so that students gain other skills and insights within the context of landcare. A key teacher wrote curriculum support materials with the assistance of several parents, teachers and education advisers. These are now being trialled and modified as the need arises.

Students have designed several types of environmental trails including: sensory; Aboriginal; historical; recent land use; trails in National Parks; and a general trail. The students learn how to work in teams, thinking a project through from start to finish, coordination of action to implement their plan on the ground, as well as the actual experience of the trail. Some of the trails have
been designed for particular age groups, while others are designed with the two-fold purpose of reinforcing or teaching certain principles, and community use.

The school uses excursions and camps to expose students to environmental issues at first hand, using teaching materials developed within the school. Teachers and students learn from a variety of guest experts about topics being studied. This also exposes the processes involved in writing, questioning, recording, letter writing, interviewing and videoing.

All classes do special projects designed to improve the environment, including: plant propagation—since June 1990, 3000 trees have been propagated by students (from indigenous seed collected by students) for a number of specific projects involving parents, such as tree and shrub landscaping at Hahndorf Golf Club, establishing trees for koalas in the Cleland Conservation Park; visiting local farms; participating in Frogwatch and Saltwatch (described earlier in this chapter); seeking suitable hollow logs from the local wood merchant for native fauna 'houses'; carrying out a local creek study designed by a parent who works for the Water Resources Department; and incorporating a reduce/reuse/recycle campaign into all activities in class and on excursions and camps, including composting of lunch scraps and recycling waste paper.

Weaving landcare throughout a school curriculum is not straightforward, however, especially for teachers who are flat out just teaching their existing coursework and have little time to consider redesigning a whole range of subjects. Landcare curriculum teaching materials are now being developed in all states, by specialist environmental educators funded by the National Landcare Program, building upon the excellent early kits which were developed in the late 1980s, notably by Catherine Buxton in Victoria. The Tasmanian project outlined in the box on pages 124–5 goes one step further, by actually working with teachers to improve their knowledge, skills and confidence in helping people to learn about landcare.

**WOMEN IN LANDCARE**

Landcare groups in which women are actively involved are more effective. They tend to tackle a broader range of issues, to share learning and decision making throughout the group to a greater
**A practical introduction to the teaching of landcare for teachers**

An innovative program based on ‘teaching teachers’ about landcare is under way in Tasmania. ‘Landcare for Teachers’ enables school teachers to help their students move from an awareness of the problems to taking action for the environment.

Landcare for Teachers provides an insight into various forms of land degradation, but it also has a positive message to transmit: individuals can make a difference. The positive, ‘hands-on’ approach is a key feature of the course and teachers often follow up by introducing landcare into their teaching curriculum in a positive way. Landcare is suited to the curriculum at all ages from early childhood to the final year of high school and it integrates into all subject areas from English and art to social studies and the sciences. Students become involved in all sorts of landcare activities, including land literacy programs, rehabilitating degraded bush areas near their schools, planning their own school grounds, monitoring natural resources such as water quality or wildlife populations, and organising junior landcare conferences.

Landcare for Teachers is a university-accredited landcare course for educators, which has been operating since 1990. Most teachers to date have taken the course for interest and professional development, but a few, and these include a growing number of trainee teachers, opt to take it as part of a teaching degree. This is particularly important, as it is often the newly-graduated teachers who are keenest to put landcare ideas into action.

The 36 hour course consists of seminars, practical projects and field trips, with an emphasis on linking the various technical and social aspects of landcare into an holistic framework. Seminar leaders are all specialists in their fields (e.g. soils, vegetation, catchment management, recycling), who convey information about their subject in an engaging way to teachers, many of whom lack a technical background in science. Their enthusiasm for their sub-
Project and commitment to landcare education are an important contribution to the success of the program.

Teachers who have completed the course have more knowledge, skills and confidence with which to help students learn about landcare, and also some personal contacts with resource people to help them get a Landcare program off the ground in their schools. The ultimate goal of the Landcare for Teachers program is to rapidly multiply the number of students involved in doing something positive and practical for the environment.

Funded by the National Landcare Program and developed at the University of Tasmania by Dr Tania Stadler, Landcare for Teachers is an innovative and far-reaching element of landcare education and land literacy in Australia. It has the potential to help students enjoy and learn from practical and interesting landcare experience by giving their teachers some basic tools, support and encouragement.

degree, and to have stronger linkages between the group and the rest of the community (such as schools), compared with groups overwhelmingly comprised of men. As a result, groups in which women are 'up front' members seem to achieve more practical results in their local district.

A distinguishing characteristic of Landcare compared with traditional approaches to research and extension is the greater recognition of the role of women in land management, and the greater involvement of women in planning, directing and carrying out group projects. There are many people in Landcare groups who have long since ceased to consider gender an issue, and whose involvement in Landcare occurs (or not) according to their interests and abilities, rather than their gender. In most farming couples, land management information and decisions are shared, although for practical reasons often only one partner attends Landcare functions. Landcare has made a big difference to the lives of many people involved in it, women and men, but particularly some of the women involved in group leadership, coordination and facilitation roles.

The prominent roles played from the start of the Victorian LandCare program by Joan Kirner (Minister for Conservation,
Forests and Lands and later Premier of Victoria) and Heather Mitchell (President of the Victorian Farmers Federation), people who were prepared to cross political barriers to get things done, may have encouraged women's involvement in that state. Women do occupy high profile leadership roles within the broader environmental movement in Australia; for example, Ros Kelly, former Federal Minister for the Environment, Tricia Caswell, Karen Alexander and Sue Salmon of the Australian Conservation Foundation, Winsome McCaughey of Greening Australia, Lynette Thorstensen of Greenpeace and Karenne Jurd of The Wilderness Society.

But we still have a long way to go. We lack data on the degree and type of participation by women in landcare in Australia, but it is safe to say that involvement of women is patchy. Overall, women probably remain a significant minority of Landcare group members, and an even smaller minority of Landcare group leaders. A review of the Victorian LandCare program in 1989 found that many Landcare group members, male and female, were mildly offended that women's involvement was even considered an issue.116 A survey of Land Conservation District Committees in Western Australia in 1991 found that women made up seventeen per cent of the membership of these committees, and of these women, 35 per cent were in the role of secretary.117 Anecdotal evidence suggests that, as one travels further north and further away from the coast, the traditional gender roles, of women in the home and men doing farm work and going to meetings, become more entrenched. Where women are involved in Landcare groups in these areas, it is common that they are the secretary of the group and expected to provide the cakes and tea ('ladies bring a plate') after the meeting.

Even in these more conservative areas, traditional stereotypes are breaking down. Of course many women on the land have always been intimately involved in discussions and decisions about land management, especially financial decisions. It is often the female farming partner who does the books. Furthermore, it is common in Australia that women on the land have more formal education than their husbands, which may explain why women are often asked to be the secretary of Landcare groups (often an onerous; unglamorous role considering the paper warfare involved in Landcare funding and the amount of literature with which groups are bombarded). However, using the same logic, one might expect a disproportionately high number of women Landcare group leaders, which is not the case. People involved in Landcare could be asking why this is so. With rural economic decline and the difficulties in
affording outside labour, many women on the land are now also doing more work in addition to their work in the home (either on the farm or elsewhere for off-farm income).\textsuperscript{118}

There is enormous potential for women to play a constructive role in the Landcare movement. We have no wish to polarise Landcare according to gender, but women on the land do tend to be more concerned with long-term social and environmental issues than do men. It is usually the women on the land who are first to express concern about the long-term effects (on human health and the environment) of agricultural chemicals, or about the loss of remnant vegetation and hence wildlife, or about water quality, landscape values, or the closure of schools, the ageing of rural populations and social fragmentation. It is usually the women who first see the writing on the wall when their farms are going broke, and it is usually the women who are first to seek outside help, rather than clinging to forlorn hopes of better prices and better seasons. Furthermore, women are often more open and better able to communicate about these issues, and they tend to have a wider network of confidantes.

Peer support networks are particularly pertinent when we consider the social aspects of rural decline introduced in Chapter 2, as posited by Peter Cock of the Graduate School of Environmental Science at Monash University:

\textit{From the standpoint of the individual's empowerment in the world, local cooperative development provides access to a human pool of so-called 'significant others' within one's immediate environment \ldots Such cooperative development can provide a powerful bridge between the individual household and the wider society. A clear sense of belonging and social identity is basic to human well-being. Social alienation, stress and their symptoms of suicide, drug use and acute anxiety tend to be minimised when each person is connected in intimate ways through a persistent network of other persons which extends beyond the nuclear family, but which does not grow far beyond the number of people a person can know.}\textsuperscript{119}

Involving women in Landcare, or any other form of agricultural extension, research and development, means more than just hanging out a shingle saying 'everyone welcome'. Simple matters such as the scheduling of meetings, field days, tours and workshops so that
both partners can attend (providing child care facilities if necessary) are extremely important.\textsuperscript{120} The literature disseminated by government departments and other institutions conveys implicit messages. For example, where photographs of group activities feature men only, or programs list male speakers only, it is easy for women to feel excluded. The employment of women extension officers and researchers, which has probably been taken further in Landcare (particularly the employment of facilitators and coordinators) than in other sectors of agriculture in Australia, has been a critical step in the right direction.

We are not implying that all extension staff, facilitators and coordinators should be women. With appropriate training, it should be possible for people of either gender to work effectively with farmers on social and environmental issues. But ideally there should be a balance between men and women in research and extension. The pursuit of sustainable agriculture in general has much to gain from a blend of the perspectives, skills and experiences of women and men. In Landcare, however, we are prepared to stick our necks out and suggest that landcare would benefit if the traditional balance of men to women employed in extension, facilitation and coordination roles were tilted—in other words, if women were a majority in these roles.

We are arguing for recognition and support for greater involvement of women in Landcare and the general quest for sustainable systems of land use and management in Australia, not just on the grounds of equity (which are compelling), but because society has so much to gain in sheer productivity terms if everyone has equal opportunity, credibility and legitimacy as players in this scene. Women already play constructive, productive, economically vital roles on farms and in Landcare groups. However, we are only scratching the surface of the potential gains from tapping into the different skills, perspectives, experiences and intellectual effort (not better or worse, but different, equally valid and valuable) which could be harnessed if all the relevant sectors of society genuinely felt part of the effort. This argument holds not only for women, but for other groups such as older people, indigenous people, youth and ethnic groups. We can all benefit in very tangible ways if the full spectrum of society can and do get involved.

There are a number of initiatives in place around Australia which are working towards or which complement this goal. We will mention a few that are indicative of a groundswell of effort in diverse situations. One of the most important of these is the emer-
gence of networks for rural women, such as the Victorian Rural Women’s Network, which was established in 1986 by the Office of Rural Affairs within the Department of Agriculture, in recognition of the key role of women in sustaining their families, farms, businesses and communities. The Network is not a separate organisation; but a process of linking groups and individual women in order to share resources and skills to meet the needs of rural women, and to enable women to have a more active and influential role in government decisions which affect their lives. The main themes of the Network are continually evolving, but they encompass information sharing, skills development for participation in public life, handling change in rural communities, health and environmental issues, fostering economic independence, and education and training in rural areas.

What does a rural women’s network do in practice? The Victorian network publishes a free quarterly newsletter, NETWORK, which provides a forum for raising and sharing ideas and experiences, 85 per cent of the content being contributed by rural women, and it has a circulation of 13,000. Other activities of the Network include grassroots networking between groups and individuals, linking people and groups, answering queries and supporting workshops and conferences; promoting the needs of rural people in state government, ensuring relevant departments are aware of the needs of rural women; and developing and delivering strategies to tackle each of the themes mentioned above. The two full-time staff of the Network receive advice and direction from a reference group comprising representatives of a wide range of relevant organisations and a number of individual women from across the state. This group also plays an important consultative role.

Complementing the activities of the various networks around the country are many smaller initiatives responding to perceived local needs. For example, Terri Lloyd, a farmer from Dumbleyung in the southern wheatbelt of Western Australia, organised bus tours for farm women to look at research into wildlife corridors and the activities of farmers in other areas, supported by the Department of Agriculture and Greening Australia. She also organised a series of electric fencing workshops for farm women. These activities were organised by women, for women, during school hours, with small children welcome. Maureen Walsh, one of the Farm Advance coordinators (see Chapter 7), was instrumental in setting up the TAFE course ‘Paddock to Plate’, which helps rural women to understand the entire production, processing and marketing sys-
tem and to look for ways to jump off the treadmill of declining farm terms of trade. Maureen also organised a series of chemical awareness days for farm women, and a number of farm women discussion groups.

These activities, and dozens of others we have not mentioned, are likely to be consolidated further with the development of a national newsletter for rural women and the occasion of the International Women in Agriculture Conference at the University of Melbourne in July 1994. People interested in this issue from an international perspective would do well to read Changing the Boundaries: Women-centred perspectives on population and the environment, by Janice Jiggins, published by the Island Press, Washington.

CASE STUDY

COMMUNITY LANDCARE TECHNICIANS

The activities and vigour of Landcare groups are creating an increased demand for on-farm technical advice on a wide range of land conservation issues at a time when technical advisory services, especially for one-to-one advice on farms, are being constrained by budget cut-backs and losses of experienced staff. Government agencies have traditionally provided the vast majority of most forms of land conservation advice, which is not something most farmers are willing to pay for, so it is unlikely that private enterprise will step into the vacuum—especially for those issues where the public benefit may be higher than the benefit to the individual land user. This is potentially a huge problem for Landcare.

However, there is a middle road between providing a complete publicly-funded advisory service using full-time public servants, which is increasingly beyond state budgets, and leaving extension to the market to determine, which will surely leave land conservation in the cold. There is a potentially much more rewarding direction towards improved land management than either of these apparent alternatives.

The simple idea is to use some of the remaining extension officers with a high level of technical skills and an ability to impart them, to run training programs for farmers in the tech-
nical aspects of land conservation, and to encourage Landcare
groups to employ these newly qualified people at a subsidised
rate. This solution puts skills into local communities where
they will be retained, unlike extension officers who tend to
come and go. This idea is being pioneered in Western Aus­
tralia by the Department of Agriculture.122

In an effort to satisfy the demands for basic technical sup­
port such as surveying of soil conservation earthworks,
watertable monitoring or tree species selection and establish­
ment techniques, DAWA set up a Community Landcare Tech­
nicians training scheme with National Landcare Program
(NLP) funding. The program is designed to provide local
people with skills that are needed within their community.
Land Conservation District Committees are able to nominate
people from their district to attend short modules of technical
training, coordinated by Tim Negus at Narrogin. Most partici­
pants are young farmers. People who successfully complete
the training are then endorsed by the Department as com­
petent in their field, and are able to advertise their services as
landcare assistants on a commercial basis.

Community Landcare Technicians are qualified after 30
days training in three modules: ‘Planning to Combat Salinity’,
‘Revegetation—Trees and Forage Shrubs’, ‘Erosion and
Water Control’; and 30 days supervised work experience.
Each module consists of ten days formal course work followed
by ten days of supervised work experience in the trainee’s
home district. Days are divided into mornings spent in the
lecture hall in discussion groups, listening to talks, viewing
slides or videos, or working on aerial photographs, maps or
plans. Afternoons are spent visiting commercial farms, in­
specting problems, discussing options and then planning,
mapping or surveying the recommended works—again in
groups of three or four. Team building and facilitation tech­
niques are included to develop trainees’ confidence in work­
ing with groups after they graduate. Listening to the client,
and developing the skills of sharing and not directing what
should be done, are encouraged in the trainees to make the
most of farmers’ intimate local knowledge of their own prop­
erty and farming system.

Thirty-eight per cent of land conservation technical train­
ing in Western Australia is devoted to Community Landcare
Technicians, with the aim of having a technical resource per-
son in every Land Conservation District by 1994. By June 1992, 74 trainees had attended courses; 30 Community Landcare Technicians (CLTs) had successfully completed all modules of the course, of whom twenty were actively applying their skills in the field and ten were under-utilised. Given the current torpor of the rural economy, the fact that twenty newly trained people are actively employed on land conservation work is extremely encouraging.

Catalytic technical training for high performing Community Landcare Technicians is currently being introduced, in which selected CLTs work in a catchment under the direct supervision of a Department of Agriculture land conservation officer. The possibility of linking qualified CLTs with work that needs doing in an LCD through the use of national funding for underemployed people is being investigated by the department. Local people have learned new skills, community groups have decided what needs to be done—funds are needed to bring them together.

Training for farmers, rather than just for departmental or NLP-funded staff reifies the principles of community-based action and empowerment, in that it transfers skills to Landcare groups to build their own strengths and resources. Such training meshes in with the facilitation skills used to set goals and action plans, by mirroring concepts of participation, ownership and decision making in an everyday setting. The distinction between farmers and departmental staff is blurred when they share the same courses.

The increased emphasis in training on maintenance skills (such as communication, maintaining motivation, making meetings effective) reflects changes in the Landcare groups in Western Australia. Over half the LCDCs have now set goals and begun action plans. For these groups, maintenance skills are becoming vital as they grapple with 'flat spots' in enthusiasm, long serving members, second generation leaders and being a target for information and requests. Moving from the awareness raising, information gathering and planning phase into implementation of projects on individual properties and at a catchment scale creates a demand for local technical support. Having a local person skilled in particular land conservation techniques working for the group fosters self-reliance and independence in gathering and using information.
**CASE STUDY**

**DUNECARE**

Even before Landcare started in New South Wales in 1989, Australia's most populous state pioneered a complementary program called 'Dunecare', which involves coastal communities in looking after and rehabilitating sensitive dune systems along the New South Wales coast, and it is now being adopted in other states. The pilot Dunecare program was initiated by the Soil Conservation Service on the north coast in January 1988. Four coastal communities were selected to participate in sand dune reclamation projects, which were launched as the 'Dunecare' program in September 1988. The program quickly expanded along the coast, to the point where there were twenty Dunecare groups by May 1990, 41 by June 1991 and over 100 by 1994.124

Soil conservationists Peter Davies and Debbie Tksachenko were instrumental in developing Dunecare on the New South Wales north coast. Their overall aim was to stabilise shifting sand dunes using high levels of community participation or, in economists' terms, to create a management system based on low capital inputs but high voluntary labour inputs. Socially, the spin-offs are increased community awareness of the dune system and its management requirements, and opportunities for the community to get involved in the management of public lands in their own neighbourhood.

The program has been extremely successful. In essence, local coastal communities are looking after their own backyards, just as farmers are doing, except that the lands they are working on are not their own. Given the demography of the New South Wales coast, Dunecare groups tend to consist of a broad spectrum of professional people, retired people, unemployed people and other beach users. In the early days of Dunecare, the Soil Conservation Service contributed a great deal of expertise, demonstrating dune restoration and stabilisation techniques, providing advice and materials, and lending equipment. These days most state government external assistance is in terms of education, with some financial grants coming through the National Landcare
A group which epitomises Dunecare is the Fingal Head Dunecare and Reafforestation Group, located near Tweed Heads on the New South Wales–Queensland border, which formed in 1989 in order to:

- revegetate the entire dune system and re-establish the littoral rainforest while eradicating introduced species, particularly Bitou Bush;
- establish and operate a nursery where local endangered species, like Cryptocaria foetida, and site-specific native plants are propagated for planting and distribution to other Dunecare groups;
- promote their activities and plan of action throughout the Tweed region, educating and involving a wide range of people and organisations, and developing a model for similar programs elsewhere.

The group designed and built their nursery with the help of local businesses and the council, who supplied materials and water to the site. The council also helps with the use of its machines for Dunecare work when they are not required elsewhere. According to the group coordinator, Kate Piper, 'Members of the Fingal group have put in thousands of hours of work to remove Bitou Bush and stabilise the dunes. But without the help of organisations such as Lions, the Tweed Garden Club and the Pooningbah Aboriginal and Islander Community, we would be nowhere near where we are now.'

In June 1992, Fingal Dunecare, in association with another community group, Fingal Defenders Inc., began participating in the federal Jobskills Program. Ten unemployed volunteers were trained over six months in plant nursery skills, Bitou Bush eradication, reafforestation and coastal management techniques, under Kate Piper's supervision. Brian Mason, senior agronomist with the Queensland Beach Protection Society, recalls: 'In twelve months, the Fingal group had planted probably more trees than any other tree planting organisation in Australia. When you see the enormity of the problem and immensity of the task to restore the dunes, it is a wonder it didn’t stop them dead in their tracks.'

One of the secrets to the success of Fingal and the other
Dunecare groups is that, unlike more remote rural Landcare groups, they are able to draw on a richer and more diverse population of people, many of whom have spare time and for whom physical outdoor work is a novelty. They tend to tap into support from a wide range of organisations, as noted by Lee Scarlett, a member of the Fingal group: ‘We constantly seek advice from the Department of Conservation and Land Management, the Beach Protection Society, Queensland Department of Lands, Tweed Shire Council, Tweed–Byron Aboriginal Land Council, state and federal departments of Wildlife and Nature Conservation, and other recognised specialists across the state.’ The Fingal group have also received tremendous support from the media, who they invite to every working bee, barbecue, seminar, workshop and conference. The work of Dunecare groups is something most people identify with, and with which many businesses wish to be associated.

Dunecare work also offers great opportunities for action learning for students and adults. The potential synergy which can be captured when students are involved in learning activities which are actually relevant and useful in the world outside the classroom, has already been mentioned in our land literacy discussion. Here is an example of a type of environmental education which is becoming ever more common in Australia, which is highly complementary to Landcare and Dunecare, and which will hopefully reverse the trend of each human generation becoming progressively more detached from and ignorant of the natural resources upon which human societies ultimately depend.

Kingscliff High School is quite near Fingal Dunecare Group. In 1989, science teacher Peter Langley encouraged his Year 9 science class to select research topics which they thought were the main environmental concerns of the community. The students designed a wave motion machine to show the effects of waves on beach erosion. Mermaid Plastics constructed the tank and the Year 10 electronics class built the motor from a windscreen motor. Kingscliff Rotary Club donated $600 for materials. Students measure wave frequency, heights and amplitudes to investigate how and why erosion occurs, generating discussion of how erosion can be prevented from destroying the beaches.

At the rear of Kingscliff High School is a tract of rainforest
degraded by misuse, resulting in the invasion by weeds such as Lantana. The class drew up a rehabilitation plan, applied for and received funding from local organisations for replenishing the rainforest and establishing a shadehouse. They then spent days removing the weeds, cleaning out the small creek which runs through the rainforest, and planting over 250 trees. Once a month the science class collects seeds and grows them in the shadehouse, while maintaining the trees already planted. This project complements historical and ecological studies of the rainforests of the Tweed.

Peter Langley reflects:

Since we began our projects in 1989, school and community involvement has increased dramatically. Our work, which once involved only the 30 students of Year 9 science, has now expanded to include community groups such as Fingal and Pottsville Dunecare Groups, Apex, Rotary, Lions, Tweed Shire Council, the Allan Fletcher Institute in Brisbane and the majority of the junior school of Kingscliff High.

When students and adults are learning together on projects relevant to the whole community, like stabilising coastal dunes, students get the satisfaction of knowing that they are not merely going through the motions of a classroom exercise; adults get exposed to the fresh ideas and perspectives of a generation which appears to be more committed to environmental issues, and hopefully some useful practical work gets done. This is a type of social learning which can help whole communities constructively confront the need for change in their relationship with nature.
The current financial crisis in rural Australia is making it difficult for most farming practices to pay. In this context, farmers can only afford changes which at least maintain short-term profitability. This would seem to preclude changes aimed at improving long-term sustainability.

However, improving sustainability and improving profitability need not be mutually exclusive. There are many refinements which can be made to conventional farming systems which improve profitability, and which are in the better long-term interests of the land. This is not a 'how to' manual of conservation farming—there are other, more technical references specific to particular regions. Throughout the case studies examined thus far and later in this chapter, there are examples of how individuals and groups have made profitable changes to farming practices, such as reducing rangeland stocking rates and improving herd quality, improving perennial pastures and rotational grazing, opportunity cropping on suitable land types and elimination of cropping from unsuitable land types, fine-tuning cropping practices to increase plant water use and crop yields, drainage of waterlogged areas, provision of shelter for stock and crops, and establishment of fodder species to fill autumn feed gaps, allowing higher year-round production. Each of these cases must be appreciated in its own context and the lessons learned interpreted accordingly. General prescriptions are of little value.

Nevertheless, there are some general principles and planning processes which do travel well. In tough times it is even more important to manage resources smarter. Know your land, your enterprise, your farming system, your markets, your industry and, above all, your own strengths and weaknesses. Take time to get in control...
of the information most relevant to your business. Be careful to avoid false economies in a rush to cut costs. Good advice is always worth paying for, especially for people under the stress of debt who may be having trouble seeing the wood from the trees. Careful management of financial resources and services, making sure the farm accountant is more than just a tax agent, looking for the best possible re-financing options—these are all common sense strategies at any time, particularly relevant now.

Being prepared to share stress is an important step in dealing with it, which is why groups, whether Landcare groups widening their focus, or farm management discussion groups, have a great deal to offer. Farmers learn most of all from each other, about farm business management as much as any other topic, although it does take a while for mutual trust to develop in a group situation, and skilled facilitation is a big help.

Of course a lot depends on the quality of management. Experienced farmers, agricultural advisers and consultants know well that there is usually quite a gap between the best farmers and the average farmers in a given district, and that the land of poor managers is more likely to be in bad condition than the land of the better and more profitable managers.

But land-conserving practices are as handy as an ashtray on a motorbike unless they are practical, profitable, low risk and reasonably compatible with the farmer's style of farming. It behoves advocates of conservation practices to be aware of the context in which their preferred technology or practice is to be applied, and to be conscious of the limitations (from a farmer's perspective) of measures being advocated.

The following cases illustrate that taking a sustainability perspective does not necessarily mean financial sacrifice. However, when there is no cash available, more emphasis may be put on planning rather than implementation. We begin with a discussion of farm planning processes. There is little to be gained by lamenting the fact that farmers may not be doing much at the moment. We should be focusing on the constraints to land conservation (discussed in Chapter 8) and looking for ways to help farmers to jump off the cost/price squeeze treadmill, rather than just telling them to run a bit faster or give up.

PUTTING IT ALL TOGETHER—THE PLANNING PROCESS

I used to have a farm plan in my head—which was a bloody silly place for it!
Making Landcare pay

Peter Waldron, one of the Potter Farmland Plan\textsuperscript{128} demonstration farmers, often uses this line when he is showing visitors around his property, as an introduction to the value of farm planning and of going through an explicit farm planning process.

One of the most significant aspects of Landcare in Australia is the degree to which it is now associated with an emphasis on farm and catchment planning. This association is important for several reasons: Landcare is about more than 'fixing' isolated problems, it concerns the integration of productivity goals with land conservation goals; Landcare is concerned with taking a long-term perspective on the management of natural resources; and Landcare is about 'scaling up' from the individual farm level to tackle problems cooperatively on a district or catchment basis. Each of these challenges demands a planned approach, preferably in a dynamic, ongoing planning process. This planning is one of the most important contributions Landcare is making to help farmers to improve productivity in ways which also enhance the health of their land or, in the arid language of economics, improve income without depreciating natural capital.

It is worth briefly reviewing the evolution of farm planning and its relationship with Landcare.

Farm planning\textsuperscript{129} has evolved considerably over the last 40 years in Australian agriculture. It emerged in a formal sense during the 1950s. Soil conservation departments in Victoria and New South Wales introduced farm planning services in 1951 and 1957 respectively.\textsuperscript{130} These plans were primarily aimed at soil erosion control and were largely prepared by government staff, using land capability assessment as the basis for plan development. Consequently these early plans focused on physical erosion control works and, to a lesser extent, property layout, water conservation, tillage methods and pasture development.

Also during the 1950s, P.A. Yeomans, a visionary farmer, surveyor and engineer, developed Keyline:

\textit{... a set of principles, techniques and systems coordinated into a plan for the development of farm and grazing landscapes ... a master plan for the elaboration of a 'replacement' for the natural or existing landscape. A principal aim of Keyline is to increase both the depth and fertility of the soil so that the soil of farming and grazing land is safe and permanent and capable of continuous improvement ... It includes new cultivation techniques; a method of farm subdivision and layout; planning for}
timber and scrub clearing and water conservation and irrigation. All are planned to facilitate or assist in the production of fertile soil.¹³¹

Yeomans was ahead of his time in the use of terms such as ‘safe’, ‘permanent’, ‘capable of continuous improvement’, ‘facilitate production of fertile soil’, in attempting to integrate land and water conservation with improved soil fertility, and in recognising the importance of biological activity within soils and the role of remnant vegetation on farms. He also contended that farmers could follow his methods to prepare and implement their own Keyline plans, thus anticipating the critical debate about ownership of the farm planning process by several decades.

Most property planning activity through the 1960s and 1970s was still led by state soil conservation agencies, although farm management consultants began to offer production-oriented planning advice, and plans focusing on surface hydrology became more common in irrigation districts.¹³² Several government agencies broadened their thinking on farm planning from the mid-1980s. The Western Australian Department of Agriculture developed a comprehensive computer-based farm planning package called ‘Landman’, which integrated land management plans with financial management plans and mathematical programming models, to answer ‘what if’ questions to help farmers quickly evaluate the physical and financial impact of any planning decision.¹³³ State government agencies in Western Australia, Victoria and Queensland began to develop self-help farm planning courses and resource material in the late 80s.¹³⁴

The Potter Farmland Plan project ran a series of short courses in whole farm planning starting in 1987, at which groups of farmers, usually from the same district, were guided through the farm planning process together (in their local hall) for half a day per week over six to eight weeks. The interaction between course participants was enlightening. It exposed the benefits of looking with fresh eyes at another’s problems and the willingness of farmers to be more adventurous in their exploration of possibilities for the management of land other than their own.¹³⁵ Similar courses, supported by various farm planning manuals and kits are now operating in most states. Even more common are property planning workshops which are often run by Landcare groups or state agencies in farm sheds or local schools over a day or so.¹³⁶

Two dominant trends are evident when looking back over this evolution, the first focusing on what farm planning means and thus
what a plan consists of, the second concerning who should be involved and at what stages of the planning process. The outcome of these two trends has been a continuous evolution in the how of farm planning. We have seen:

- A move away from ‘fixing’ land degradation problems towards developing better land management systems.
- Greater emphasis (albeit with a long way to go) on integrating the production enterprise and financial management into the property planning process, rather than confining it to the physical layout of the property. What happens between the fences is as important as fence location. A state of the art property plan of the 90s thus consists of: an assessment and mapping of the status and distribution of natural resources (soils, water, vegetation, topography); classification of the farm into various land units according to land capability and recommended practices; definition of options for production systems on each land type and over the whole farm; longer term schedules for managing risk (eg droughts, floods, fires), vertebrate pests and weeds, nature conservation, water conservation and off-site effects; and finally an integration of all this physical planning into farm business management.137

- A continual shift in the degree of participation in, and ownership of, the planning process, away from public servants and consultants towards land users:
- Accelerating acceptance of catchment and/or district plans which build on individual property plans, which encompass broader ecological issues (eg remnant vegetation, river management, groundwater systems, wildlife habitat), and which are just starting to recognise, if not integrate, social issues.
- Increasing emphasis on process (recognising the importance of involvement and ownership) and flexibility of output. The presentation of the plan is less important than the changes which occur inside the planners’ heads and those which are subsequently implemented on the ground.
- Institutions, in particular land conservation agencies and agriculture departments, are learning to respond to requests for planning assistance, rather than designing and running their own planning services according to their own priorities and capacities. Consultants are also getting in on the act, latterly with the added stimulus of regulations requiring an approved property plan to be eligible for deductions under section 75D of the Tax Act.
The artificial lines between researcher, extension agent and land user are being blurred and in some cases dissolved through the planning process. Property planning is now seen much more as an ongoing learning process than as the production of a ‘flash map of the farm’ which is framed and given pride of place on the office wall (or even worse, rolled up and put away) never to work for its keep again.\textsuperscript{138}

One of the most common activities for Landcare groups is property and catchment planning. Most of the land degradation problems which concern groups cross property boundaries and are thus more suited to catchment-based approaches. Groups are also better able to attract resources from government and private sources to run farm planning short courses and to assist in the preparation of catchment plans. As more groups define their own needs and approach the same task in their own way, the evolution of different approaches to farm and catchment planning has accelerated. Some groups are using computer-based Geographic Information Systems (GIS), others have developed very simple processes based around laser-copied enlarged aerial photographs, and others have made very effective use of private consultants as hunters and gatherers of information and as ‘the voice of the catchment’.

We have already looked at the Kalannie–Goodlands Land Conservation District Committee in Western Australia, and briefly mentioned their catchment planning activities. This process is being coordinated by Viv Read, a former adviser with the Department of Agriculture who is now an independent land management and catchment planning consultant.\textsuperscript{139} We asked Viv to put some thoughts on paper which could go into a box on catchment planning. Viv was concerned about encapsulating such an issue so briefly, but he responded in a way which captures the complexity, the potential, and the still-developing status of group-based property and catchment planning.

Viv touches on a number of issues here, such as the importance of information—who generates it, who stores it and who controls it; the interdependence of ecological and agronomic issues at both farm and catchment scales; the relationship between farmers’ land management and management of land by local and state governments (and the ecological importance of the latter); the influence of the structure and cohesion of the Landcare group on the type of planning it can carry out; the significant technical uncertainties and gaps in knowledge which confront efforts to develop more sustainable (‘ecologically robust’) agricultural systems; and the spirit of
Viv Read on property and catchment planning with Kalannie–Goodlands

We have burgeoning barriers at all levels to the development of an intuitively robust landcare ethic and of ecologically robust land use systems. However, those who have a bona fide responsibility or love for the land are not deterred.

The essence of success with the Kalannie–Goodlands group is a complex formulation. It goes beyond representation by visible demonstration of achievement or an account of technical requirements for land amelioration. Replication of the change that is required is dependent upon a very sound planning framework. For Kalannie–Goodlands, this has yet to be developed.

The achievements of the Kalannie–Goodlands LCDC to date represent the early stages of a fully matured catchment management project. We have aroused and aligned curiosity, created an information dissemination system, made participation better than rugged individuality, developed mechanisms for self-energisation and broken the myths of authoritarianism.

Technically, for project administration, the project has developed specialised roles within the LCD structure for Executive Committee, Committee, Catchment Leaders, Group Coordinator and Community Landcare Technician. The latter role is an initiative of the Department of Agriculture but has been embellished and tailored for the requirements of the Kalannie–Goodlands group. With the inclusion of my roles as land management consultant and project manager, each role is now considered indispensable.

Information administration is fundamental to the psyche of success. At an earlier stage, the group recognised the importance of independence of information. They partially addressed this issue by group contributions towards the commercial development of a locally conducted GIS. This initiative has caused some friction with those who need centralised control but has also opened the window of liberty to those who will most use the infor-
mation. Ownership and management of information remains the most threatening barrier to better land management. Centralised information covers for deficiencies where they occur but at the same time disempowers grassroots thought and action.

The planning achievements for the Kalannie-Goodlands LCD are notable for the geographic enormity of the project. We are now about 70 per cent complete with the preparation of property plans for the 95 farming families who manage the 276,000 hectares of agricultural land. There are no plans for the approximately 24,000 hectares of public land within the LCD! The importance of the individual property plans is in providing the land managers with a format for informed decision making. The plans confront status quo agriculture and also provide the rationale for an alternative. Given this along with a robust information base, the land manager will make confident decisions and take prompt action. Without confrontation and a structured alternative, the outcome is inaction.

There is excess emphasis on the importance of economic rationalisation of property plans. The Kalannie-Goodlands project has not adopted this approach because rational economics oversimplifies the required decision processes. My experience elsewhere has been of farmers telling a rational economist to be seated during a land management planning discussion. Farmers intuitively know the complexity of ecological and social systems, and so see through simplification. They are driven more by understanding than by an economic imperative on land issues. Even impoverished landholders expend disproportionately high effort and dollars on their land when they understand it!

To highlight property planning achievements risks overemphasising individual requirements for a technical fix. Owing also to enhanced graphics and enhanced publicity, the technical focus is on 'tree planting' and 'earthworks'. Full implementation of the statistical requirements of these two management tools may be equated with full implementation of a plan. This overlooks the more fundamental benefit of planning, that being to provide a framework for the development of
agricultural systems. Too much effort has gone towards offering useful but specialised management information to farmers without adequate consideration for its integration within the practical farming system or the environmental landscape. The planning approach provides an excellent opportunity to do just this.

Again, to overemphasise the importance of property plans risks diminishing the importance of catchment-scale planning and management. With the Kalannie–Goodlands LCD, we have only just begun the catchment-scale development of planning. Cumulation of natural resource and hazard information from property planning by hand or computer provides a strong structure for the cooperative decision-making processes that are required for the more fundamental environmental management requirements district-wide. The total information base within a catchment allows participant decision makers to see sense in major changes which may seem senseless when considered in part on individual properties.

In the Kalannie–Goodlands LCD, there has been a refreshing response from landholders, research institutions and extension bureaucracies to the possibilities made available by catchment-scale consideration. Soil infiltration rate research is more meaningful if the extent and distribution of hard-setting soil is known. Cooperative water supply schemes are feasible when potential dam sites are identified and waterways are coordinated. Culverts and floodways can be designed with known catchment parameters. Gravel pit management can be considered when their environmental effect is shown. Pressure for reserve management can be developed when it can be demonstrated that adjoining land is to be actively managed. A joint urban group/LCD botanical survey has biogeographical significance when all remnant vegetation within a catchment is mapped. Control of rabbits appears possible when the distribution of soils they frequent is shown. Minimalised firebreaks become obvious on a catchment-scale plan. Cooperative mallee fowl management becomes desirable when their existence and their habitat can be shown.

Perhaps the greatest benefit of the catchment planning
procedure if allowed to develop fully is exposure of the unknown. We suspect that sub-surface geological structures influence the distribution of salinity but we do not know the extent. We suspect that the lakes within the LCD are major areas of groundwater discharge but we do not know how significant this is to the adjacent agricultural land. We suspect that the variability of land characteristics within one particular land unit is more important than the apparent variation between other land units, but we do not know the extent of variability. For each of these issues, and others, we are formulating the appropriate questions and attempting to attract research attention for relevant answers. Landholder involvement in research formulation is imperative. The Kalannie–Goodlands farmers are still to be attributed full credence for the quality of land management questions asked. The project initiatives for ‘farmer-led’ research are beginning to evolve.

The planning project for the Kalannie–Goodlands LCD has deliberately evaded specialisation and isolated management to ensure the holistic development of integrated land management systems.

Gravel pits are usually managed by local government, according to criteria dominated by road making and maintenance, not land degradation or possible ecological impacts at a landscape scale. In many regions, gravel pits (and rubbish tips which are also managed by municipalities) are often in islands of remnant vegetation called nature reserves. As Dennis Saunders, referring at the Tammin Landcare Expo to an aerial slide of a small ‘nature reserve’ remarked dryly: ‘you can tell immediately it’s a nature reserve because of the prominence of the rubbish tip and the gravel pit!’

†The contrast between the management of the monocultural pastures and crops of agricultural land, and the management of these patches of remnant vegetation has been described by Keith Bradby (quoted in Lefroy et al 1992) as ‘ecological apartheid.’

†Western Australian fire prevention regulations insist on ploughed firebreaks around certain areas, but in sandy soils, firebreaks can cause significant erosion problems.
inquiry and learning which pervades the process. We discuss these issues further in Chapters 7 and 9.

To date, the emphasis in most Landcare group planning activities, whether at farm or catchment level, has been on the ecological and agronomic aspects of the planning process—because of the sheer imperative of coming to grips with the causes, extent and possible solutions to land degradation problems. But, notwithstanding Viv Read’s comments on the limited perspective of ‘rational economics’, if plans are to be implemented (in the sense that they become a framework not just for farm improvement, but for everyday management), then the planning process must take into account the personal and business aspirations of the farm family. This is an area in which state agencies and other outsiders working with Landcare groups still need to do a lot of work. One group which has looked at this issue in depth is the Farm Management 500 (FM500) project in south-eastern Australia.

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**CASE STUDY**

**FARM MANAGEMENT 500**

From 1986, farm management consultants Neil Clark, from Bendigo in central Victoria, and Tim Hutchings, who farms at Yerong Creek near Wagga Wagga in New South Wales, ran a privately-sponsored project called FarmFacts. FarmFacts involved 80 farmers in twelve groups from Young to Hamilton learning how to use computers for farm business management. After initially slow progress, as the families involved became more familiar with computer use, participants were able to develop business plans and farm monitoring and record-keeping systems, and then to compare their data with others to check their relative strengths and weaknesses. Some comments from group members give an idea of the impact of this project:

> It involves all family members in group discussions and learning, rewards spouses and the younger members with recognition and a sense of achievement, builds up their self esteem and confidence, and allows them to make a greater personal contribution to decision making on the farm.
The major benefits so far have been access to information, resources and people and in the interaction that takes place at annual conferences and regular group meetings. These groups comprise progressive people who want to learn, stay in farming and get personal and financial satisfaction from their involvement. The interchange of ideas is fantastic and we learn from each other’s mistakes as well as successes.\textsuperscript{142} 

One major benefit of group activity such as FarmFacts and FM500 is that it encourages you to set goals and targets. It gives a great sense of achievement each time they are accomplished. At home on the farm, we tend to become insular and narrow, but being a member of a group helps you to retain the right attitude and boosts your confidence.\textsuperscript{143} 

The success of FarmFacts and the continued commitment of sponsors prompted Neil and Tim to take the project into a much more ambitious phase, involving 480 farmers in 40 groups from Cootamundra in New South Wales to Apsley near the South Australian border, supported by a diverse group of fifteen consultants and a resource network of industry experts. The new project is called Farm Management 500. It got underway in earnest in 1992, with funding from the Rural Industries Research and Development Corporation, the National Australia Bank, Hoechst Agrivet, PIVOT and National & General Insurance.\textsuperscript{144} The aim of FM500 is to increase the viability of both farms and farmers by harnessing the power of group learning among peer groups of farmers, facilitated by experienced consultants. Each group meets for one day, four to six times per year in members’ homes, and will combine for ten regional conferences in the first two years of the project.

These small groups take advantage of the diversity of skills and experience within each group, which means that members are learning as much from each other as from the consultant or other outsiders. Furthermore, the involvement of all partners in a family business provides opportunities for improved communication about long-term issues in a constructive setting, enabling people to combat feelings of isolation and frustration. The project is based on the premise
that yield and profit underpin all other farming options, including lifestyle and conservation goals. However, FM500 also emphasises the fundamental importance of human resources in farming. In 1993, a particular focus was on estate planning and retirement issues, to help members to ensure a smooth transition between generations within farm businesses, and to manage resources so that both the people retiring from the farm and those remaining to run it are able to meet their needs.

In many ways Farm Management 500 is anticipating the realities of farming in the 1990s and beyond, in the absence of fundamental reform to the Australian agricultural sector. In a country which exports most of its farm produce, which is a price taker in most commodities and which cannot afford farm subsidies, farm costs will continue to rise, prices received for farm outputs will continue to fall in real terms, seasons will continue to vary, farmers will continue to leave the land, and rural communities will continue to wither.

Apart from selling the land, an option which is usually considered much later than it should be, farmers have two main choices if they wish to remain viable as farmers. The first is to become ever more efficient and better at managing all farm resources—reducing costs, improving yields, improving time management, developing alternative enterprises, producing premium products and marketing them more cleverly, making optimum use of all information sources including professional advisers, and managing financial resources astutely. The second is to seek another income to subsidise the farm. Many younger farmers are already heading down both these tracks. Farm Management 500 is committed to helping its members to be among those Australian farmers who manage to survive by simply farming better. The project is operating on the gloomy but pragmatic assumption that today's conditions must be accepted as normal; therefore members must adjust and farm to these conditions. From this stance, improved prices are treated as a welcome bonus, not budgeted for as a rightful return and then whinged about when they fail to materialise.

The principles and modus operandi of FM500 are sound and the project will generate very useful insights and real farm data of significant value at a much wider level. The model of private and government sponsorship helping farmers to help themselves has great
potential to be used more widely. An extrapolation of the assumptions underpinning this project sees the best farmers surviving by continual fine-tuning of their operations, and efficiencies gained through expansion as they buy the farms of people squeezed out of agriculture. The squeezing process is likely to accelerate with declining prices for agricultural land, particularly away from the coast, during the 90s.

Of course there will be fluctuations, chimeras of hope regarding real increases in world prices, particularly if North America and the European Community manage to reform their agricultural subsidies so as not to distort world markets. Such intervals will bring bursts of increased prosperity for those Australian farmers (like FM500 members) in a position to capitalise on these circumstances. In the long term, most forecasters predict a brighter outlook for Australian agriculture, based on growth in global consumption of agricultural products and an assumed limited capacity of other agricultural exporters to respond to increased demands.

A word about 'efficiency'

Throughout official documents and the rhetoric of politicians, agribureaucrats and captains of agri-industry, the word 'efficiency' is used freely, but rarely defined. Efficient agricultural systems in industrialised countries are thought to be those which produce food at least cost. When viewed through the eyes of an ecologist, a sociologist, or consumers of food, air, water or rural landscapes, this notion of efficiency looks increasingly suspect. It leads to increasing specialisation, monocultures, larger scale, intensification of production, and externalising as many costs (e.g., environmental and social costs) as possible. If the costs to society of species extinctions, degradation of soil, air, water and vegetation, homogenisation of rural landscapes, withering of rural villages and increased social stress were fully accounted for, the balance sheet of so-called 'efficient modern farming methods' looks sick indeed and, even by the same narrow economic criteria, inefficient.

Tracey Clunies-Ross and Nicholas Hildyard sum up the
myth of economic efficiency as it applies to subsidised EC and US agriculture in their book *The Politics of Industrial Agriculture*:

In the case of small- and medium-sized farms, versus big farms, the economics of production have become hopelessly skewed by subsidies. In economic theory, farmers produce for a market, and compete with each other to supply that market: the most efficient thrive. In Europe and in the US, taxpayer subsidies are linked to the volume of output: the biggest and most intensive farmers pick up the lion’s share of the subsidies, and they thrive. This should not be interpreted as economic efficiency. In fact, in the current situation, where the EC for instance produces grain, the larger the volume of grain a farm produces, the more it costs the EC in storage and export subsidies. Taken to its logical absurdity (which it now has been) it becomes cheaper to pay farmers to produce nothing (set-aside) than to buy their grain. Within this economic framework, small, less intensive farmers should be seen as being more efficient as they produce fewer unwanted surpluses.

In effect, it is almost impossible to tell who is producing most efficiently. Past subsidies for fuel, for drainage, for irrigation, for research into high input/high output agriculture, not to mention current subsidies, produce a completely distorted picture. All that can be said with any certainty is that current policies continue to favour large, intensive farmers.

But in the meantime, the attrition within Australian agriculture seems likely to be grim. The question about what happens to those farmers (the majority in number), who are not able for various reasons to go the FM500 route, remains. This is not merely an economic question of rural ‘adjustment’. It has profound environmental and social implications. The desperate fight for farm survival is usually reflected in greater pressure on the land, magnified by the extreme variability of the Australian climate. So-
social depression in a literal sense and the wasting of country towns accompanies the flight of farmers from their land. The social dimensions of the rural crisis were hinted at in the introduction. But it must be recognised that symptoms of social decline such as suicides, health problems, violence, drug abuse and low levels of education are likely to get dramatically worse after the next spurt of farm foreclosures, in a vicious circle of greater and greater stresses on fewer and fewer people. As these are the people managing the land on behalf of the rest of society, we must find better ways of taking these social issues into account than merely offering counselling services and financial assistance 'to leave the land with dignity'.

We will discuss these wider issues and where Landcare fits in later, as we have drifted away from farm planning. The farm business planning advocated by FM500 complements the more ecological catchment-scale approach of Viv Read, described in the box on pages 150 and 151. Ideally the two should happen concurrently, so that farmers' thoughts on management options are challenged by their increasing ecological literacy, and by social imperatives in their family and the community.

Central to the FM500 project is the development and implementation of a five-year business plan by each of the families involved. Nigel McGuckian and Mike Stephens (two of the project consultants) have produced an instructional guide and a workbook to help people with farm business planning, which they define as 'a process of thinking about how you want the farm to develop, and how you will provide the resources to achieve that development'. The FM500 team suggest that a good planning process must challenge farmers to be critical about their performance, recognise the rapidly changing environment in which farming operates, while setting realistic and achievable goals. Climate, commodity prices and input prices may be out of the individual farmer's control, but it is usually possible through good planning to buffer the effect of drought or fire, reduce vulnerability to price changes, and improve productivity.

The FM500 planning process has ten main subject areas: farm resources, family, finance, productivity, management, marketing, personal development, lifestyle, retirement and estate planning. The planning process in each of these areas
Making Landcare pay has several components: a **situation analysis**—where are we now; a **strategic audit**—the business we are in and its strengths, weaknesses, opportunities and threats; **business objectives**—where are we heading; **relevant strategies**—how do we get from here to there; **implementation**—who does what, when and how; and **monitoring**—measuring progress and adjusting to changing circumstances.

There are several advantages for farmers who seriously commit themselves to such a planning process:

- It encourages farmers to take time out, to stand back and look critically at what they do, and look ahead a few years or even a generation. This point was made in more colourful language by a farmer at a farm planning workshop: ‘when you are up to your arse in alligators, it is hard to concentrate on draining the swamp!’
- It makes keeping good physical and financial records a must.
- The advantages and disadvantages of moving in various directions (eg expansion, changing enterprise, business as usual, or selling out) can be tested, or at least thought through in a systematic way, before any money is spent or irreversible moves made.
- Business opportunities and threats should emerge, enabling quick responses and thus better timing of decisions.
- Farmers with a good business plan are at a competitive advantage in dealing with financial institutions, agribusiness firms and advisers of all sorts.

Given the pedigree of FM500, it is hardly surprising that more than 60 per cent of members now use computers for managing information, a proportion which is still growing. From an initial focus on farm financial management, the tendency is for farmers to graduate to using paddock management programs and spreadsheets for recording many types of production data.

Various state and private farm planning projects, including those mentioned here, have led to growing recognition of the ecological value and business sense of informing land management with an appreciation of the opportunities and constraints imposed by natu-
ral resources, in a systematic planning process. This recognition culminated in the development of a national property planning initiative, announced by Primary Industries and Energy Minister Simon Crean in August 1992. 147

**FENCING**

What do the following land conservation measures have in common?

- protecting an eroding gully, remnant vegetation, or a stream from grazing animals;
- reducing stocking rates on a scalded area, or a patch of range-land in which natural regeneration is desired;
- establishing salt-tolerant fodder shrubs on low-lying, salty, waterlogged areas;
- subdividing farmland according to natural land management units (defined by soil type, slope, aspect, drainage, vegetation) to enable each land unit to be managed according to its potential and its limitations;
- establishing trees, whether for salinity control, shade and shelter, wildlife habitat, wood or aesthetics.

The answer is fencing. In each of these activities, fencing is usually essential, it usually demands a large proportion of the cost of a given project, and its effectiveness is crucial to the effectiveness of the project as a whole. 148 A vast quantity of fencing is required both for the rehabilitation of degraded areas and for the implementation of more sustainable systems of land use and management.

We have calculated elsewhere that the establishment of one billion trees, as intended under the federal government’s One Billion Trees Program (OBT), involves at least one million kilometres of fencing. The billion trees (and the million kilometres of fencing) is only a symbolic start. Furthermore, if we consider the fencing involved in protecting the Murray–Darling river system, including major tributaries, from eutrophication and consequent blue-green algae blooms, using the simple vegetative filters described in the Peel–Harvey case study earlier, then the amount of fencing required is much higher again. As fencing costs (including labour) range from less than $750 per kilometre for very efficient electric fences to $3000 or more per kilometre for the more common pre-
fabricated or plain wire conventional fences, a round figure of two billion dollars, for the OBT fencing alone, is reasonable.\textsuperscript{149}

Fencing is an area where farmers seem most reluctant to change, where 'Grandad's way' is still often the rule. With the exception of electric fencing and the development of high tensile wire, fence technology has not changed significantly this century. Government institutions have tended to stay away from fencing research and extension, which has been dominated by suppliers of conventional fencing, in whose interest it is to sell the maximum amount of fencing material. One noteworthy beacon in fencing extension is the innovative maverick fencing consultant, Bob Piesse, who generates more original ideas in a day than most of us do in our lives. Bob has made a tremendous contribution to the development of more efficient fence designs, and consequently to land conservation, over the last 50 years.

When one is aware of, and comfortable with, more efficient fence designs, it is easy to be amazed at the money wasted on inefficient fencing. The most common inefficiencies include having far too many posts, droppers and wires; and inadequate strainer assemblies, costing hundreds of dollars more per kilometre than is necessary. The same farmers would probably drive a hard bargain to save $50 on other products at their local rural merchandiser.

Electric fencing technology has improved out of sight in the last fifteen years. Even in Tasmania and New Zealand, solar-powered, one- and two-wire fences have successfully controlled goats and cross-bred sheep for years. A well-planned, well-earthed, well-insulated and well-constructed electric fence will almost always be the most effective and efficient option. \textit{Planning for Sustainable Farming}\textsuperscript{150} discusses and illustrates a range of electric and conventional fence options for revegetation and other land conservation projects. Electric fencing manufacturers such as Gallagher Australia provide information on specific products, as well as general information on design and construction of electric fences, and have been active in recent years at Landcare group field days and as sponsors of landcare activities.

Even with non-electric fences there are tremendous opportunities to put up effective fences which do not cost an arm and a leg (and heaps of steel and timber). Most people do not realise that, if strainers are up to scratch, and high tensile wire is kept at the right tension, the only reason for posts is to keep the wires off the ground and evenly spaced. A three inch (75 mm) post or a dropper will do that just as well as a six inch
(150 mm) post, and only in really rough country are posts needed more than every 50 metres.

Fencing is a major component of land conservation activity, and fencing costs are one of the biggest hurdles to achieving more practical works on the ground. But it is possible, even in tough times, to do land conservation works which do not cost a fortune, and there are Landcare groups tackling this problem with ingenuity and resourcefulness.

The following example from the Neridup Landcare group illustrates how Landcare groups can share useful practical knowledge, in this case the knowledge of just how much the design of fencing influences its cost and consequently the cost of land conservation projects. The group held a workshop to discuss different fencing options, at which group members presented their preferred fence design, with costings. According to Marg Agnew, this generated an extremely lively discussion on a topic guaranteed to spark interest at most Landcare group meetings. Some of the systems proposed are outlined in Table 6.1.

Roughly $10 per kilometre should be added to the cost of the electric options to allow for the cost of a mains-powered energiser ($30 per kilometre for a solar energiser). Although farmers rarely cost their labour, it would be reasonable to double these figures to approximate the actual cost of a constructed fence. Furthermore, any gates, bends or corners (extremely common in land conservation work) require additional end assemblies and greater expense, particularly in conventional fencing.

The Harrowgate Landcare group near the Mt Lofty Ranges in South Australia recognised this point, by following the example of the Potter Farmland Plan demonstration farms in constructing curved electric fences around one of their demonstration sites which involves revegetating a saline discharge area.

The West Hume Landcare Group in the Riverina district of New South Wales has been able to protect shelterbelts with two or three electric wires, using Insultimber posts and droppers, at a cost of about $630 per kilometre plus end assemblies. Sue Rose, coordinator of the West Hume group, notes that stock which are not used to electric fences may require a four- or five-wire fence, and that it is particularly important to use earth-return wires in dry conditions. Considerable savings can be made when stock are accustomed to electric fences, which can be achieved with the use of impregnable electrified training yards for off-shears sheep, weaned lambs and calves, and newly purchased stock. Information and advice on electric...
Table 6.1  Materials cost for one kilometre of straight fence with two end assemblies

<table>
<thead>
<tr>
<th>System 1</th>
<th>System 2</th>
<th>System 3</th>
<th>System 4</th>
<th>System 5</th>
<th>System 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional</td>
<td>Conventional</td>
<td>Conventional</td>
<td>Electric</td>
<td>Electric</td>
<td>Electric</td>
</tr>
<tr>
<td>6:70:30 ringlock</td>
<td>6:70:45 ringlock</td>
<td>5:70:30 ringlock</td>
<td>4 plain wires,</td>
<td>4 plain wires,</td>
<td>4 plain wires,</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>clips &amp; insulators</td>
<td>clips &amp; insulators</td>
<td>clips &amp; insulators</td>
</tr>
<tr>
<td>treated pine posts</td>
<td>1.5 m steel posts</td>
<td>1.65 m gal posts</td>
<td>mallet posts @</td>
<td>1.65 m steel posts</td>
<td>fibreglass posts</td>
</tr>
<tr>
<td>@ 15 m</td>
<td>@ 14 m</td>
<td>@ 11 m</td>
<td>40 m, 3 droppers</td>
<td>@ 50 m, 3 black</td>
<td>@ 15 m</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>between</td>
<td>poly droppers</td>
<td></td>
</tr>
<tr>
<td>box assembly</td>
<td>125 mm mallet</td>
<td>200 mm strainers,</td>
<td>box assembly</td>
<td>200 mm strainers</td>
<td>150 mm strainers</td>
</tr>
<tr>
<td>strainers</td>
<td>strainers</td>
<td>pipe stays,</td>
<td>strainers</td>
<td>cemented in</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>cemented</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>$1200</td>
<td>$822</td>
<td>$1285</td>
<td>$624</td>
<td>$490</td>
<td>$489</td>
</tr>
</tbody>
</table>

Source: Neridup Landcare Group
fence design and components can be obtained from manufacturers such as Gallagher Australia, who have been very active in sponsoring Landcare group field days and demonstration sites.

The limitations of conventional fence designs have proscribed farmers' options in terms of the use of different land units and layout of farms. In the words of Ron Watkins, a leading conservation farmer from Western Australia, Australian agriculture has been 'square farming in a round world', operating on rectilinear grids in a landscape and topography which is anything but linear. The reasons for the chequerboard layout of farms and farming landscapes are largely historical: ease of surveying on a grid and calculating allotment sizes when land was initially subdivided; the cost of fencing; and also the design of conventional (non-electric) fencing, which relies on very tight wires, most easily achieved on straight sections of fence. But as the Harrowgate Landcare Group demonstration site shows, fences need no longer be rigorously straight, and fencing to the lie of the land is now much more realistic with modern electric fencing, careful design and installation, and some education of stock.

The following sections highlight some landcare options and some farm families which show in a practical way how landcare and improved productivity can be complementary, rather than competitive, goals. This is only a tiny sample. There are thousands of farm families involved in similar efforts (but using very different methods) on their land in an incredible diversity of circumstances. We were reluctant to single out any individuals, but it is useful to look at what can be achieved, through some real examples. Readers of this section should be careful not to fall into the easy tendency to think that landcare means planting trees, or planning the physical layout of farms and catchments, or building cheap fences, or particular cropping practices, though any or all of these could be part of landcare projects. Landcare should not be identified with any particular farming methods, but rather with attempts to develop and implement farming systems which are compatible with the long-term health of the land, whether in the wet/dry tropics of the Top End, the ancient dunes of the Eyre Peninsula or the cold, dry Tasmanian Midlands. Of course the farming methods in these regions are completely different, but in each case there remain practices which are much more sustainable than others. Landcare is about integrating the best available knowledge to improve the sustainability of farming systems and applying it in a cooperative way at a catchment or district level.
**CASE STUDY**

**'JANGARRI'**

Jan and Garry English have transformed a 'run-down block' into a more ecologically sustainable enterprise since the late 1970s. They have increased animal performance as well as increasing stock numbers, improved paddock management, introduced agroforestry, and turned problem areas into assets. One of the basic tenets of their property management strategy is not to use every square metre for production. All decisions are based on being able to survive the harshest of conditions. Their feats were recognised in 1990 by their win in the primary producers category at the Australian Landcare Awards.

'Jangarri' covers 1534 hectares and lies 30 kilometres due north of Esperance, on the south coast of Western Australia. The property was released as virgin land (covered by coastal mallee scrub, Banksia and an extraordinary diversity of understorey species) in 1960. The soil is basically sand underlain by clay. It receives about 450 mm (eighteen inches) of rainfall per year, of which one-third falls outside the winter growing season.

Jan and Garry English purchased their first thousand hectares of the present block in 1976. The land had been overcleared and remaining native vegetation was in a poor state. The cleared area of 440 hectares carried only 1600 sheep with difficulty because of poor pastures and insufficient dam water. Wool cuts averaged 4.6 kilograms per head and lambing percentages were low—only 58 per cent marked and 44 per cent weaned, largely owing to worms and ill thrift throughout the flock. Wheat yields were 1.17 tonnes per hectare and barley yielded less than half a tonne per hectare. Wind erosion was a problem. There was little bird life and earthworms were rare in the garden and paddocks. 'The remnants of paperbark swamps were becoming bare salt scalds with skeletons of trees ring-barked by sheep. Fencing was on the grid with large paddocks and few watering points.'

In 1981, the English family purchased the adjoining block of 484 hectares, making the present total of 1534 hectares, of which 1034 hectares are used for conventional farming, leav-
ing 500 hectares of saline watercourses, swamps and remnant vegetation.

Jan and Garry laughingly reflect:

*The beginning of the farm plan was a small aerial photo and paddock layout drawn on the back of a 'Weeties' packet in 1977. Climatic events had a big bearing on the planning in the early years and it became obvious that re-fencing to soil type and degradation hazard was necessary to improve the yields in crops and allow more efficient grazing of pasture.*

Heavy rains in 1979 caused waterlogging and ponding problems. As a consequence, ‘V’ and ‘W’ drains were installed at a low cost using a plough. The watertable has been rising in recent years, with salinity readings greater than 3000 microsiemens per metre as shallow as one metre below the surface. To tackle this problem, which threatens the long-term viability of the property, Jan and Garry have sown strategic strips of country to lucerne to draw down the watertable and provide useful fodder. Belts of mixed tree species have been planted for water control and as windbreaks. An eight hectare recharge area has been sown to Tagasaste and Acacia saligna. According to Garry: ‘Many of the local native trees are too efficient with water use and hence not very good for water control on their own. Because crops do not use much water, their future on the property is under close review. Although we have developed the property using ecological principles, there seems to be little draw-down of the watertable. More trees appears the only long-term solution.’

A major goal throughout the property planning process has been to reduce the effects of wind erosion, which wrought havoc in 1981, with major losses in stock and newborn lambs, as well as topsoil from paddocks under crop and pasture. Jan and Garry introduced minimal tillage, stubble retention and extensive tree planting. Non-wetting soils have affected the establishment of annual pastures. A mixture of veldt grass, perennial rye, lucerne, fescue, consol and phalaris has been used with some success. It also required a change to rotational grazing to maintain stable pastures. Jan and Garry have decided over the fifteen years of developing their property that pasture production is the most sustainable enterprise and only
limited cropping will be continued. A mixture of clovers with annual Ryegrass has been selected and superphosphate is applied at 20 kilograms for each Dry Sheep Equivalent carrying capacity (ie 200 kilograms per hectare with ten sheep per hectare). After experiments in 1988, 1989 and 1990, the English's found that by using small paddocks, stocking rates could be increased a further 50 per cent on the better soil types.

Several strategies are used to maintain stocking rates through the autumn feed gap. For example, making silage from the spring flush in pasture growth; rotationally grazing perennial pastures; lot feeding weaners and so on. Salt scalds have been drained and sown to Puccinellia and Tall Wheat Grass to regain some productivity, reduce erosion and use water. Some scalds have been oversown with saltbush and wattles to take up more groundwater.

An agroforestry project was commenced in 1984 on 160 hectares to produce timber and crops and reduce erosion and waterlogging. *Pinus radiata* was chosen and triple rows were planted at a cost of $60 per thousand seedlings and ten days work in preparation, planting, fertilising and insect control. Crop yields (lupins, wheat, oats) have increased; tree survival has been 98 per cent; wind erosion has been controlled; and there has been a marked draw-down in the watertable under the tree belts. Since 1976, trees have been planted for landscape improvement, for bird life, as windbreaks and for watertable control. Jan and Garry believe in multiple use plantings wherever possible. Most of the early plantings were done using seedlings, but with costs rising they have tried direct seeding methods using seed collected on the property.

Careful management of 500 hectares of naturally saline watercourses and lakes allows some production for short periods of the year. The biggest benefit according to Jan and Garry is the ecological value of conserving habitat for flora and fauna. The English family have created an eight hectare arboretum on a formerly cleared island, establishing trees by seedlings and by direct seeding, with some hope of future timber production. Old paperbark swamps have been fenced and planted with salt-tolerant trees. 'Each year the number of birds found on the farm is increasing due, in part, to creating the conservation refuge. On country unsuitable for agriculture, permanent native vegetation has been left. Protection of the diverse flora, which is unique to this part of Australia, is our high priority.'
Banksia speciosa, a spectacular member of the Proteaceae family, occurs on the deep white sands on the property. After a feasibility study, cuttings have been harvested to supply the cut-flower market, which is now a valuable and sustainable contribution to farm income.

In summary, the main features contributing to the development of this relatively sustainable enterprise have been:

- The farm plan is continually modified and updated—it is a working document.
- The farm is fenced according to soil type and topography with all lands seen as having a use.
- The farmed area has been reduced from 1050 to 850 hectares, yet overall stock numbers, productivity and profitability have increased.
- Problem areas have been turned into assets, such as the wildflower producing areas, natural drainage features and conservation areas.
- Tree planting has formed a significant part of the management for crop and pasture protection, reducing water-tables, improving aesthetics, attracting bird life and possibly providing future timber production.
- The works carried out in implementing the plan are integrated into farm business management, not regarded as an add-on.

According to Jan and Garry: 'We have achieved this so far by just doing a bit of planning and one project each year.' This work has been successfully done by Jan and Garry with the help of their three children, and despite the fact that they have hosted literally thousands of hours of farm visits. They do not want to charge people to inspect this work because they consider that talking to anyone about landcare is actually gaining allies in the long run.

CASE STUDY

'BONNEYS PLAINS'

The Fingal Valley is a beautiful stretch of country, east of the Tasmanian Midlands. Biz and Lindsay Nicholson’s 2310 hectare property ‘Bonneys Plains’ is in the heart of the valley. Biz
and Lindsay took over management of the property in 1988. They base their farm management on a whole farm approach and a philosophy of 'working with nature, not against it'. This has paid dividends through increased productivity and capital value of the property, and farm management changes which the Nicholsons believe are more sustainable over the long term, ensuring that the condition of the farm will improve as a result of their stewardship.

Soon after assuming control of the property, Biz and Lindsay participated in a Whole Farm Planning course run by the Burnie TAFE college, which led them to devise a physical property plan and a financial plan in line with their overall farm management and lifestyle goals. The property plan led to a reorganisation of paddock layout, reduced paddock sizes to improve stock and pasture management and to farm on the contour as much as possible, and planned rotations for each paddock. The physical plan has extended emphasis on using electric fences and stock laneways, larger plantations and more efficient livestock handling facilities. They have since attended a four day Grazing Cell course which gave them a better understanding of pasture ecology and efficient grazing management—knowledge which will hopefully be translated into better productivity from both native and improved pastures.

The Nicholsons have also fenced off streams and remnant vegetation, increased water storage, established shelterbelts and wildlife corridors, maintained tussocks and sedges for shelter, changed to direct drilling of pasture to maintain soil structure and prevent erosion, and installed shallow surface drains to remove excess surface water and prevent waterlogging. All revegetation work has relied on a mixture of about twenty local species of trees and shrubs propagated and grown in the 'Bonneys Plains' nursery.

Biz and Lindsay run a mixed enterprise, producing wool (from about 4500 Spanish Merinos), 130 beef cattle, goats for fibre production and weed control, barley, oats, triticale and dryland lucerne. Their overall stocking rate is low because of the proportion of uncleared bush, which has a carrying capacity of less than ten per cent of improved pastures. Monitoring all aspects of this business has been crucial to its success. Thorough paddock records of the condition of soil, water and pastures, and all inputs and outputs are compiled to
complement farm financial management. According to Biz and Lindsay: 'The key to the success of our whole farm plan is flexibility within the implementation timetable, with the ability to incorporate planting, natural regeneration and land capability projects in each year, in line with the farm budget.'

Some ecological indicators are already promising. Fish and platypus are returning to Buffalo Brook as a result of fencing it on both sides, creating a 23 hectare reserve for five kilometres along the stream. Natural regeneration of native species is healing the once severe erosion of the streambank. Another 22 hectares of remnant bush has been fenced from stock to provide wildlife habitat and a seedbank for a great diversity of local species. This patch may provide occasional emergency shelter for newly shorn sheep or lambing ewes. Hollow trees, fallen branches and litter are all left undisturbed to provide habitat for birds, marsupials, echidnas, amphibians, lizards and insects. Trees and shrubs seem healthier as a result of not being grazed or subject to soil compaction by livestock. According to Lindsay: 'The species in this patch range from orchids to eucalypts, and are maintained for our enjoyment and for future generations.'

Overall, the changes in farm management are directed to reducing erosion, maintaining and increasing populations of native plants and animals, increasing agricultural efficiency and productivity, and improving the quality of life for 'the whole family.'

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**CASE STUDY**

'**PARADISE**'

Dean and Sherren Melvin and Dean's brother Craig jointly farm 'Paradise Farm' and 'Clover Downs', near Dowerin about three hours east-north-east of Perth, in 350 mm rainfall wheat country, similar to the Kalannie–Goodlands landscape described earlier. But 'Paradise' is anything but a typical wheat–sheep operation.153

'Paradise' is a 508 hectare mosaic of sandplain soils, and Clover Downs is 1255 hectares consisting of ten per cent York Gum/Salmon Gum country, 30 per cent Tamma country and
60 per cent sandplain. The natural vegetation prior to European settlement on the sandplain soils was mallee (multi-stemmed eucalyptus spp), heath dominated by three families—Myrtaceae (melaleucas, leptospermum, calothamnus, eucalyptus), Leguminosae (acacia) and Proteaceae (banksia, xylomelum, hakea), and small patches of York Gum (Eucalyptus loxophleba) woodland. The land type referred to as Tamma consists of gravelly sands over laterite with a neutral to acid pH, formerly covered with Tamma (Allocasuarina spp). The land known as York Gum/Salmon Gum country consists of brown sandy loams and red brown loams, neutral to alkaline, formerly covered with a woodland of E. loxophleba and E. salmonophloia.

So, of the total 1760 hectares, there are 125 hectares of red-brown earth, 375 hectares of lateritic podsolic and 1260 hectares of earthy sands. The main income sources are two-thirds from cropping (920 hectares wheat, lupins and cereal rye) and one-third from sheep (840 hectares pasture). The conventional farming system for the wheatbelt is based on a rotation of wheat- and legume-based annual pastures on heavier soils, and wheat and lupins on lighter sandy soils. Sheep graze annual pastures, which are supplemented by stubbles after crops are harvested, providing an extra source of income. Lupins and annual pasture legumes provide a disease break and a nitrogen boost for subsequent crops.

The conventional farming system really struggles on the poorer sandplain soils. Wheat and lupin yields average 0.8 tonnes per hectare, compared with 2.3 tonnes per hectare and 1.2 tonnes per hectare respectively over the rest of the farm. The carrying capacity of these soils for grazing is about 2.5 sheep per hectare. Given rising input costs and low prices for wheat and wool, the profitability of the conventional system on sandplain soils is marginal at best (in Dean’s words ‘a fast way to lose money’). Environmentally, conventional cropping of sandplain soils is extremely dubious.

The conventional system, after crops are harvested, leaves the topsoil exposed in the period from February to June. This is when it is most vulnerable to soil loss through wind and water erosion from high intensity summer storms, and storms which accompany the first of the winter rains, often removing 20 to 30 tonnes per hectare of fines from the topsoil. The fines, or dust fraction, of topsoils in the wheatbelt typically
contain most of the nutrients and trace elements. In one wind erosion event in March 1988, researchers estimated that some soils lost as much as 80 kilograms per hectare of nitrogen in two days.\textsuperscript{155} The conventional system, based on annuals, is also inefficient in its use of water as it is unable to take advantage of the 20 per cent of annual rainfall that falls in summer/autumn, which either runs off, causing erosion, or infiltrates to groundwater, contributing to the risk of salinity. Neither can the annual crops or pastures make use of excess winter rainfall that infiltrates beyond their shallow root zone. Rising watertables on a regional scale bring dissolved salts into the capillary zone where waterlogging and the increasing concentration of salt limit plant growth and ultimately preclude conventional agricultural production on much of the valley floors.

The Melvin family was forced to look at the sustainability of their enterprise before the term itself became trendy. In 1983, their farm adviser suggested that either Dean, his brother, or his father would have to leave the farm, given the proportion of unproductive sandplain soils on their land. This was not an attractive option, so Dean worked off-farm shearing sheep, saved some money and then went on a trip through the Middle East, looking at farming systems in Mediterranean climates which had been farmed for thousands of years.

On his return, Dean began to experiment to develop alley farming systems, in response to low crop yields due to infertility and poor moisture-holding capacity, and very poor persistence of annual legume pasture species due to soil acidity, wind erosion (removal of organic matter) and low soil moisture-holding capacity. These systems have been in continuous development on 'Paradise' over the last six years, with the help of scientists, especially Ted Lefroy from the Department of Agriculture. Alley farming, the production of crops and pastures between hedgerows of trees and shrubs, will continue to evolve on 'Paradise'. The essential ingredients are the incorporation of permanent vegetation belts consisting of the fodder shrub Tagasaste (\textit{Chamaecytisus palmensis}), native eucalypts and the natives \textit{Acacia saligna} and \textit{Atriplex amnicola}. On the poorer soils, this has been accompanied by a reduction in the amount of cropping, and a consequent increase in grazing and the introduction of cattle. Along the way Dean has pioneered the development of a large-scale system for raising inexpensive, open-rooted seedlings suitable for
machine planting, thus substantially reducing the establishment cost and increasing the reliability of planting large numbers of trees into cropping systems.

It must be stressed that the alley farming options discussed below are but a sample of a number currently in place or under consideration, all of which are likely to be improved with Dean’s increasing knowledge and confidence in alley farming, and as external influences change.

Essentially the alley farming system involves the establishment of tree and shrub species (including legumes) in strips at regular intervals against the prevailing wind or on the contour, during a year in which the paddock is in crop. On ‘Paradise’, the original alley farming layout consists of three rows of trees (Tagasaste, eucalypts and Acacia saligna), with rows two metres apart and trees two metres apart within rows, then 30 metres of inter-row (crop or pasture), then another triple row of trees and so on. Thus the trees take up seventeen per cent of the paddock area, at an overall density of from 277 stems per hectare (with 3 metres between trees) to 831 stems per hectare (with 1 metre between trees), as illustrated in Figure 6.1.

Figure 6.1 Layout of the alley farming system

The layout in Figure 6.1 was the original alley farming option, developed for the poorer sandplain soils. The pasture is composed of a summer-active perennial grass, Rhodes Grass (Chloris gayana var. Katamboora), a winter-active annual grass, Ryegrass (Lolium rigidum var. Wimmera), a winter-active annual legume, clover (Trifolium subterraneum var. Daliak) and several other species including brome grass, capeweed and hares-foot clover. This was over-sown with grain lupins in the fourth year to produce a cash crop and replenish soil nitrogen. It is assumed that lupin yield will increase in the alleys by twenty per cent owing to the benefits
of shelter from the trees, but that this will be offset to some extent by competition from the perennial grass in spring. As seventeen per cent of crop area is taken up by trees, it is assumed that the overall yield of lupins will be somewhat lower than in an open paddock.

However, with subsequent experience and constant innovation on 'Paradise', Dean and Ted now consider this layout to be at the green feedlot end of the spectrum of alley farming options. Seventeen per cent of a paddock taken up with trees is a lot, appropriate where cropping is marginal, that is, where you can grow lupins but not wheat. Where cropping is a viable option, the alleys widen out to 60, 100 or even 200 metres, with hedgerow species chosen appropriately, and the land occupied by trees changes to nine, six and three per cent, respectively. The impact of these lower tree densities on recharge to groundwater is debatable but as yet unknown. Where reasonable pasture can be grown, the feed value of the alley system is the leverage effect of a 20 per cent increase in pasture production in the alleys due to shelter, not so much the feed value of the trees themselves. Even in the green feedlot option illustrated above, where a good (preferably perennial) pasture can be grown, the value of the trees is in their shelter effect primarily and direct feed value second. Where few or no existing pasture or crop options exist, then fodder tree species become very important and their density goes up, and the major economic benefit for farmers arises from opportunistic trading in livestock to make best use of extra summer feed.

Ted Lefroy asserts that the biggest potential impact of alley farming is in broadacre cropping on duplex soils and heavier soils, where it represents the only way to increase water use sufficiently (compared with annual cropping) to prevent further salinity and waterlogging, and the only way to prevent wind erosion. So the option illustrated above represents only a small slice of the potential application of alley farming. Table 6.2 illustrates the spectrum of alley farming options on different soil types with their different potential for cropping.

Dean's preferred planting pattern now that he has shown he can have a perennial and annual pasture in the alleys on the poorest soil type, is 60-metre alleys separating two or three row hedgerows. The low cost option is two rows of Chamaecytisus palmensis (Tag in Table 6.2) or Acacia saligna,
with trees three metres apart in each row, giving 100 stems per hectare (nine per cent of the paddock area) at a cost of about $10 per hectare, and good shelter coverage with a potential hedgerow height of four metres. The higher cost option is for three rows of trees in the hedgerow, the centre row being Tag or saligna, with *Atriplex amnicola* (river saltbush), in the outer two rows, giving 170 stems per hectare (twelve per cent of the paddock) at a cost of $20 per hectare. Even on sandplain the latter option provides saltbush shrubs of three metre diameter, all within browsing range, if planted with a legume such as saligna or Tagasaste.

Table 6.2 Alley farming options from feed supply to crop shelter

<table>
<thead>
<tr>
<th>Options</th>
<th>Green feedlot</th>
<th>Feed/crop</th>
<th>Crop/feed</th>
<th>Grain bowl</th>
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</thead>
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<td>Alley width</td>
<td>10–30</td>
<td>30–60</td>
<td>30–60</td>
<td>60–200</td>
</tr>
<tr>
<td>(m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stems/ha</td>
<td>3000–1000</td>
<td>300–100</td>
<td>300–100</td>
<td>100–40</td>
</tr>
<tr>
<td>Hedgerow</td>
<td>Tag/saligna</td>
<td>Tag/saligna</td>
<td>Mallee</td>
<td>Taller eucalypts</td>
</tr>
<tr>
<td>shelter</td>
<td></td>
<td></td>
<td>eucalypts</td>
<td>(eg <em>E. camaldulensis</em>)</td>
</tr>
<tr>
<td>fodder</td>
<td>Tag/saligna</td>
<td>Saltbush</td>
<td>Acacias</td>
<td>Acacias</td>
</tr>
<tr>
<td>Hedgerow</td>
<td>4–5 m</td>
<td>4–5 m</td>
<td>4–5 m</td>
<td>10–15 m</td>
</tr>
<tr>
<td>height</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alley</td>
<td>perennial</td>
<td>lupin/</td>
<td>wheat/pasture</td>
<td>wheat/pasture</td>
</tr>
<tr>
<td>species</td>
<td>pasture</td>
<td>wheat</td>
<td></td>
<td>or lupin/wheat or wheat/peas</td>
</tr>
</tbody>
</table>

The trees are planted by machine in late winter as one-year-old open-rooted seedlings rather than by direct seeding or by seedlings in containers. This has proven to be a reliable method of getting trees sufficiently well-established to survive the first summer. The other huge advantage of this system is that no fencing is required, usually the most expensive component of farm revegetation, as the seedlings can be grazed in the autumn following planting, providing this is done with a
high stocking rate for a short period. The young trees will recover from a quick, one-off defoliation but not persistent grazing pressure over several months.

The main constraint to production of wool or beef in the region is the lack of feed in late summer and autumn. This shortfall is met by supplementing dry pasture and crop residues with lupins or oats. The alley farming system is designed to fill this feed gap using perennial shrubs, enabling more livestock options to be considered. Trees are mechanically cut and fed to sheep, or grazed directly by cattle and sheep from February to June. Taking advantage of the extra feed in the alley farming system has meant big changes to the Melvins' livestock strategies. From having 4000 sheep all year round previously, Dean now has only 500 sheep throughout the year, and he buys 3500–4000 sheep and 80 cattle in March, which are rotationally grazed (at an average stocking of ten DSEs per hectare) through the alley paddocks, then sold in July. The cattle are good for pruning the shrubs and bringing them down to within the browsing range of sheep, thus avoiding the expense (about $35 per hectare) of mechanical topping.

In 1991, Dean averaged $100 gross profit per head of cattle and $17 per head of sheep (including three kilograms of wool at $4 per kilo). However, it must be noted that the profitability of this short-term livestock trading is enhanced by the fact that few farmers in the region have summer/autumn feed, which means that Dean enjoys the benefit of buying stock cheaply when others have run out of feed, and selling on a rising market after the break in season, when everyone else has feed again and wants to buy stock. If everyone adopted the alley farming system as a grazing option, the profitability of such trading would be reduced, although income from wool would be unaffected. This is a classic example of differential profits between the first few people to adopt an agricultural innovation and those who follow much later, usually when forced to by declining terms of trade.

Few farming systems are as monocultural as the Western Australian wheatbelt. One can drive for over 1000 kilometres from Esperance to Geraldton, through farms which average over 2000 hectares (but may be more than 10 000 hectares), and which consist almost entirely of wheat and lupins and an occasional mob of sheep. The monotony of the landscape is
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broken every 60 to 80 kilometres by huge silos on the horizon, signalling the probable presence of a town, with one or two shops, one or two pubs, one or two petrol stations, a school, a council chambers, a hall, a footy/cricket ground, tennis courts and a few hundred people.

Through summer and autumn, the alley farming system on 'Paradise' is a startling island of green in this vast beaten-gold and dun coloured landscape. It represents a radical departure from the conventional system—ecologically, aesthetically and agronomically. As three of the four main tree species planted are natives, the alley farming system can potentially improve the chances for survival of some of the wheatbelt bird species currently in severe decline, especially if the hedgerows of trees form corridors that connect larger habitat areas of remnant native vegetation. While the influences of native birds, small mammals, insects and other invertebrates on crop and pasture pests are not well understood, anecdotal evidence suggests that they can play a useful role in some instances. Some of these interactions are illustrated in Figure 6.2.

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**Figure 6.2** Ecological interactions within the alley farming system
From an ecological perspective, alley farming has a number of advantages over conventional cropping in the wheatbelt. Moisture is often a limiting factor for crop growth in this landscape, which receives a very high input of solar radiation and in which evapotranspiration losses can be extremely high. The triple rows of trees absorb the energy of drying winds, reducing wind speeds across crops and pastures, increasing humidity within the crop/pasture, and reducing the amount of moisture lost to the atmosphere. Shelter is also likely to increase the temperature within the crop canopy early in the growing season when low temperatures are limiting. In three separate studies in different parts of southern Australia, shelterbelts within crops have been found to increase cereal crop production by an average of twenty per cent, representing a handsome investment.\textsuperscript{159}

Data from research at Rutherglen Research Institute in south-eastern Australia,\textsuperscript{160} illustrated in Figure 6.3, suggests that the benefits of shelter on crop yields are maximised between four and ten tree heights from the trees, a zone which researchers call the ‘quiet zone’. This research suggests that the main influence of shelter is the reduction in wind speeds (and hence evaporation from the soil surface), conserving water which is critical when moisture is a limiting factor during the period of grain filling in late spring/early summer. With legumes especially, shelter is likely to reduce flower abortion caused by drying winds in spring.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure63.png}
\caption{Effect of shelter on yields of wheat and oats}
\end{figure}
The sandplain soils in the wheatbelt are highly permeable, which means that nutrients (including fertilisers) can be leached beyond the root zone very easily during summer and autumn rains. The root systems of the trees in these soils often extend ten to twenty metres below the soil surface, extracting nutrients from a much greater soil volume than can crops, and ensuring that nutrient cycling is inherently more efficient. Furthermore, the alley farming system has livestock grazing pasture for three years out of each four, which means that nutrients and organic matter in the form of manure are also kept within the system, whereas in a conventional wheat rotation a greater proportion of nutrients are removed.

An important off-site effect of the alley farming system is that it will use more of the available water throughout the year, particularly that which falls in summer/autumn storms, thus reducing the off-site impact of rising saline watertables. As the tap roots of the eucalypts in particular can reach the groundwater, and as shelter reduces evaporation losses, the alley farming system is also better able to cope with extended dry periods. More importantly, this system ensures complete soil cover throughout the year, almost eliminating the possibility of wind and water erosion which is always a risk under conventional cropping.

A desk-top analysis of the energy efficiency of alley farming, in which alleys in a wheat/lupins rotation on heavier soils or alleys with perennial pastures on sandplain soils are compared with open crops or pastures without alleys, suggests that the alleys considerably increase (by a factor of between two and four), the energy efficiency of the farming system in this environment. This is basically because fossil fuel energy inputs (diesel and fertiliser) are reduced, but energy yields are comparable, and with alleys there is a greater livestock turn off without the same requirement for supplementary feed. If occasional topsoil losses through erosion are prevented by alleys (which seems likely), then the energy efficiency gains of alley farming systems relative to conventional cropping become much higher.

Gordon Conway proposed in a 1985 paper that the behaviour of agroecosystems can be described by four system properties—productivity, stability, sustainability and equitability. He defines productivity as the yield or net income per unit of resource (interpreting resources in a very wide sense
including energy, biodiversity and human inputs); stability is the degree to which productivity is constant in the face of small disturbances caused by normal fluctuations in environmental variables such as climate; sustainability refers to the ability of the system to maintain productivity in spite of a major disturbance such as a large stress (e.g., salinity, indebtedness) or a large perturbation (drought, flood, disease, a new pest); and finally, equitability expresses how evenly the products of an agroecosystem are distributed among its human beneficiaries.

Our analysis comparing alley farming with conventional cropping on 'Paradise' lacks complete information to exploit fully Conway's analytical framework. In order to get a more complete comparison of these systems it is essential to examine their impact on nutrient cycling, biodiversity and water use at the farm level, their response to stress and perturbations, the impact of these systems on profitability, cash flow, equity and debt, and finally to assess their social viability at the community and landscape level in order to give the picture real depth and meaning. Many assumptions and areas of incomplete information will be encountered along the way, but such an analysis can enhance understanding of the complexities and imperatives implicit in the challenge of developing more sustainable farming systems. We should be doing more such analyses, highlighting assumptions, information gaps and emerging questions, and exposing the interrelationships between economic, social and ecological factors.

For the purposes of debate, let us look at each of these criteria, applying existing knowledge and intuition to a comparison of the two systems with the information currently available. Table 6.3 compares and contrasts the two systems in each of the key agroecosystem properties proposed by Conway.

This analysis is as yet incomplete. However, the data currently available, some basic ecology and farmer's common sense suggest that the alley farming system is a very promising option in the Western Australian wheatbelt. While the optimum combinations and configurations of trees, pastures and crops are still being tested, there is great scope for wider application of this system. Sandplain soils cover significant areas of the Western Australian wheatbelt and they already exhibit stark evidence of the unsustainability of conventional
<table>
<thead>
<tr>
<th>Agroecosystem</th>
<th>Alley farming property</th>
<th>Conventional cropping property</th>
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</thead>
<tbody>
<tr>
<td>Productivity*</td>
<td>22 500 MJ/ha/year, with a ratio of output/input of about six. Products include wool, beef, tree seed, fodder and lupins, with potential for honey and wood products in the long term. The use of perennial plants ensures better use of rainfall throughout the year.</td>
<td>18 000 MJ/ha/year, with an energy output/input ratio of about 1.5. Products are wheat and lupins, and yields are extremely dependent on rainfall between May and October. In good years this system may make more money, in poor years it loses money.</td>
</tr>
<tr>
<td>Stability</td>
<td>Productivity is very stable owing to the combination of perennial plants with deep root systems.</td>
<td>Productivity varies according to growing season rainfall, which is not reliable. Yields average 2.3 tonnes/ha, but range from one to four tonnes.</td>
</tr>
<tr>
<td>Sustainability</td>
<td>Continual soil cover, increased diversity of flora and fauna, greater biomass above and below ground, lower reliance on external inputs and more efficient nutrient cycling suggest a more sustainable system at both farm and watershed scales, owing to the off-site benefits of increased plant water use and protection from erosion.</td>
<td>Wheat and lupin monocultures are vulnerable to pests and disease. Bare, exposed soils from January to April are vulnerable to summer storms and subsequent wind and water erosion which is irreversible in these soils. These systems mine nutrients and thus rely on external inputs. They are unsustainable at the landscape scale.</td>
</tr>
<tr>
<td>Equitability</td>
<td>This is not easy to assess. Costs are lower and returns more even and less dependent on international markets. More intensive management and higher yields suggest that smaller farms are more viable under this system, creating the potential for more even distribution of benefits and more viable rural communities.</td>
<td>Fluctuating yields and prices determined by overseas markets distorted by EC and US subsidies; reliance on external fossil fuel inputs which are increasing in price; a continuing trend to larger farms, fewer people and dying towns; all these serve to question the equitability of this system.</td>
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</tbody>
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Note: *Campbell, Lefroy and Melvin (unpublished)
cropping on these soils—wind and water erosion, soil structure decline, waterlogging, soil acidification, species extinctions and so on. Alley farming systems also have potential in other soil types given a different choice of species for the hedgerows and appropriate alley widths.

As this landscape was covered with trees and shrubs for millennia until about twenty years ago, intuition suggests that any permanent farming system in this landscape will also have to incorporate perennials as a key component. This analysis backs up such an hypothesis, suggesting that alley farming is significantly more efficient in terms of water, energy and nutrient cycling, and it is more productive, more stable and more sustainable on this soil type. Given its lower reliance on external inputs and international market prices, it also appears that alley farming will provide a more secure livelihood for the Melvin family—probably the most crucial determinant of all in the future development of alley farming in the wheatbelt.

In Dean Melvin’s words: ‘I’m sick and tired 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 well adapted and just want to live in this country. I want to develop Australian farming.’

Alley farming is just one option, and its relative merits as a farming system are not as important as the fact that some families and some scientists are having a real go at developing farming systems which may be more appropriate to the landscape. They deserve all the support the wider community can muster.

CASE STUDY

‘ATARTINGA’

Bob Purvis has been running ‘Atartinga’, 200 kilometres north of Alice Springs, since the late 1950s. When he took over the 229 000 hectare property (smaller than the average cattle station in the Northern Territory), it was severely run down after years of overgrazing. ‘Atartinga’ came out of the 1959–65 drought with only 280 cattle, a debt of £19 000, extensive land degradation and no immediate prospect of buying more land.
But over more than 30 years, Bob has thoughtfully, patiently and skilfully turned 'Ataringa' around, so that today it is one of the most consistently profitable stations in Central Australia and in considerably better ecological condition than most.

Bob Purvis is a tall, dry, far-sighted man, independent of mind, with a clearly articulated personal philosophy on managing rangelands. Bob's outlook is essentially based on continuous learning about the land and its natural characteristics, and how to live within the limits these characteristics impose.

The question of limits and capacities is still problematic within the Australian rangelands. Many regard the rangelands as being among the most degraded land in Australia: because of overgrazing of very old, weathered, shallow soils by cloven-hoofed animals; the introduction of animals and plants which have become pests over vast areas and which have displaced native species; the establishment of permanent fresh water in troughs and bores leading to significant increases in populations of native herbivores including kangaroos; and alterations to the burning practices formerly used by Aborigines. Mining, tourism and human settlements have also had significant impacts within small areas in this vast expanse of pastoralism.

For Bob Purvis, living within natural limits means having a significantly lower stocking rate than the average for the region, being prepared to reduce stock numbers at an early stage in drier seasons, maintaining and increasing ground-cover as much as possible, careful use of patch burning for scrub control, and skilful management of water. Water management means planning and everyday management of stock watering points but, just as important, it also involves planning and being ready for unpredictable rains. Overland flow during infrequent heavy rainfalls can cause huge long-term damage, or be of lasting benefit for plant growth, depending on how it is handled.

CSIRO scientist Gary Bastin points out that water management in arid regions is not a new idea, but was a feature of early civilisations who developed elaborate methods for diverting flood waters over cropping areas, for example on the Tigris and Euphrates more than 2000 years ago. On 'Ataringa', as on most stations, there is a considerable diversity of
land types occurring in irregular shapes which are not practical to fence. Bastin describes a process which illustrates the need for careful water management in Australian rangelands:

Non-degraded rangelands function through the maintenance of resource-rich ‘fertile patches’ (Tongway et al 1989; Tongway and Ludwig 1990). These areas are relatively stable in space and time and, in seemingly flat landscapes, accumulate water, nutrients and seed through their microtopographical relief. On land in good condition, there are many small patches and water flow is intercepted before it can gain velocity and erosive force. The landscape is buffered against erosion by the proximity of well vegetated run-on areas to comparatively small source areas (Pickup 1988). However, fertile patches are the focus of intense grazing pressure by inadequately controlled stock, particularly in adverse seasons. The country as a whole then degrades as palatable species decline and vegetation cover is reduced. Run-off is increased and erosional processes become intensified. Buffering is reduced as patches lose their capacity to respond to ... small rainfall events.165

When Bob Purvis took over ‘Atartinga’, this process had occurred on extensive areas, causing large ‘scalds’—completely bare, compacted, eroded patches of land which had previously been among the most fertile lands. With the help of soil conservation officers from the then Northern Territory Administration, Bob used a cable blade bulldozer to build 25 earthen banks on bare, degraded granite plains in 1969, to trap water and encourage regeneration of herbage species. Over the years since, with the help of Bob Keetch and others from the Conservation Commission (NT), he has refined the design, construction methods and placement of banks, and tested a huge range of introduced forage species sown behind the banks—the best of which have proven to be US Buffel grass and Blue Panic. There are now more than 500 banks on the eastern side of ‘Atartinga’, and native perennials are
recolonising formerly scalded areas. The extra nutritious forage on the areas adjacent to the banks provides a handsome return (in beef production alone) on the investment in the banks, according to CSIRO calculations.\textsuperscript{166}

Another key aspect to improved range management on ‘Atartinga’ is the use of fire—a technique used by Aborigines in the rangelands over millennia. There is a considerable problem on ‘Atartinga’ (and over vast areas of Australian rangelands) with woody shrub encroachment, primarily caused by historic overgrazing which created more favourable conditions for regeneration of shrubs than for grasses and herbs, converting formerly open country to vast woody thickets. As grasses are replaced by shrubs, and under continued grazing pressure, it becomes very difficult to get a decent burn going—the traditional method of killing shrubs and stimulating grass regeneration, creating and maintaining open grasslands. But Bob’s low stocking rates, some strategic sowing of Buffel grass, and judicious opportunistic use of the firestick when weather conditions and fuel loads are favourable, is enabling him to nibble away at the patches of scrub, recreating more productive and stable open grasslands.

Bob Purvis is forthright in his criticism of the general standard of rangeland management, in particular of the high stocking rates maintained on many stations, which he believes are leading to the loss of perennial species and long-term damage to exposed soil. While many in the pastoral industry respect what Bob has achieved on ‘Atartinga’, his well known views on stocking rates are not universally acclaimed.

Research over many years by scientists at the CSIRO Division of Wildlife and Ecology at Alice Springs definitely supports Bob Purvis in suggesting that lower stocking rates are not only more ecologically sustainable, but more profitable. When actual figures are compared over twenty years or so (still a fairly short-term comparison, given the climatic variability of the arid zone), a low stocking rate regime, with conservative drought de-stocking policies, is more profitable in cash terms. Bob is able to turn off heavier beasts earlier, attracting premium prices, his input costs are lower and he does not suffer the same fluctuations in net return that characterise most of the industry.
The advantages of lower stocking rates are gradually becoming accepted in the northern cattle industry, as people start to focus on kilograms of beef of a certain quality per square kilometre, rather than just numbers of cattle. This change in focus has been accelerated by the Brucellosis and Tuberculosis Eradication Campaign (BTEC), the national campaign which has eradicated brucellosis and tuberculosis from cattle and buffalo throughout Australia. BTEC has forced (and subsidised) the cattle industry to become more professional in the rangelands—less like hunting and more amenable to herd management. There are clear trends towards more control of stock, more watering points, more paddocks, higher weaning and calving percentages, greater ability to spell paddocks and recognition of the profitability of more conservative stocking rates.

However, there are still many pastoralists who believe that the major influence on range condition is the season, not grazing pressure, which means they tend to run what they regard as the most profitable number of stock (usually the maximum), expressing the popular view that ‘the country will come back’. So the development of more conservative stocking regimes, and management which is responsive to range condition, is much more likely to be driven by profitability than a concern for the environment. Indeed, one has only to drive through Australian rangelands after good rains to see extravagant displays of wildflowers and furious growth of annuals from horizon to horizon. Such spectacles support the view that rain, not cattle, determines the condition of the land. But the sheer variability of climate in the rangelands masks long-term trends. It is very difficult to tell just by eye and memory whether the country does completely ‘come back’ after a good rain, or whether there is a gradual disappearance of some species and a decline in the ability of the country to recover after extended dry spells. The most urgent extension priority in the rangelands, then, is to demonstrate in dollar terms the advantages of lower stocking rates and better control of stock.

Properties like ‘Atartinga’ provide a tremendous resource of practical information to support such a research and extension effort.
CASE STUDY

A STIRLING EFFORT

Lyn and Barry Stirling have literally been pushing landcare uphill for the past eighteen years. They farm near Tumby Bay on the south-eastern edge of the Eyre Peninsula in South Australia, which we introduced in Chapter 4.

Rural decline is rampant on Eyre Peninsula. Barry Stirling describes in bald terms a scenario which sees this region in deep social and economic crisis:

Farmers are suffering from advanced AIDS (Acquired Income Deficiency Syndrome). We have had below average seasons in 1985, 1986, 1987, 1988, 1989, and since then a drop in prices. When 400 farmers out of 2200 walked off their farms, they were bought up by other farmers. With high interest rates, most are now in trouble. Now with wool prices falling and land not selling at all, 70 per cent of the farmers are technically bankrupt. Average farm equity ranges from seventeen per cent in the far west to 63.5 per cent around Tumby Bay. Average farm debt in this area is about $207 000 and the 1993 harvest was pretty bad.

Another unfortunate reality for agriculture on Eyre Peninsula is the nature of the soil and the history of its (ab)use since European settlement. The first clearing started early last century in the Sheoak (Allocasuarina spp) woodlands, to provide wood for the boilers of coastal steamers. Rabbits relished the sandy soil and dry climate of the Peninsula and became a massive problem early this century. By 1940 rabbits had ruined the property of which the Stirling's farm was formerly part, as sheep numbers crashed from 28 000 to 3000. After the Second World War, this property was split up into about 25 soldier settlement blocks, one of which was taken up by Barry’s father for dairying. In 1972, the Stirling family bought out their neighbours, who could not handle the stony soils on their 650 hectares, which they sold for $40 000, with 1000 sheep and machinery thrown in. The Stirlings ran this land as a dry stock block until 1977, when they split the fam-
ily partnership and Lyn and Barry started to farm the new block on their own.

Their new farm was totally devoid of trees, with only 70 arable hectares when they took over. This did not deter Lyn and Barry, whose achievements are especially noteworthy in the ecological and economic reality of the Eyre Peninsula. They set about replanning the property so that they could raise productivity without degrading it. Barry describes the first steps:

We ran into water erosion problems in the early 1980s and started contouring [constructing earthen banks along the contour, and doing all cultivation along the contour to trap run off and prevent erosion] in 1985. We have since done 70 kilometres this way and have gone from thirteen paddocks to 30 in this time. We have stabilised creek banks using Kikuyu grass and Red Gums (E. camaldulensis). I had to learn how to modify plant to suit our property, as we could afford only older, cheaper machinery. Our header has a special self-levelling shelf system we designed, and comb plates with lower points and shear pins for protection against rocks. We have shifted the tractor draw-bar to a central point under the middle of the motor and widened the wheels of all plant to allow safer working along the contour on side slopes.

Many kilometres of contour banks have been constructed on the steep (up to 25 per cent) slopes. On these slopes the Stirlings also ripped and cleared off the stones and rocks. The life of a tractor tyre can be as short as 700 hours in this country, so the benefits of farming in this way are starting to attract other farmers in the district, who are beginning to follow the Stirlings’ lead and contour their lands.

Barry Stirling describes the essence of their program: ‘Since 1976 we have brought into production 330 hectares of difficult country through conservation farming methods such as minimum tillage practices for all cropping programs, working on the contour, sinking dams and soaks in all paddocks, planting 20000 trees and seeding about 100 kilometres of tree lines with our home-made direct seeder. We are now self-sufficient in regards to water supply.’
The revegetation efforts of the Stirlings are a great example of what a combination of farmers' practical nous and ingenuity, coupled with determination and hard work, can achieve without excessive out-of-pocket expenditure. Lyn and Barry are establishing trees for shelterbelts and wildlife corridors which will connect small patches of remnant native vegetation, and the steep country is being planted back to native trees for fodder, fuel, wildlife habitat and beautification. Barry is experimenting to find the most reliable and cost-effective establishment technique. After persevering with tubed seedlings, he feels that this method of establishing trees does not achieve their aims quickly enough, so they are trying direct seeding. Using direct seeding, Barry believes they can establish 100,000 to 150,000 trees and shrubs quickly and economically:

We have developed one large direct seeding contour plough and a small seeder attached to the bulldozer ripper. We call it the 'Ripper Seeder'. We have also done some direct seeding by hand into roughly prepared ground and we tried using a combine pulling a sheet of chain mesh. A good direct seeder costs up to $16,000, but ours is now recognised as one of the best and costs $1,200 to build. We also discovered a new method of scarifying tree seed by freezing it for two days before putting it in hot water.

Waterfowl have benefited considerably from the tree plantings, giving them more protection and nesting sites. Rabbits and feral cats have been eradicated and a host of weeds, which infested the slopes, are now under control. Adding to the uphill battle was a fearful storm which dumped 175 mm (seven inches) of rain in three hours in April 1989. Barry recalls: 'This one rain destroyed half the contour work and 21 out of 23 dams. All in all we spent $30,000 repairing fences, dams and contour banks. Without our conservation work it would have been much more devastating. It proved we were on the right track.'

As a result of their activities the Stirlings have boosted their farm production by 40 per cent and have alleviated water shortages formerly faced every season. Stocking rates have in-
increased from 1000 sheep in 1977 to 3500 on the same area.

Initially the Stirlings were looked upon as ‘greenies’ and with a lot of suspicion by some people in the district. Says Barry: ‘It would have been far easier to just farm the hilly country and not worry about causing any erosion or managing it for long-term viability. But the benefits have outweighed the costs and we know we are on the right track.’ Other people obviously agree, as the Stirlings’ achievements have been recognised in the South Australian Ibis Awards and Primary Industries Landcare Awards, the BP Conservation Farmer of the Month for June 1992 and the Victorian Banksia Foundation’s Conservation Award for Primary Production in 1992.

This recognition is gratifying, but it brings with it many additional demands, as Lyn and Barry caution: ‘We have had approximately 40 visitors per week for the whole year, and numerous public engagements all over Australia. At night, the phone runs hot. We would recommend people in landcare groups be very careful in promoting a local person, because that person has to put up with a lot of pressure and needs to be aware of what can happen.’

Lyn and Barry summarise the advantages of the improvements to their property since taking over in 1977:

- Contour banks and working on the contour has evened out the distribution of water from the tops to the bottoms of hills, giving more even crop yields. Improved water penetration has increased yields.
- Shelterbelts are good for stock and also for lowering evaporation rates by lifting winds. Eyre Peninsula is a very windy environment with the sea on both sides.
- The value of the property has increased by ten to fifteen times the original purchase price and our increased production has enabled us to reduce our mid-1980s debt to a manageable $23 000 dollars.
- Our working environment and self-satisfaction has really changed and gives us some pluses to think about during these hard economic times.

Lyn, Barry and Trevor Trenberth were instrumental in the initiation and development of the Tumby Bay Landcare Group, one of the most diverse and active groups in South Australia, which we introduced in Chapter 4.
Wooragee Primary School in north-east Victoria has its own Landcare group, involved in composting (shown here), revegetation, rabbit and weed control, and farm planning activities.

Landcare for Teachers course participants learn how to measure soil pH.
Dunecare members erecting a hessian fence to halt sand drift and allow revegetation.

Greg Bugden and Barry and Peter Gillies inspecting electric fencing constructed at the Uranquinty Landcare group's demonstration site west of Wagga Wagga.
Shearing time on 'jangarri': Garry English counting out shorn sheep.

Jan English and kids skirting a fleece.
'Bonneys Plains':
Biz and Lindsay Nicholson in their farm nursery.

'Paradise':
Dean Melvin.
While this chapter attempts to show that landcare and profitability are not mutually-exclusive and that there are numerous examples where more sustainable land use practices are also more profitable, we should not fall into the trap of using profitability as the only arbiter of the worth of any particular land management option.

This is not a book about economics, but it is worth reviewing briefly the major problems generated by the doctrine of neoclassical economics (or 'free market economics' or 'market-oriented economics' or that hackneyed oxymoron 'economic rationalism'), as it is at present the dominant paradigm in Australian politics and thus has significant implications for the management of natural resources.

There is a compelling argument that continued reliance on economic models and investment criteria as the main input to political decision making is impeding our ability to deal effectively with environmental and social issues. 167

In neoclassical economics, the market determines value; it is 'the hidden hand' which serves as a neutral judge. At the heart of this theory is the assumption of rational individuals pursuing their own self-interest, which is also assumed to be consistent with the interests of society as a whole. In its modern guise, neoclassical economics holds that individuals seek to maximise their utility (constrained personal satisfaction) and they make trade-offs at the margin to equate different positions of equal utility, thus reflecting their preferences through 'rational' choices. Thus the value of anything (goods and services, wilderness experiences, clean air and water for future generations or whatever) is determined by the market, which reflects the sum total of individual preferences, each of which is based on the amount of personal utility yielded. Doug Cocks summarises the attractions of the neoclassical model:

*Market capitalism is a very good core system for organising the production of goods and services. Through mutually beneficial and voluntary exchanges validated by the price mechanism, it rations the use of scarce resources into producing goods which people are willing and able to pay for. With the promise of profit it fosters innovation to meet unsatisfied needs and, conversely, moves resources from where they are no longer required. It avoids the crushing burden experienced in centralised economies of trying to calculate relative prices for everything such that shortages and surpluses are minimal.* 168
The most powerful arguments against the possibility of sustainable use of natural resources ever occurring or even being approached, in a globally integrated economic system operating within a political climate dominated by belief in market forces, are those which come under ‘market imperfections’, a euphemistic term often used by economists to refer to the acknowledged faults when markets are not quite ‘perfect’. When viewed through the prism of sustainability, these ‘imperfections’ could be more accurately described as glaring fundamental deficiencies and contradictions, rather than blemishes which can be corrected by routine servicing of the economic apparatus with a political tweak here and some fiscal lubricant there.

The World Bank economist Herman Daly and the theologian J.B. Cobb Jr identify six socially essential functions which unrestricted markets cannot perform, but which are nevertheless essential for efficient functioning of the market:

- **Fair competition**. The competitiveness of a market is always under threat from oligopolies, monopolies and collusion, which routinely distort prices. There is a natural tendency for successful businesses to grow and gradually work towards market dominance. Daly and Cobb point out that the current tendency is towards mergers, takeovers, and aggregation in the search for international competitiveness, vertical and horizontal integration, and economies of scale.

- **Moral capital**. Markets are driven by individualistic self-interest, yet their efficiency depends on values such as honesty, initiative and thrift. This is a fundamental contradiction—the notion that self-interest works to the common good is unsound. The crises following the deregulation and speculation frenzy of the 1980s point to the consequences of the depletion of moral capital.

- **Public goods**. Markets do not supply goods which, once available, are freely available to all—for example, infrastructure such as highways and national defence. This point is readily conceded by market-oriented economists, so it is expected that governments do have a role to provide such functions, using public funds. Real markets rarely produce pure public goods (eg attractive landscapes), at least deliberately, nor can they produce positional goods such as the Mona Lisa or rainforest in increased quantities, yet markets attempt to ration such goods by price.

- **Externalities**. Those who engage in market transactions rarely
pay the full costs of those transactions. Costs imposed by issues such as pollution, loss of biodiversity or ozone depletion are routinely passed to the community, rather than reflected in product prices. These side effects which are not accounted for by the market are called externalities. Externalities and imperfect information commonly lead to ‘incorrect’ prices for goods and services, which then distort the prices of all other goods and services and, in the case of the environment, commonly lead to rates of resource depletion or degradation which would not be economically rational if full costs were reflected in the price of goods and services.

- **Just distribution (equity)**: ‘Real markets are not good at producing goods for poor people or unborn people or incompetent people or minority groups.’ There is nothing in the market mechanism which works to provide employment at a living wage for all who need it, nor to provide for those unable to work. It does not follow that if the cake is bigger, everyone will get a bigger slice; in fact economic growth has tended to widen the gap between rich and poor in countries of the north and the south.

- **Ecological sustainability**: Market forces are notoriously myopic. The market has no way of determining its optimum scale relative to the ecosystem on which it depends—it does not have a ‘Plimsoll Line’ criterion, nor an ‘existence theorem’. It responds to resource depletion by transferring an ever greater share of available resources to the economically powerful.

At the social level, neoclassical economics assumes that a competitive market equilibrium, which in turn assumes, among other things, perfect information available to all, well-defined property rights and an absence of externalities (unpriced side-effects on third parties), will maximise collective welfare.

However, most environmental issues are characterised by large scales in space and time, ubiquitous externalities, ill-defined or non-existent property rights, imperfect information, and intangible values which are difficult to express in monetary terms. Thus there are many aspects of mainstream political/economic theory and practice which stimulate, reinforce and justify patently unsustainable uses of natural resources.

So what are the alternatives to the currently dominant paradigm?

Alternative strands of economic theory which are more consistent with wiser use of natural resources and thus avoiding or at least
postponing the extinction of *Homo sapiens*, are presented and discussed by Daly and Cobb in *For the Common Good*, by Robyn Eckersley in her excellent review of Green politics, *Environmentalism and Political Theory: towards an ecocentric approach*, and by various authors in *Ecological Economics*, edited by Robert Costanza.174

The central values of Green economics175 are participatory democracy, ecological responsibility, social justice, decentralisation and the dispersal of economic and political power. Green economists accept the Western liberal traditions of representative democracy, tolerance of political diversity, the rule of law and due process, and protection of human rights including freedoms of speech, assembly and organisation, but they are suspicious of the concentration of economic power in either the state or corporate capitalism. Essentially Green economics envisions a market economy (within circumscribed ecological limits) with a large private sector.176 As put by Daly and Cobb:

> If one favours independence, participation, decentralised decision making, and small- or human-scale enterprises, then one has to accept the category of profit as a legitimate and necessary source of income. There is plenty of room to complain about monopoly profits, but that is a complaint against monopoly, not against profits per se ... If one dislikes centralised bureaucratic decision making then one must accept the market and the profit motive, if not as a positive good then as the lesser of two evils ... We have no hesitation in opting for the market as the basic institution of resource allocation.177

However, Green economists, while accepting the market, have been at the forefront of the critique of prevailing modes of free market economics and private and state capitalism—accepting the price mechanism does not imply endorsement of existing patterns of ownership and control, nor of the existing distribution of wealth.178

Some practical initiatives and institutional implications flow from Green economic thought, such as:

- a range of new fiscal measures (eg resource depletion quotas, marketable permits, resource taxes, pollution charges) to control resource depletion and reduce throughput. Technological progress should seek to increase efficiency, not increase through-
put. High natural resource prices and high taxes on energy would be a good start. Renewable resources, both as sources and sinks should be exploited on a profit-maximising sustained yield basis, that is, harvesting rates should not exceed regeneration rates and waste emissions should not exceed the renewable assimilative capacity of the environment. Depletable resources should be exploited at a rate equal to the creation of renewable substitutes, and the revenue from this exploitation should be divided into an income component and a capital component, the latter being reinvested to create new renewable assets, so that by the time the resource is depleted a replacement will have been created:

- improved long range impact assessment and technology assessment;
- replacing misleading GDP/GNP statistics with more meaningful indicators of economic well-being;
- shifts in the burden of taxation away from labour toward increasingly scarce factors of production such as land, natural resources and fossil fuels;
- the development of local credit and banking facilities and ethical investment funds;
- greater worker and community ownership of capital assets and participation in corporate investment decisions;
- cultivation of the well-informed 'Green consumer', through independent consumer organisations, stricter controls on labelling, advertising and certification systems;
- fostering of non-market exchanges at a community level.

The Green economic agenda is not without problems however. There are formidable political difficulties (and naiveties) associated with implementing the propositions of alternative economics, some of which are so alien to the dominant way of life in modern industrial societies. For example, the notion that decentralised decision making by local communities or bioregions will result in more ecologically sound management of natural resources assumes ecological literacy throughout all human populations and ignores the rights of other people in other regions. Many progressive social and environmental reforms (eg affirmative action, abolition of slavery, homosexual law reform, preservation of wilderness) have emanated from cosmopolitan central governments, rather than provincially or locally, often against the wishes of the local community. Achieving redistributive justice at the same time as encouraging reduced material throughput in a predominantly market
economy will be extremely difficult. Robyn Eckersley predicts increasing tension between democracy and efficiency, as the need to retain and discipline the market and the price mechanism will confer greater powers in the state. She also suggests that Green economists underestimate the cunning of market rationality in finding ways around macro-economic controls. Finally, Eckersley asserts that the urgency of many environmental issues demands multilateral action by nation states and she echoes the concerns of others in stressing the critical importance of effective international treaties, agreements and controls:

... there are few material (as distinct from moral) incentives for exemplary ecological action—whether on the part of transnational corporations or nation states—in the competitive environment of global capitalism. Without concerted ecodiplomacy resulting in a comprehensive range of treaties providing for macro-ecological controls and standards at the international level, Green economists will be hard-pressed to convince an effective majority of voters in their own nation that they must become ecological saints while individuals and corporations in other countries continue to engage in ecologically irresponsible practices.161

Thus, when we begin to consider the implications of shifting human management of natural resources to a more sustainable basis, we are immediately confronted with a tension between ‘bottom-up’ and ‘top-down’, especially as we move between scales in space and time (discussed in more depth in Chapter 9). As mentioned earlier, reform is necessary in both directions and they can be mutually reinforcing, rather than mutually exclusive. Grassroots movements, like Landcare, allow desirable reforms at a macro level to become more politically feasible, and prominent commitment and leadership at a high level can provide the clout to make more space and resources for community-based initiatives. We are not suggesting that Landcare groups are the answer to all environmental problems, but neither do we think that these problems can be tackled effectively without the commitment, knowledge and direct involvement of those whose daily activities and decisions directly affect natural resources.

Returning to the farm level, there are many motivations for people to manage a given piece of land in a given way, and none is more rational than any other. Jan Doewe van der Ploeg posits that
agriculture is an extremely heterogeneous activity, in which farmers, by means of their farming strategies, participate actively in shaping agricultural development. Farmers are seen as knowledgeable actors who manage their human and biophysical resources according to specific objectives and rationalities, which of course vary within a given society and between societies. However, farmers are not completely free to do whatever they want; their room for manoeuvre is limited by the structural context in which they operate, established by such influences as the state, markets, technology and social norms. The variation between farmer strategies within a given structural context can be attributed to their differing farming styles.\footnote{182}

Van der Ploeg discusses farming styles in the context of two extremes in the forms of agricultural production: (a) relatively autonomous, historically guaranteed reproduction; and (b) market-dependent reproduction. In the former case, the labor force and all the means of production in any farming cycle are the material result of the preceding cycle, production in the present cycle creates the inputs for the next cycle and so on. Emergencies and inputs which cannot be produced on the farm (such as iron) are paid for out of savings generated by selling surplus production. In market-dependent reproduction, the necessary production factors and inputs are commodities mobilised through the relevant markets and thus depend on the market, not on the previous production cycle on the farm.\footnote{183}

Clearly modern industrial agriculture is the end-point of a transition to market-dependent reproduction, which is the result of what van der Ploeg calls ‘the process of externalisation in agriculture’, in which inputs and management tasks and processes become progressively removed from the farm and more subject to external (particularly market) forces. Yet even within this process, at any given stage in any region, there is a diversity of farming styles.

The usefulness of van der Ploeg’s concepts is that they provide a sociological basis for a critique of contemporary agricultural policies, which are widely seen to be contributing to environmental degradation.\footnote{184} For example, in western Europe, official policies discuss ‘marginal’ and ‘underdeveloped’ regions, yet these terms only make sense within a strictly unilinear model in which ‘development’ is assumed to mean progression towards greater market dependency and high-input/high-output farming. However, van de Ploeg’s discussion of farming styles makes it clear that no particular rationality is any more valid than another, and that there is a
sound case, on equity grounds alone, for differentiating within agricultural policy interventions (especially subsidies) to account for different farming styles, rather than simply labelling any deviations from the high input-high output model as 'backward' or 'inefficient'.

If Australian farmers were 'economically rational', as assumed by neoclassical economics, most would have sold their farms and invested the money years ago—even bank interest has been higher than the return to capital of most farms over the last twenty years.

Of the many motivations for owning and/or managing land, one which is important for an increasing number of land users in Australia is nature conservation. For these people, the arbiter of success is not the amount of money they make (above their basic needs), but the impact of their management on the ecosystem in which they live. There are thousands of such people and we cannot possibly do them justice, but it is useful to look at one case more closely.

**CASE STUDY**

**ANDREW HALL, MT WARNING CRATER**

The Northern Rivers Rainforest in northern New South Wales is one of the most botanically rich and most beautiful plant communities in Australia. In 1980, Andrew Hall purchased a 54 hectare property on the rim of the Mt Warning Crater, near Murwillimbah. The small farm, lying between the Nightcap National Park and the Nullum State Forest, had been a soldier settlement block released in 1919 for soldiers returning from the First World War and had been used for banana production and dairy farming until 1980. The land is on very steep slopes in a very high rainfall area, and its use for agriculture had led to serious water erosion. When Andrew first bought the block it was covered with kikuyu grass, crofton weed and lantana, surrounded on three sides by rainforest and eucalypt forest in which there was very little natural regeneration.

Andrew started planting trees to control weeds, to protect the soil from erosion and to establish a woodlot. He committed himself to focus on species native to the area, and has planted more
than 30,000 trees over the last 13 years—a mixture of rainforest species, hoop pine, eucalypts and understorey shrubs. The first koala was seen in 1989 and in the last five years there has been a noticeable increase of all sorts of small marsupials, including brown antechinus, paddy melon and wallabies, as well as platypus, goannas, snakes and a myriad of birds. These plantings have started to create their own micro-climate, which is encouraging natural regeneration from seed distributed by wind, water, animals, birds and insects.

Recreating a rainforest is not easy. Andrew had a lot of trouble getting rainforest seedlings to survive at first, because voracious weed growth overwhelmed the slower growing rainforest species and exposure to the sun burned off the remainder. A wildlife corridor between the State Forest and the National Park was replanted three times because of the difficult terrain. But slowly, techniques were developed to give a 90 per cent success rate.

Throughout the Landcare movement, new ideas are being tested and new techniques being developed. This is not just trial and error, but purposeful experimentation to solve particular problems in particular circumstances. Of course there is great potential for scientists, if there were enough of them with sufficient resources, to help people with such experimentation, and such interaction may lead to more learning for all involved. But the key point of this and thousands of other instances is that innovation is not necessarily science-led, but an outcome of people working in a more or less systematic way to improve their own situation.

Andrew employs local people to help him with his annual planting, which lasts between one and four weeks early in the year. These people gain terrific practical knowledge of rainforest planting techniques and are further encouraged by the success of previous years’ plantings. Neighbours have used this experience to help in replanting their own properties, and some have planted small areas to cabinet timbers as a form of superannuation.

Andrew’s project is an earnest attempt to restore the unique environment of the Northern Rivers rainforest. He is aware that he will not see his forest fully mature, but he is rewarded by the delight he gets from watching it grow and caring for it, knowing that he is making a difference in his part of the world.
This topic deserves a whole book rather than a single chapter. Landcare has turned Australian land conservation research and extension on its head. Changes in the 'how' and the 'who' of research and extension over recent years have been profound. Perhaps the most significant feature of the (r)evolution in research and extension practice is that change is occurring in the field, on the run, often initiated by practitioners rather than planners or policy makers. It is difficult to capture the breadth, depth and significance of the way in which Landcare departs from traditional approaches to land conservation extension and research. We attempt to do so by detouring through some extension theory in order to set the scene for an exploration of the jobs and daily lives of some people working with Landcare groups.

**THE TRADITIONAL TECHNOLOGY TRANSFER MODEL OF RESEARCH AND EXTENSION**

Landcare is a marked departure from the dominant 'diffusion of innovations' theory, upon which most land conservation extension in Australia has been based for the last two or three decades. This model theorises that adoption of a given innovation by a given farmer is the end result of a mental progression through awareness, information, evaluation, trial and finally adoption. Farmers were assumed to be a homogeneous group apart from their propensity to adopt and it was also implicitly assumed that innovation is inherently good and equally beneficial for all farmers, and that therefore everyone would adopt eventually. A few are quick to catch on to an innovation, then many follow, and a few take much longer, resulting in a bell-shaped curve if
adoption is graphed over time.\textsuperscript{186} This theory enabled the labelling of farmers according to their order on the adoption spectrum, the earliest being 'innovators', followed by the 'early adopters', 'early majority', 'late majority' and finally, the 'laggards'. It underpinned the notion that research and extension need only work with the innovators and early majority, theoretically 'the top' sixteen per cent of farmers, and the rest would automatically follow their example. This is a very comfortable notion for agricultural scientists, who learn much from and enjoy working with innovative farmers, who often move in the same social circles.

Diffusion theory has underpinned systems of research and extension in which scientists determine research priorities and carry out research in controlled conditions on research stations and in laboratories, generating new knowledge and technologies which are transferred to the leading farmers by extension services. These farmers adopt the innovation(s) and iron out any wrinkles, and the innovation then diffuses through the farming community. Research and extension systems based on this model, commonly referred to as the 'transfer of technology' model, have been remarkably successful in increasing agricultural production in many countries, including Australia. Investment in agricultural research institutions and their projects has been consistently profitable.\textsuperscript{187} When it comes to the adoption of innovations such as a higher yielding crop variety, or machinery which saves time or labour, hundreds of empirical studies have proved the diffusion process to occur.\textsuperscript{188}

But the theory of diffusion of innovations has fairly narrow limits, some of which were acknowledged and documented by Everett Rogers, a key architect of diffusion theory. Rogers proposed that five key attributes of innovations—relative advantage, compatibility, complexity, trialability and observability—are important in determining adoption, thus focusing attention on the nature of the technology as well as the farmers' propensity to adopt.\textsuperscript{189} Others suggested that the main limitation of diffusion research was its inability to predict the conditions within which diffusion could be expected to work.\textsuperscript{190} Furthermore, the focus on the individual as the unit of analysis and the assumption that all farmers are the same with respect to the usefulness of a given innovation is patently flawed. It ignores distortion of information through the diffusion process, differential rewards between earlier and later adopters of innovations, the diversity among farmers and their farming styles, and important social consequences.\textsuperscript{191} Research and extension systems based on the transfer of technology model tend to be biased towards larger and more 'successful' farmers.\textsuperscript{192}
Times have changed. Maximising food production is no longer the main goal of agriculture. Certainly global food production must continue to increase, but opportunities to bring about such increases by bringing new land into production or making simple modifications to farming systems are increasingly scarce. To refer to Rogers' characteristics of a given innovation: where the innovation is complex, where costs and returns may be hard to identify or apportion, where there is no immediate return, or where the innovation challenges community norms, then linear communication from researcher to extension agent to progressive farmer to the rest is unlikely to result in widespread adoption. Yet these very characteristics are all quite common when one is confronted with the challenge of developing more sustainable farming systems.

THE PARTICIPATION PARADIGM

One of the most fascinating aspects of Landcare is the extent to which it has blossomed under its own steam, rather than as the end result of carefully conceived strategic policy interventions. Undoubtedly the inputs of some key public figures, administrators and policy makers with an awareness of, and commitment to, a participatory approach were critical in enabling the rapid growth and resourcing of Landcare. But overall, policy has tended to gasp in the dust of on-ground developments. Frank Vanclay of Charles Sturt University at Wagga Wagga has pointed out that Landcare has developed without a substantial theoretical basis and consists 'of a substantial amount of ideological faith'. To the extent that most Landcare practitioners are unaware of academic extension theories, this suggestion is certainly true. However, what is ideological faith to one person may seem common sense to another, as Angus Howell, sheep farmer and coordinator of the Warrenbayne Boho Landcare Group suggests:

*Initially government officials and scientists were threatened by the process, but now they see themselves as part of a team with the community. They are comfortable with the fact that the farmers too have a background of knowledge that is important to them. Where Landcare groups have taken the responsibility for looking after the public awareness programs, the level of understanding has exploded [waving his hands up into the air]. We have a better feel for the sorts of processes from which we learn than does (with respect) the best trained field officer.*
The drive to replace diffusion theory with a coherent body of thought which better explains how knowledge is generated, exchanged, transformed and used in rural communities, and which can point to more appropriate models for institutional and policy development, has gathered momentum. In 1987, Robert Chambers and Janice Jiggins published a seminal paper in the journal *Agricultural Administration and Extension*, which analysed the limitations of the transfer of technology model of agricultural research, in particular from the perspective of the hundreds of millions of resource-poor farmers who have been further marginalised by the green revolution. They proposed a new approach which they called 'Farmer First and Last', designed specifically to transfer power and initiative throughout the research and extension process to farmers, relying to a much greater extent on farmers' knowledge, skills and self-interest, placing scientists more in the roles of learners and facilitators. They asserted that scientists would need to acquire new skills and that a turn-around in behaviour and attitudes would be required in order for researchers and extension staff to work more effectively with all types of farmers.

In the late 1980s, a range of participatory approaches to the generation, exchange and use of information expanded upon and implemented the above themes in many countries, consolidating the emergence of a new world view in agriculture. This world view acknowledged the limitations of reductionist science, positivism and the technology transfer approach, and complemented this with a 'farmer first' paradigm in which farmers' needs and priorities are the starting point for agricultural research and extension, throughout which farmers are intimately involved.

Chambers and other proponents of this emerging paradigm do not suggest that the 'farmer first' approach replaces the traditional research-advisory cycle, rather it complements it. Successful Australian models of 'farmer first' approaches are in action, in the Kondinin Group based in Western Australia (which started in the 1970s), the Farm Management 500 and Farm Advance projects in south-eastern Australia and of course leading Landcare groups. But these groups have had to work extremely hard over a number of years to achieve recognition (particularly from research funding bodies) as legitimate players in research.

There have been notable successes in the application of participatory approaches in complex, diverse and risky environments around the world. However, Jules Pretty and Robert Chambers contend that, in order for participatory approaches (of which Landcare is a classic example on a large scale) to spark lasting improvements, a conjunction of three critical factors is required:
• new institutional environments explicitly endorsing a participation paradigm;
• new learning environments for professionals and rural people to develop capacities;
• new methods for partnerships, dialogue, participatory analysis and sharing.

Institutional support is likely to have little impact unless it is followed through with participatory approaches to learning, and participatory methods applied in research and extension in the field. Pretty and Chambers mention examples where a Director General has been convinced of the value of participatory methods, but staff wedded to traditional top-down approaches have resisted reform. They cite problems such as poor linkages between institutions and farmers’ groups, ‘departmental separatism’, obstacles to multidisciplinary teams and individual behaviour imical to participatory interaction, as limiting institutional support. Landcare groups are familiar with these hassles.

Participatory methods in the field may be abandoned or never even tried, unless there is institutional support and/or a learning environment. Jules Pretty tells of a follow-up visit to a field research station several years after running field training workshops in participatory approaches: ‘Yes, we remember that workshop very well. It was great, but we have not used any of the methods ...’ A creative and participatory learning environment (eg the Landcare facilitation training courses in various Australian states), in the absence of institutional support and constant reinforcement through application of methods in the field, is typically marginal, vulnerable and short-lived, often critically dependent on one or two enthusiastic people.

Pretty and Chambers sum up the necessary pre-conditions for a move into the participation paradigm as follows:

... When the learning environment remains top-down, formal and based on detailed manuals, even though there is institutional support, field methods may not become truly participatory: this problem is indicated where training takes extended periods in the classroom rather than the field. When participatory field methods are not known or practised, reinforcement through popular enthusiasm does not occur, and appraisal and action are more laborious and less easily sustained. In these various conditions, programs tend to be either weak and threatened within their institu-
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...or to sink into repetitive ruts. In both cases, the withdrawal of external support is a danger...

In [successful situations], support within institutions exists at the top. Authority is decentralised, and local diversity supported. There are incentives and encouragement to conduct participatory work. Linkages and sharing are encouraged with other institutions, whether NGO, government or local organisations. Spread is lateral, through sharing within and between organisations, and through participants becoming trainers. The learning environment focuses on problem-solving, and is interactive and field-based. Error is embraced in the learning process. Responsibility is personal rather than procedural, relying more on discretion and judgment and less on rules and manuals. Behaviour and attitudes are democratic, stressing listening and facilitation, not didactic teaching. Methods and approaches are participatory and enabling, and seek to enhance capabilities. Local groups and organisations are supported, and encouraged to conduct their own experiments and extension, to manage themselves and to make demands on the system. Rapid adaptation to change occurs through devolved responsibility, local learning and the responsive generation of a range of options. 198

This is quite consistent with the Landcare experience in Australia in its present pivotal stage of development. Landcare has many isolated examples of genuinely participatory methods being applied in the field; we have some creative, interactive, capacity-enhancing training in some states and there are varying degrees of institutional support and commitment to participatory approaches.

However, there are several challenges implicit in any serious consideration of the concept of sustainable agricultural systems, which suggest that considerations wider than just the degree of participation of land users are needed in order to inform the development of more appropriate research and extension systems.

Firstly, the scales in space and time involved mean that the farm and the farmer are among many other players, not the key focus of the system. Rural communities, urban consumers, the voting population, other species, future generations—all have a stake in sustainable systems of food- and fibre-production.

Secondly, the conundrum of achieving sustainable development and the complexity of integrating ecological, social and economic considerations in situations characterised by vast scale, uncertainty
and urgency, mean that society has to develop new competencies in learning, planning, and making and implementing collective decisions. We have already mentioned the concept of 'second order science' of Funtowicz and Ravetz, which offers penetrating insights into the deficiencies of reductionist science in such situations.199 Interdisciplinary research, integrating bio-physical, economic and social research skills, is required to look at 'the big picture'—not only to develop multi-faceted processes for tackling complex problems, but often in order to find out which smaller bits of the picture are most in need of more basic research.

Because solutions to environmental issues will require institutional, structural and social change as well as new knowledge, it is equally apparent that people from many community sectors need to be involved with scientists from the earliest stages of research, not at the 'university researchers have discovered that ...', or 'scientists recommend that ...' stage. Science has a vital role to play, but as a tool of society, not to set the agenda.

In terms of the effectiveness of Landcare groups and of the goal of sustainability, the way in which research is carried out is as important as which issues are explored. The complexities inherent in sustainability and the primacy of farmers in making land management decisions mean that a recipe approach to land management recommendations won't work. Researchers and extensionists working with farming communities, with a focus on tools instead of recipes, will require new modes of thinking and acting. Science must work more closely with communities throughout the entire research process from issue identification to adoption, if researchers are to avoid the problem referred to by Brian Roberts as 'answering questions no-one has asked'.

Answering questions no-one has asked is a characteristic of systems of research and extension based on the transfer of technology paradigm, propped up by the questionable assumptions of diffusion theory. Researchers at Wageningen Agricultural University in the Netherlands, in particular Niels Röling and Paul Engel, have developed the concept of an Agricultural Knowledge and Information System as a more constructive analytical model, enabling the consideration of a multiplicity of relatively autonomous actors, diversity in sources and types of information, identification of knowledge networks, and the development of knowledge management.200

A knowledge systems approach broadens the ambit of extension. Figure 7.1201 depicts the extension spectrum—from technology transfer (in which paternalism and the 'expert syndrome' thrive) to
human resource development. It illustrates that different approaches to extension, requiring different types of skills, are appropriate in different situations.

Technical know-how is not made redundant as situations become more complex; rather it is built upon as the spectrum moves towards empowerment. One of the most profound constraints to landcare is the lack of technically sound, profitable solutions, which means that technical training and expertise are as important now as ever. However, the social and economic aspirations of many Landcare groups, and their focus on the community and catchment level, necessarily limit the applicability of technology transfer approaches to a narrow portion of their spectrum of concerns.

In summary, extension and research are being required to change to mission-centred, rather than problem-focused approaches; to learn new skills to work effectively at a community, rather than a paddock, level; and to concentrate far more on process—who is involved at what level, who asks the questions, who listens, and who owns the process, rather than on traditional concerns of tasks and outputs (publications).

Let us ground this fairly abstract discussion in the everyday lives of some extension and research practitioners. We have looked at Landcare in action through the perspectives of various Landcare groups and farm families. But, although farmers are the key agents at the 'dirty end' of landcare, the Landcare movement embraces a broader spectrum of actors. In Chapter 3 we discussed the characteristics of effective Landcare groups, many of which are influ-
enced to a large extent by the quality of technical advice and facilitation skills to which groups have access. There are many hundreds of extension officers and researchers working with Landcare groups and with individual farmers, usually working long hours, often in their own time, and with increasingly scanty resources. Their perspective offers a better feel for the overall effort and potential embodied in the Landcare movement.

**CHANGING ROLES IN AGRICULTURE AND NATURAL RESOURCE MANAGEMENT**

Landcare groups have precipitated the emergence of new roles within Australian agriculture, which are distinctly different from the roles associated with the traditional labels of extensionist, researcher and farmer. There are now well over one hundred people working in Landcare facilitation and coordination roles in Australia, most of whom are funded by the National Landcare Program. In addition, many traditional agricultural advisers, some researchers and some representatives of local government and conservation groups, are receiving some form of training in these modes of operation to improve the effectiveness of their own interaction with Landcare groups. This discussion focuses on roles, not people. It is quite feasible, in fact common, for one person to perform each of these roles at various times with various groups, or even with the same group. Recognising the appropriate mode of action is part of the art.

Lea Jellinek and Christine Joannides have been working on social aspects of sustainable agriculture for several years, Lea as a consultant sociologist and Chris as a Landcare facilitator. At a weeds conference in Melbourne in 1991, they presented a paper which makes a practical case for intermediaries between farmers and sources of technical and financial assistance, some extracts of which bear repeating:

*Put yourselves in the farmer's shoes. You are on your farm, slaving away, head down, trying to make a living in this harsh economic climate. You need to decide which crops to plant, how they fit into your current rotation, whether you will be able to tackle the weeds, whether you should try direct drilling, whether you have the necessary equipment, whether the prices will hold and you will be able to sell what you have produced. You are bombarded by masses of information about soils, prices, crops, livestock, pastures,*
markets, stubble retention, herbicides, resistance to herbicides, disease. There is no-one out there who knows your particular circumstances, who understands your entire farming operation. There is no-one to help you sift through the mass of contradictory data. You feel overloaded with information, and yet in an information vacuum.

Weeds and herbicides are but one aspect of the farmers’ decision-making process. This is a highly complex and specialised field. The local chemical representatives in your area are the most knowledgeable, but are they to be trusted? After all, they are promoting a product from which their firms profit. You are in a quandary. Who should you turn to? You need an unbiased opinion from someone who is not pushing a product. You need to understand the trade-offs, the benefits and dangers. Like so many others, you fear the long-term effects of chemicals on yourself and your land. You need to know all the other possible sources of information—the experiences of other farmers, research stations, private consultants, government departments, magazines, books, computer, television and radio programs. You need someone to help you integrate this information about weeds and chemicals with all the other aspects of your farm.

Governments all around the world ... are cutting back on extension. In our society, little value is placed on education and extension, the learning process. Communication, talking, interaction, asking questions and listening are taken for granted. It’s assumed that we learn from childhood to face one another and talk. And yet, in our increasingly scientific, specialised and complex world, the things that should be most obvious and basic, are most alien. We do not know how to convey information, how to place ourselves in somebody else’s shoes and stimulate their enthusiasm. We do not take the time to gain trust, interest and involvement, the basic ingredients of learning. We forget that there are farmers out there—the main agents of change, living in a particular place with particular problems. We do not know how to place our fragment of specialised scientific knowledge in their whole farming system. We lecture instead of asking and forget that face to face dialogue is the most natural and one of the most effective ways to convey knowledge.
Farmers are surrounded by a mass of data which is hellishly difficult to sort through, even for the most educated. Field communicators can try to make sense of it all, or at least bring all those who know about it face to face with the farmer to explain themselves. The field communicators can get an overall picture of the common problems and key issues. Unlike the scientists isolated in their laboratories or universities, the field communicators get to know the people, places and problems they are dealing with. They are the bridge to the outside world—the missing link.

As one farmer put it, 'without the link person it is like having a motor without a spark plug'.

The 'field communicator' role described above has elements of facilitation, coordination, consultancy and traditional advisory work, and the quote makes a good case for the continued need for intermediaries between farmers and sources of information. A critical question is who should pay for these field communicators? We must be more sophisticated in our analyses of public and private benefits and costs, so that taxpayers' funds are spent where they will achieve most public good, most effectively. We will return to this discussion after exploring the specific roles emerging in Landcare and how they differ from the more traditional modes of extension based on the assumptions of diffusion theory.

**Facilitation**

Essentially, the aim of the facilitator is to foster community synergy. This means helping Landcare groups to make best use of the human resources available, by acting as a link person within the group and the local community, and also between the group and outside sources of information and assistance.

Facilitation in the Landcare context usually also means helping to develop a shared sense of direction among all the relevant actors. This requires a sufficient insight into group processes to be able to assist groups to find and set direction, to identify factors preventing the group from reaching its potential, and the skills to work through these issues with the group, without imposing direction upon them.

Facilitation is much more a matter of skilled listening, asking the right questions of the right people at the right time, than it is delivery of technical information or packages. This can mean challenging farmers to open their minds to new possibilities, to new ways of
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looking at their situation, their resources and the options open to them. Facilitators are often ‘providers of occasions’, organisers of encounters designed to stimulate new ideas, new ways of thinking, new perspectives or new liaisons between groups and sources of assistance. Jane Becker, a former archaeologist working as a Landcare facilitator in Northern Tasmania, likens her role to that of the piece of grit in the oyster, which hopefully one day leads to the development of a pearl. The art of fostering group synergy is delicate. It involves knowing when to lead and when to wait. It also requires empathy with farmers.

Facilitators are often involved with a number of Landcare groups at one time. While their main role is in the early stages of group establishment, they may perform a short-term troubleshooting role with mature groups from time to time, or be involved with rejuvenation of groups in decline. Facilitators ideally have sufficient technical skills in land management to be able to assist groups to set technically sound goals and access appropriate advice, but this is not essential. More important, facilitators must be able to handle the fine balance between intervention and strategic withdrawal in group activities. Facilitators are often the ‘meat in the sandwich’ between the sometimes conflicting demands of Landcare groups and government agencies. These people must have higher-level group facilitation skills, skills which are traditionally practised outside of agriculture.

Landcare facilitators work at the interface between community groups and government agencies, of which they are usually quasi-members. Facilitators are inexorably drawn to conflicts of interests between and/or within agencies and groups. For example, a group may perceive its problems very differently from the regional salinity expert, who may have a reasonable grasp of the technical issues and a pet project for which he has been trying to get resources. He has a clear view of ‘what the group really needs’, which happens to coincide with his project idea for which he wants the group to seek funds. On the other hand, the group is still working out its priorities and direction, a process which the facilitator understands is critical to its longer-term autonomy and self-reliance, and which could be compromised by an injection of funds early in the life of the group for a project few group members understand or have any ownership of. In this case the facilitator has to manage both the learning of the group and the interventions of the expert—a tricky situation potentially rife with tension and conflict.

Anna Carr notes that the role of the government-funded facilitator was a critical factor in the success of Landcare groups
with whom she carried out detailed case studies in Western Australia and New South Wales, not least by acting as a 'bureaucracy buster'. Seeking technical information, clarifying regulations, diminishing the administrative workload of the group, linking groups with schools, advising on project submissions, providing a pathway for government to enlist group support in activities such as farm planning workshops or developing a rural strategy, were all important contributions made by facilitators.

Facilitators are not just faced with challenges at the interface between groups and government agencies, but within and between government agencies. The hundred or so nationally-funded Landcare group facilitators are mostly between 25 and 40 years old, with a great diversity of educational backgrounds and work experience, many from outside agriculture, many of whom are women, almost all committed environmentalists and optimistic about the potential of community participation. They are pioneering a new role in which they are expected to use communication and facilitation skills, with an emphasis on process rather than content, employed on fixed three-to-five year contracts with no job promises thereafter. They share tea breaks in district offices of Ministries of Agriculture and the like, with their regional bosses and other colleagues, groups consisting overwhelmingly of male agricultural science graduates, permanent public servants with years of long service leave and superannuation accumulated in a system dominated by the linear technology transfer paradigm, oriented towards the unquestioned goal of increasing agricultural productivity, in which the scientist and scientific rationality is pre-eminent, and in which the traditional notion of community consultation is a public meeting to announce departmental policy to anyone who turns up, or regular meetings of advisory committees established by the department.

The above caricature is intended to depict a fertile environment for conflict, tension and misunderstanding. There is an obvious clash of cultural interpretations and world views between these two types of actors. Such clashes tend to take place in a context which is home turf to the traditional extension staff. Facilitators often have to seek contact with other facilitators in other regions or states to get positive professional feedback or advice, as their local work environment is often unhelpful at best, and hostile at worst. There is no rule book for facilitators and they are typically isolated, outnumbered in their regions by traditional extension and research staff. Many facilitators are trying to respond to more than twenty
Landcare groups, often over regions much larger than, say, the Netherlands. As most groups have their meetings at nights and their field days/farm walks at weekends, the hours and the travelling distances involved can be horrific—extremely stressful for people with young families.

On the other hand, most facilitators report tremendous satisfaction from seeing improvement in the level of activity, sense of direction, amount of learning, or degree of autonomy and self-reliance in the groups with whom they work, and they greatly enjoy their interaction with active Landcare group members and leaders. Such interaction is often their main daily support, so there is a natural tendency for facilitators to gravitate towards the 'good groups', despite the intention that they work with struggling groups, just as there is a seemingly inexorable attraction between extension agents and progressive farmers.

For regional facilitators, Landcare is typically their main source of satisfaction and their main frustration. The stresses of the job are extremely high, the security is poor and rewards tend to be personal rather than public or professional recognition. In fact the better they are at their job, the more subtle their interventions are, and the greater the independence of the Landcare groups in their area. It is only after they are gone that people recognise the quality and importance of their contribution—which does not bode well for the development of professional standing or career paths for facilitators.

The quality of facilitation support is obviously a key factor influencing Landcare group effectiveness. However, there is a fine line between helping a group to get themselves organised and to access support, and becoming pivotal in the achievement of the group, to the point where if the facilitator leaves, the group fizzes out. One needs to be careful in assessing the performance of facilitators by observing the groups they are working with, as it is easy for facilitators to fall into the trap of running themselves ragged on behalf of the group: 'After all, I'm getting paid, but the farmers are not', creating lots of activity but not really enhancing autonomy or self-reliance within the group—for example, through developing self-financing mechanisms and ongoing links with outside experts and sources of support. Good facilitators tend to work themselves out of a job, withdrawing as groups become self-reliant.

The uncharted territory of the Landcare facilitation role, the questions with which facilitators are continually confronted, and the personal dilemmas many experience in trying to foster community involvement in developing more sustainable farming systems
from within a traditional institutional framework of technology transfer, are illustrated in the following comments.

Colin O'Keefe is a graduate from the Faculty of Agriculture and Rural Development of the University of Western Sydney, Hawkesbury. In March 1992, Colin posed certain questions to 120 of his peers—Landcare facilitators, coordinators and group leaders from all states, at a workshop at the Hamilton Institute of Rural Learning. When he made the comments quoted below, he was a coordinator of the Holbrook Landcare Group in the Riverina district of New South Wales, funded by the National Landcare Program. Colin is now the Landcare Coordinator for the Australian Capital Territory, based in Canberra.

‘How do we interpret our role as coordinator or facilitator?’

Where is our starting point?

In many ways, we are in a unique situation. We are in a very young field of practice, without precedent. This is a position of luxury, for we are able to innovate and to develop roles without the constraints of tradition, mythology or established disciplines.

Are we helpers, ‘gofers’, change agents or emancipators? Or are we reactors to political struggle, driven by clients’ situations and established philosophies? Or must we be all of these?

Why are we in this role at all? Responses may range from ‘it’s a job’ to ‘fixing land degradation’ to ‘building a sustainable agriculture’, and many more. If we see ourselves in the sustainable agriculture camp, then our role becomes much more complicated, unclear and unfamiliar. If we define Landcare as dealing with land degradation, then we are no different from the traditional extension role, a duplication of the current system if you like, and we are expendable. If, however, we define Landcare as agriculture searching for ways to be sustainable, then our role is much more complex and not so easy to define. It is at this point that we begin to separate from the traditional extension model, as practised by many agencies.

As an overriding theme, I have observed that the most difficult part of my job (apart from working for a committee) is asking the right question for the situation in hand.

Fundamentally, Government agencies are driven from top down by policy and bureaucratic needs. There are,
however, signs that this may be changing. Public servants often work from a position of superior knowledge (eg elitism, control of research focus and limited access), so they believe they know best. As a result of this top-down corporate culture, there have been many ‘manufactured’ Landcare groups and coordinator/facilitator positions. In this situation, what is our role?

Farmers and those in government agencies who generally acknowledge we face potentially serious environmental problems believe that Landcare is ‘fixing’ land degradation. These people believe the major task is on-ground works and the major question is who will pay. The underlying assumption here is that current farming practices only need refining. However, if we believe Landcare to be more fundamental and complex, we may well have the dilemma of a technological fix versus cultural change. If this perception and assumption is close to the mark, what is our role?

For decades, rural communities have been declining, with social and economic links directed towards larger rural cities. For these people to refocus on the local community, as Landcare implies; may take considerable effort (it may be analogous to farming returning to practices that exclude chemicals). How do we respond to this situation?

The perception appears to be that coordination, participation and cooperation just appear with the presence of a coordinator or facilitator. We are often expected (implicitly and explicitly) to be sales people for the group leadership and for landcare in general. In this situation what is the group’s responsibility, and how could we best respond? Are we manufacturers of enthusiasm?

Though many policies have changed, the practices of some government agencies have not. The ‘trickle down’ effect in extension theory still pervades; ie, work with the community leaders and the others will soon follow; only train the coordinators/facilitators and the Landcare groups will respond accordingly the way they ‘should’. What is our role in this situation?

If we are seen by the groups to be employed by them, and thus recognised as subordinates and not as team members, what is our role?

There is often a clash between the bureaucratic culture of government agencies and the highly individual and independent nature of farmers. These differences often manifest themselves in a power struggle and a mutual level
of distrust and disrespect. In this climate what is our role?

How can we interpret our role so that by the end of our contract we have worked ourselves out of a job by enabling the group(s) to coordinate/facilitate themselves (self-sufficiency)? Maybe the group believes we are there to relieve them of their workload (when in fact our presence will mean an increased workload) or are we there to increase the activity of the group? How involved should we become and in what form?

Given that landcare issues often have less priority than financial and social priorities (eg educating the children) could we expect support from academia or elsewhere to assist us with process, understanding and emphasis to help make significant inroads? If so, what form would this support best take?

If the group's leadership see the social aspects of Landcare as 'awareness to fix past mistakes', and the political aspects as 'a willingness to fix these past problems', given this shallow, engineering and convenient interpretation, how do we respond?

Groups often resist criticising their structure and process, and then rebuff us for attempting to do so. At the same time we may well be accused of neglecting the group's priorities of sourcing funds, maximising on-ground works and selling Landcare. What is our role in this situation?

Is there a role for us to influence groups as to what their roles and responsibilities might be? If so, what is the context, form and degree of this type of input?

Farmers as owners of the problems must acknowledge responsibility for their part in the need for landcare. Can we, together with government agencies, do more than facilitate learning? Where does pro-active education finish and top-down manipulation begin?

If the concept of Landcare is about sustainable agriculture, then it will be seen as long-term; culturally, socially, politically and ecologically complex. The longevity of Landcare will also require a more rigorous understanding of how agriculture can prosper whilst enhancing the ecosystem and rewarding the farming community. To say that we do little more than transitional extension is an admission of ignorance about the complexity of Landcare, its relationships with sustainable agriculture and to draw attention to the confusion people have about our role and our lack of support.
Will these problems be overcome with time (accepting teething problems), or will the economic rationalists discard the concept of Landcare before there is sufficient time for it to mature? After all, there has been little conceptual and academic support. We have been provided virtually no input to such fundamental questions as: a) How is change facilitated? b) How can we best operate within current structures? c) How can a sustainable agriculture be achieved?

A clue to this Landcare dilemma and how we fit in, is innovation; not fixing past mistakes or justifying current traditions. This innovation will need to be broad-based in political, ecological, economic and cultural aspects of Landcare.

These questions remain pertinent, and are likely to be so for the foreseeable future as Landcare continues to evolve and as the Australian rural crisis deepens. They are questions which should be exercising institutional minds, but more important, perhaps, the thoughts of people in the field. The roles of facilitators, coordinators, extension staff and researchers are profoundly influenced by the people they work with, by farmers and other land users, as well as by their bosses and remote policy makers. Landcare reflects a change in farmers’ expectations of government and of ‘scientific experts’ and a pragmatic recognition that rural land users may be better off explicitly taking responsibility for resource management issues. Landcare group members have a crucial role to play in defining the roles of the publicly-funded people with whom they interact.

CASE STUDY

THE ‘HUMAN YELLOW PAGES’

Local government is probably the most crucial layer of government for assisting Landcare groups, yet it has been the most neglected to date. A rural shire usually has a works crew, earthmoving and other equipment, administrative and clerical staff, a depot and offices (often grand), most commonly under the joint control of an engineer and a clerk, who report to a predominantly male council made up of senior members of the farming community, a few business people from the local town (often at least one estate agent) and perhaps a long-serving local school teacher or public servant.
Rarely epicentres of environmental enlightenment, rural shires can nevertheless make an enormous contribution to landcare and improved land management within their area, often without spending much extra money. Local governments are closer to the voters and to land management issues; they have potentially useful labour, equipment and office facilities to assist Landcare groups, as well as significant direct and indirect influences on land management. Many councils seem unaware of the links between good land management and their own expenditure on infrastructure such as roads, culverts, drains, bridges and water supplies—let alone the less obvious links such as farm productivity, environmental health and landscape amenity. Local government is in a great position to set an example of environmental responsibility in its management of open space, rubbish tips, gravel pits, water supplies and their catchments, sewage treatment, fire prevention works, road reserves and watercourses, and in its considerable influence through planning schemes and development approval procedures. But unfortunately, landcare initiatives at the community level of government are the exception rather than the rule and many Landcare groups despair at the attitudes and behaviour of their local council.

However, most rural councils lack appropriately trained people, which limits their capacity to play a constructive role in land management. This situation could be improved if central governments were to allocate additional resources to landcare through local government, as the following case illustrates.

In 1990, Christine Joannides was employed by the Shire of Kaniva in the Victorian Wimmera as a Community Landcare Facilitator, the first appointment of a landcare facilitator by local government in Australia.

One of the major changes in the Kaniva area since the Second World War has been the shift from grazing to cropping and the consequent increase in run-off. This was highlighted in wet years such as 1987 and 1988, when most of the rural land in the municipality was inundated and many roads were impassable, costing millions of dollars in damage to Shire infrastructure and in lost production, with incalculable damage to the long-term productive capacity of soils and to water quality. Most farmers in the area still relied heavily on cultivation to reduce weeds. Cultivation compacted the soil and limited water infiltration. Excessive run-off from the upper
slopes flooded more productive lower lands. In effect, poor land management was contributing to lower agricultural returns and higher costs imposed on the whole community, and consequently to social and economic decline. The Kaniva Shire Council could see that developing and extending more productive and sustainable land management practices, particularly in the upper catchments of the Shire, was one of the keys to arresting the general decline in the Shire.

Kaniva Shire successfully applied for National Landcare Program grants to study these land management problems and to employ a Landcare facilitator to improve community awareness and encourage farmers to adopt better farming practices. A steering committee involving the Department of Conservation and Environment, Department of Agriculture and Rural Affairs, the University of Melbourne Centre for Farm Planning and Land Management (primarily Dr Lea Jellinek), the Wimmera Conservation Farming Association, the Kaniva Branch of the Victorian Farmers Federation, and local community groups was set up to oversee the project. Their objective was to develop and implement programs for the repair and sustainable use of land in the Shire.

When Christine Joannides was first appointed, she found herself in a vacuum, among two to three hundred farmers who did not want to know her and who were cynical of any government departments or extension. They felt Chris was just another young upstart, fresh from university, with all sorts of naïve, perhaps 'greenie' ideas who had been employed by the Shire to tell them what to do. They thought, 'Another one of those "facilitators" (paper shufflers) wasting taxpayers' money. What does she know about Kaniva, farming and the farmers' needs?'

The basis of Chris's approach has been to listen to farmers—to find out what they know and what they want. Although she was ostensibly employed to set up catchment management groups to encourage farmers to reduce cultivation, she first needed to gain the trust of the farmers and the Kaniva community. She needed time to get to know them. She needed to visit them in their homes, on their farms, in shearing sheds, at the pub, school, fire brigade, church and during footy on Saturdays. In two months she made more than 50 farm visits, often dropping in unannounced. She needed the flexibility to work weekends and nights. Four leading farmers in the district were prepared to give Chris guidance and advice whenever she felt lost.
Says Chris: 'I realised early on that the pub was a great place to meet farmers, and that this was where many exchanged ideas about farming and found out what was going on in the town. I was fortunate that on Friday afternoons I could talk to retired farmers and in the evening talk to their grandsons, giving me a wide cross section of views on farming.'

Chris's immediate aim was to understand the farmers' lot, to shuffle in their boots and to respond to their needs rather than try to create groups or impose ideas upon them. There seemed little point in forming new groups when people were already fully occupied farming and participating in existing social clusters and clubs.

After one year, Chris started to gain acceptance and acclaim for the work she was doing. Farmers rang her with all sorts of queries ranging from snails in crops to the growing of garlic and coriander. She sought answers by contacting experts in the field. She became the farmers' link person to the outside world, sifting through the mass of data and finding out which consultant, chemical representative or farmer could be of assistance. Before long, Chris's contacts extended not just throughout the farming community of Kaniva but in Victoria, South Australia, Western Australia and New South Wales. Dealing with non-wetting sands, snails in harvests or seeds bursting may not have seemed relevant to catchment management groups and minimum tillage. But in gaining the farmers' trust and understanding, stimulating their awareness and interest, they became more receptive to improved farming practices. For the farmers it was like a stepping stone to a better understanding of their farms, their problems and how they fitted into the landscape.

In the few years that Chris has been operating, she has built a strong following. With community support, Chris has:

- a regular column in the local paper—'Chris' Column';
- a window in the local bakery for displays concerning farming issues such as clover types, particular weeds, root diseases, tree guards or cropping practices;
- encouraged and helped new Landcare groups to form;
- talked to many community meetings in the region, promoting awareness of land degradation and its implications;
- helped school teachers, individuals, landholders and groups with information, advice and networking;
- organised bus trips so that people can see first-hand what others are doing;
• organised displays at agricultural and pastoral shows;
• coordinated whole farm planning workshops for Landcare group members;
• assisted farmers to convert existing machinery for conservation farming.

Of course Chris did not have the answers for every technical issue. Taking weeds and herbicides for example, she had tried to fathom this complex technical area but despite her agricultural science training she found it a minefield. Instead of answering questions herself and possibly getting them wrong, she referred farmers on: to the local chemical representative who was skilled and specialised; to Peter Ridge, a respected private consultant in the Wimmera; to Dr Harry Combellack, an expert on effective herbicide use with the Department of Conservation and Environment; and to Alan Postlethwaite, a farmer who has weed control, spraying and tight crop rotations down to a fine art.

Local farmers speak of Chris with great respect and fondness. One describes her as 'the human Yellow Pages. She's got all the contacts and telephone numbers in her office. If you've got a worry, one phone call to Christine and a day or a week later there's the answer.'

Over two years Chris has helped to make unapproachable people more approachable and helped to tie up many loose ends about farming in Kaniva. She has given the farmers confidence that there is somebody they can turn to who will seek answers to their many questions, wherever those answers might be. But working for a committee is never straightforward. Chris has to marry her priorities with those of the Shire, which is difficult, not least because, as in most shires, there are diverse, conflicting views, and communication and debate about priorities is not always open and transparent. For instance, Chris has identified an urgent need for someone to work with young people in and around the town of Kaniva as an issue which directly influences social cohesion in the district and ultimately land management. She would like to work much more with local youth. But this is not seen as such a priority, or as relevant to landcare, by some of her employers, so Chris has had to make a choice. Tensions such as this are the daily lot of a Landcare facilitator.

Chris's latest projects are to promote 'Right Rotations' and 'MEYcheck', MEYcheck (Maximum Economic Yield Check
system) is a crop-monitoring program designed to help farmers better understand the factors which influence the yield and profitability of their crops. For example, sap nitrate tests for cereals and canola are used to determine whether top-dressed urea is likely to be profitable. All assessments of crop performance are based on water use efficiency rather than on yield. The water use efficiency of a crop is the amount of grain produced for every millimetre of rainfall (after allowing for evaporation) received during the growing season, relative to the theoretical yield if all available rainfall had been used by the crop. The aim is to identify key factors which determine crop yield. Results to date show clearly that early sowing resulted in the best performing crops and that farmers who had practised stubble retention were able to take advantage of better structured soils to sow dry (before the autumn rains). There are six discussion groups involving about 30 farmers with three major soil types involved in this project, with which Chris has enthusiastic technical support from Dr Harm van Rees, a senior research scientist at the Centre for Land Protection Research at Bendigo.

Chris is also working with the Country Education Project to organise a course for farming women called ‘Paddock to Plate’, which has been developed by the Department of Agriculture at Bendigo and TAFE. The course covers all aspects of agricultural production, processing and marketing and is designed to be as ‘hands-on’ as possible. It is initially being presented in the north-western Victorian Shires of Kaniva, Lowan and Dimboola.

Chris Joannides’ work as a Landcare facilitator has filled a very important information void in the rural community in the Kaniva Shire. Changes to conservation farming practices have occurred quickly and awareness about land and resource conservation has increased dramatically. Chris has been a pivotal person in integrating the plans of the Shire with the desires of the landholders for the better management of resources and the improvement of economic viability.

Chris sums up her approach as follows: ‘There are three things which I always remember in my dealings with farmers. The first was to adopt the attitude of farmers being my teachers. The second was not to push anything. The third was that people love to have someone who is interested in listening to what they are doing.’
An aerial view of the alley farming system on 'Paradise'.

TED LEFROY

Experts snuggling in beside a hedgerow while debating the value of shelter.
Lyn and Barry Stirling sorting out seed collected on their farm.

Right: Effective Landcare groups recognise the inputs of their members and people are proud to be associated with the group.

Opposite page: Bob Purvis on 'Atartinga': the tree next to him is younger than the 22-year-old earthen bank, and is enjoying the extra nutrients and water trapped by it.
Christine Joannides, Cr Rod Coutts, Cr Graeme Sibson and Wallace Meyer in a direct-drilled wheat stubble near Kaniva.

Members of the Telopea Downs group trying to revegetate a sandhill with seed-laden branches which were later burnt to encourage regeneration.
The perspectives of Chris and Colin on Landcare facilitation are of course unique. For each circumstance there are different bio-physical challenges in diverse social settings and the nature of the facilitation role varies accordingly. It is probably influenced to an even greater extent by the personal characteristics of the facilitator. As Colin noted, there is not yet a mythology or tradition or other normative influences in Landcare group facilitation. At this stage we can still observe a great diversity of approaches. This is very fitting considering the fluidity and diversity of the Landcare movement.

At the level of the individual Landcare group, another quite distinct role is emerging to complement those of facilitation and advisory work.

**Coordination**

When Landcare groups have a fair idea of what they want to do and how they are going to do it, the amount of voluntary time which can be put in by the few people who do most of the work often becomes a constraint. At this stage a coordinator becomes useful. The role of the coordinator is to sustain the momentum of the group, to keep members involved and to ensure that group plans are implemented. Coordinators assist voluntary group leaders to organise meetings, take an active role in planning and managing group projects, keep less active group members interested, provide a link between group members and sources of technical advice and do public relations and liaison work on behalf of the group.

Coordination of resources is central to this role—for example, organising farmer contributions to projects, seeking assistance from outside groups and organising cooperative efforts between a number of farmers or with other groups. The coordinator demystifies technical issues and provides ready access to straightforward, practical advice at the local level.

In many instances, particularly in southern states, the coordination role is played by a former group leader, who is paid on a part-time basis to put more time into Landcare group activities than would otherwise be possible. This is a great arrangement where it works well. Because they are local, coordinators' expertise tends to stay in the area for much longer than departmental advisory officers, who tend to be much younger and very mobile, as the promotion and reward systems within most state agencies make it very difficult for people to pursue a career within extension without having to re-locate regularly or move to a desk job. The ongoing role of local group coordinators can relieve the administrative burden from the government agency, giving the local community owner-
ship and a degree of what Niels Röling\textsuperscript{208} refers to as ‘counter-vailing power’ or clout.

Jill Smith is a Landcare Extension Officer with the Department of Conservation and Natural Resources at Benalla. In the quote below she discusses aspects of the emerging relationship between extension staff and groups where a coordinator is involved.

The old role of an extension officer would have been to decide an extension strategy for an area, run an extension program and run all those activities yourself to arouse interest or change attitudes. These days the group takes all the responsibility for running field days and producing newsletters. It rounds up a lot more interest. Before the group started, an extension officer may have seen six or seven people out in their area. Now they see 50 or 60.

To balance that, I don’t have to spend time organising meetings, field days, farm walks. I don’t have to do a lot of out of hours ringing up landholders. Angus [Howell, the Warrenbayne Boho Landcare Group coordinator] and the group take the responsibility for organising all that. I don’t decide what direction the group is going in. But, because my groups are very active and doing exciting things, I’m involved in lots of exciting projects and I don’t have to take responsibility for a lot of the boring things like making sure there are white boards and overhead projectors at the meeting, booking buses etc.

You learn a lot from the people you go and visit. You see what works and what doesn’t work in an area and you gradually build up more information in that way. I think you learn just as much from the farmers as you do from reading and doing courses.

Landcare has been tremendously successful in raising awareness. The problem is providing the technical solutions. There are solutions but they’re not always economical and don’t always work as well as they should. [Landcare groups are] coming up with alternatives. They come up with ideas and we help them find out if they really do work—get them to try it out, get it researched.

We’re getting there. Things are improving all the time. Groups are easier to work with as far as getting change and adapting systems with changing technology.

I love my job.

Like facilitators, the one hundred or so Landcare group coordinators are also pioneering a new role, but at a local scale with a
much more tangible focus and clearly defined responsibilities than the regional facilitator. The coordinator typically works for one group only, with an area of operation and priorities determined by the group. For many coordinators, the $10 000 or so per year that they receive for their two days per week as a coordinator is crucial income which enables their family to remain viable on their own farm, and which rewards them for time they were probably contributing voluntarily anyway. They usually learn on the job, receiving advice from extension agents, regional facilitators and other coordinators, and attending occasional Landcare training activities. Many say they have learnt an enormous amount (both about land management and about people) in their role as a group coordinator, which most regard as an extremely rewarding job. They tend to be regarded as an asset rather than a threat by district extension workers and regional research scientists, as they can facilitate access to many farmers, doing the organisational back work. The expert has to turn up on the day. Consequently, most Landcare group coordinators enjoy a constructive relationship with relevant government agencies in their area, and are not as exposed to the bureaucratic hassles that are the daily bread of facilitators.

However, there is always potential for conflicting interests within even homogeneous Landcare groups, and these tend to be the focus of group coordinators. It is relatively common for a group to be dominated by the personal agendas of one or two individuals—a brittle situation. The coordinator needs to be able to work effectively with these dominant individuals, while attempting to involve other members and people on the fringes of the group in decision making and group activities.

Some Landcare groups apply for funding for a coordinator and, if successful, sit back and relax to watch the coordinator perform. Just like facilitators, if group coordinators are not careful, they can do too much on behalf of the group, performing many group tasks themselves. In such cases, group meetings are dominated by the coordinator’s report, membership tends to decline and the group is extremely dependent on the coordinator for initiative and activities. This issue is a key focus for facilitation training to assist coordinators to manage their own work environment for their own benefit and for the good of the group. In general, however, group coordinators are at the constructive end of Landcare, working for groups which know what they want to do, and gaining a great deal of personal satisfaction in the process.

Kate Walsh made the following comments at the Hamilton workshop for Landcare facilitators, coordinators and group leaders in March 1992. At the time, Kate was coordinator of the Strzelecki
Ragwort Control Group, in the steep, wet hills of south Gippsland. She has since become one of six regional facilitators working for Greening Australia Victoria, using similar skills to those described here, but over a wider area, and with a primary focus on the preservation, enhancement and establishment of native vegetation in the region for both agricultural and ecological reasons. Kate has been farming in the area for fifteen years.

I come from steep, very fertile, high rainfall country with intensive dairying, grazing, and hobby blocks. Ragwort and blackberry compete with our pastures and, if not controlled, overwhelm them. Weed control is a legal obligation but enforcement has become more and more difficult. One-third of the landowners are absentee. For the past 90 years or so, clean farms have been infested by seed from neglected land which has caused enormous resentment against neighbours and governments.

I am one of seven local Ragwort Control Group Coordinators in our region. We are employed part-time for five years by the Department of Conservation and Environment. Formal qualifications are not relevant and we work from home. To our communities, we are coordinators seven days a week. Much of our work is evenings and weekends. We are a communication link within the local community and between the Department and the community.

Employing me was actually a really brave move of the Department. I get paid for fifteen hours a week. I am responsible to my community and the department. The community is all around you and you really feel the responsibility.

A local coordinator can say ‘we’ (eg ‘we are responsible for our roadsides’) instead of ‘you’. This brings ownership of problems and solutions back to the community. We have local knowledge and perhaps some intuition for what is needed.

At our first meeting, my community set the priority—to stop ragwort flowering and seeding and to control blackberry. Every landholder must be involved and part of my role is to help motivate people to do this. I use what skills I have and then draw on the skills of my committee or Department of Conservation and Environment staff to complement mine. Some useful approaches include: encouragement, a newsletter, personal persuasion, peer group pressure, the ‘snowball effect’, respect for the past, people helping each other and sharing equipment, incentives and informal contact.
After four years, ragwort and blackberry have definitely decreased, use of herbicide has decreased, aerial spraying within the area has ceased. Everyone in the group makes a major effort to control ragwort.

A lot of land management problems are people problems. There's one bloke who'd never planted a tree. I could see for a year or two he was watching us and every now and again he would mutter, 'Ah, I should have started planting years ago', but he wouldn't do it. Anyway, yesterday I was talking to him on the road and I just had this feeling, so I said, 'You wouldn't want some trees this year would you?' and he said, 'Oh, I might take one or two hundred.' He's done three hundred so far and that's great. I had to appear really laid back and calm and not excited, but I was really just about jumping out of my skin about the triumph because he had just a totally blank hill!

When we started the group everyone was in their separate little boxes. But weeds and erosion and salinity don't respect boundaries and similarly it doesn't work if we put little compartments around ourselves. The thing about the group is to break down those compartments, to realise we're all part of a continuum. We find the common ground and go for that.

Being a local coordinator can be very intense and unrelenting and it is important to give oneself space and time. It is also essential to keep aware of the broader picture. The VFF/Greening Australia publication, Trunkline, has helped the group see themselves in the context of the broader picture.

I believe by helping the community tackle their priority problems, I have created a climate where other very important landcare problems can be acknowledged and addressed.

We've suddenly realised that everything is fragile, our incomes and our future. It has encouraged lateral thinking. We've kept up, and in some ways even increased, the momentum during this recession.

**Extension**

If the profile of government extension staff juxtaposed against facilitators earlier implies criticism of extension officers, it is unintended. Their homogeneity (in terms of education, cultural background and gender) was highlighted in a national study reviewing
training needs for professional natural resource managers. Senior administrators admit that the selection of extension staff from the 1950s until the 1980s in most states was biased heavily towards agricultural science graduates from one or two key institutions in each state, with additional unwritten, informal selection criteria such as an ability to drink beer and play football and cricket.

The resilience and seductiveness of the traditional transfer of technology paradigm from the perspective of government extension staff is understandable. The goal of increasing agricultural production has only recently been modified to increasing productivity. The concept of sustainable agriculture is still adolescent and pliable. At this stage departmental responses to the issue of sustainability are still mainly in the glossy brochure stage. Substantive change in operational practice (with the exception of responding to Landcare and declining budgets) is patchy. The predominance of the goals of increasing production and productivity were (and still are in many circles) widely accepted and supported throughout the community. Phrases such as ‘Australia rides on the sheep’s back’ are part of national folklore, although increasingly less accurate. Agricultural research and extension, until the 1980s at least, was seen to be a vital contributor to national economic growth and standards of living, and its practitioners were (and most still are) extremely comfortable with this notion.

As mentioned above, diffusion theory suggests a population of farmers normally distributed with respect to their rate of adoption of any particular innovation over time, a dogma which endorses the natural tendency of extensionists and researchers to work with the top fifteen to twenty per cent of farmers in the belief that their example leads to adoption among the rest of the farming community. Agricultural economists have been a further buttress in the dominant transfer of technology paradigm, arguing that as the top twenty per cent of farmers are responsible for a disproportionately higher percentage of agricultural production, and as declining terms of trade will squeeze out inefficient producers anyway, it is economically rational to work mainly with the better farmers.

From the perspective of our archetypal extension worker (a 40-year-old agricultural scientist, ex-footballer with a beer belly, well known for his ribald jokes and detailed knowledge of crop varieties and herbicide mixes), Landcare is a fuzzy, mildly threatening notion. Initially seen as yet another reflection of trendy environmental concerns in the cities and cynically interpreted as political vote buying, Landcare for traditional extension staff can be a crystallisation of unwelcome change.

Picture the new, young, nationally-funded Landcare facilitator, with
her training in journalism (and unabashed ignorance of herbicides—'she can't even drive a tractor!'); her new nationally-funded station wagon and relatively generous travel budget; her membership of the Wilderness Society; her feminism; and her frequent trips away for training courses in 'group dynamics', 'conflict resolution', and 'community consultative processes'. When she arrives in their region, traditional extension staff are rarely indifferent. They may welcome their new colleague as a valuable addition to meet an urgent need to service community expectations, appreciating the different skills required and the need for fresh approaches in extension. Or they may resent the resources allocated to Landcare and its implied criticism of the traditional focus on agricultural production, disparaging the lack of experience, technical knowledge and practical capabilities of the new breed called facilitators.

There are many government extension staff willing to acknowledge the poor environmental record of conventional agriculture, and also to acknowledge that effectively tackling complex environmental problems at a regional scale means more than working with the top farmers and it means more than transferring technology. But, even for these staff, the contrasts between their own training and skills and the skills and insights required to help a diverse community group understand a complex environmental issue, to develop ownership of this issue and to take collective responsibility to try to resolve it, can be unsettling. For staff who prefer to regard environmental concerns in agriculture as peripheral, it is easier to criticise Landcare as 'populist' and 'cuddly-feely' than to confront the changes required to adopt new extension approaches, let alone to question extension itself, or, heaven forbid, the role and nature of science.

Of course many extension workers and researchers interact with Landcare groups. In fact they remain one of the most important sources of technical advice, behind other farmers, ABC radio, newspapers and magazines. Many extension workers and researchers see Landcare groups simply as a more efficient way to deliver essentially technical recipes to a larger audience—in other words to continue as they have in the past, but with groups rather than individuals. As mentioned earlier, some officers have used Landcare groups to obtain funds for their own pet projects. Others, however, can see the potential of community groups to tackle issues in a way that was impossible in the past, and get a kick out of working with groups rather than talking to groups. These staff see the value of the training offered to facilitators and are keen to gain similar skills themselves. For them, Landcare is one of the best developments in their professional career, adding a new dimension to their work.
There are also some extension projects, complementary to Landcare, which underline the emergence of the participation paradigm, allowing us once again to sample the views of some extension practitioners and the implications of this paradigm shift for farmers and scientists.

CASE STUDY

FARM ADVANCE

Farm Advance is a network of groups in north-central Victoria working towards the ultimate goal of sustainable land use through a productive agriculture. The city of Bendigo is in the south-east of this region, which extends from grazing country in the higher rainfall areas south-east of Bendigo to cropping on the red-brown earths north and west of Bendigo. Roughly 2000 farmers are attempting to maintain a livelihood in this region from a diverse range of enterprises. The Farm Advance project was conceived in 1988 at a workshop organised by the Centre for Farm Planning and Land Management of the University of Melbourne. The workshop brought together farmers, agribusiness, the financial sector, scientists working in extension and research with relevant government agencies, and policy makers, to explore opportunities for developing new approaches to research and extension for sustainable agriculture in the region. Locals were convinced that the region had missed out on quality research activity over preceding decades owing to its being too far from the Department of Agriculture Research Institutes at Rutherglen and Horsham. Furthermore, they felt that findings from Rutherglen or Horsham did not tend to transplant well to the hard-setting red-brown earths and different growing conditions of the mixed farming country in north-central Victoria. Farmers wanted more research and more relevant research, but they did not want to see millions of dollars spent on buildings and a research station covered with tiny paddocks, plots and laboratories.

A small steering committee consisting of representatives of each of the above groups was formed to develop some of the ideas floated at the workshop. Nigel McGuckian, a local agricultural consultant, was engaged to look at other extension and research projects around the country to see what lessons could be learned and how the best features of existing activi-
ties could be brought to bear in a new approach relevant to the particular needs of the region. He examined current directions in the literature on extension and research, studied nearly twenty existing projects relevant to the brief, interviewed hundreds of local farmers by telephone and discussed ideas with key players in depth.

The local community was then involved in getting the groups up and running. Farm Advance has a management committee that consists of five farmers, representatives from rural industry groups and representatives from the Department of Conservation and Natural Resources (DCNR) and Department of Agriculture (DA). There is a full-time project leader based at the DCNR Centre for Land Protection Research (CLPR) and there are five group coordinators based in the community. There are 33 Farm Advance groups (some of which are also Landcare groups) with an average size of about 40 active members. All 2000 farmers in the area receive a regular newsletter. The groups hold regular field days, farm walks, training courses and 'Better Farming Bus Tours'. They draw on the services of the regional DCNR and DA offices as well as a network of private consultants. They liaise closely with the CLPR and are involved in a range of their monitoring and field trial programs.

Farm Advance is a pilot project, the running costs of which have been met by the National Landcare Program. The group plans to be self-sufficient in the long term. Members are now required to pay a $50 annual membership fee and sponsorship by local companies is becoming more important.

According to Harm van Rees:

It is very successful. I know that as far as our work is involved we would not have anywhere near the impact that we do in the community if it was not for Farm Advance. We’ve got many, many more farmers involved purely because we have a very dynamic group of coordinators ...

The value of having the farmer as a coordinator (ie local) as compared to having somebody with a red number plate is enormous. Farmers see you’re coming from the government and stand back to see what this guy is about ..., whereas a local doesn’t have those kind of problems ...
Geoff and Merna Curnow farm near Laanecoorie, 36 kilometres west of Bendigo. Merna is chairwoman of Farm Advance:

Several people around here have made the same comment to me, without any prompting I might add, that they have learnt more about farming ... in the last two years with Farm Advance than they have in all the 30 years they've been farming ... because it's driven by the group it's the sort of things that are relevant to them and what they want to see. We meet in the local hall, in the paddock, in the shearing shed, wherever it's appropriate.

FarmFacts and Farm Advance actively encourage the participation of farm women, when before it wasn't the place of a woman to be at a farm meeting. The margins of farming are a lot thinner than they used to be. The volatility of interest rates and borrowing money has been the other problem ... The sums just didn't add up. Everybody was borrowing. A lot of it's about not making farmers so isolated ...

This extract from an interview with Geoff and Merna illustrates the inextricable intertwining of farmers' economic circumstances with technical issues and social issues, and consequently the necessity for any approach to research and extension to be similarly integrative. There can be no blueprint for such an approach. However, some key general principles of the participation paradigm are: the involvement of a broad spectrum of land users at all stages in planning, priority setting and implementation; a supportive institutional setting with scientists as co-learners and facilitators; and a creative and participatory learning environment. All these are exemplified in the Farm Advance project. To illustrate that the same principles can be applied in a different way with different emphases, let us consider the SoilCare project, an hour or so east of Bendigo.

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CASE STUDY

SOILCARE

SoilCare is an integrated extension/research project which was initiated in 1988 by the Department of Agriculture at Benalla.
According to John Avery, an experienced extension specialist and one of its architects, SoilCare explicitly attempts to reconcile the resource model of extension education,\textsuperscript{213} with institutional requirements for policy-directed (ie 'top-down') definition of extension objectives. The resource model was developed by Barrie Bardsley at the University of Melbourne. It posits that most farmers' learning activities are self-directed. An effective extension system must recognise the existence of a shared pool of knowledge to which farmers, scientists and others all contribute and from which they learn; and thus extension should be concerned with creating learning situations and developing skills to enable relevant knowledge to be shared. SoilCare further accepts that the various stakeholders—different types of farmers, scientists, policy-makers, Landcare groups, agribusiness and research sponsors and so on, all have different interests and objectives and thus different requirements of the research and extension system.\textsuperscript{214}

In contrast to Farm Advance, which emerged from needs perceived and expressed by farmers, SoilCare was conceived and initiated by the Department of Agriculture, but with an aim of transferring some of the ownership of research and extension priorities and effort to farmers themselves. It has been funded primarily by Victorian government agencies, the National Landcare Program and the Grains Research and Development Corporation.

SoilCare links 14 farmer discussion groups, based on social neighbourhoods, each with 30–40 farm families, with demonstrations and trials at a paddock scale on farmers' own properties. In some cases the trials are rudimentary, involving farmers measuring yields from particular treatments using calibrated portable field bins at harvest. In other cases, trials are properly replicated, designed and supervised by scientists from the research station at Rutherglen. The key point is that farmers in their local discussion groups have the key role in asking research questions and in seeking and refining the answers. Groups negotiate their discussion program with extension staff; they determine the location, focus and design of paddock-scale trials and demonstrations; and they organise special interest workshops and tours. Individual members are encouraged and assisted to test new ideas on their own farms, the results of which are then discussed in the groups. A stubble retention machinery loan scheme is targeted through SoilCare groups.
In the words of John Avery:

I'm totally committed to working with groups, because it's a far more effective way of helping people develop their decision-making skills and helping them come to terms with where information is useful and where it isn't. It's just a much more powerful way of doing extension.

When asked, farmers tend to say the same thing [about working in groups]. Because they were sharing information themselves, as well as accessing what we [scientists] knew, they were learning a hell of a lot more than they ever did when they relied on individual contact.

We are working much more in the role of facilitating the exchange of information. We are only part of the farmer's information system.

Cathy Botta is an extension officer working most of her time with SoilCare groups. Cathy's thoughts encapsulate many of the issues involved in facilitating learning processes in farmer groups, as opposed to transferring information within the traditional technology transfer model of research and extension. In particular, the emphasis on learning together, rather than distinguishing between farmers and so-called experts, creates a very different context for the interaction between a government ministry engaged in research and extension, and the people with whom it deals.

... We went through quite a deliberate program of discussion in the first year before the demonstration area was set up. Everyone had a shared understanding about the level of knowledge already in each group. We also asked each group to nominate the major soil problems that they felt were limiting production.

So that was a good starting point to say, 'OK, let's set up a demonstration area investigating techniques which could help us overcome these problems.'

The group chose a paddock for the demonstration that the group felt they could learn the most from. Each demonstration area is different because it
reflects the group and their problem. That was why we went to locality-based groups—to get away from the reaction to field days, where you hear farmers saying, 'Well, you know that's fine, but it wouldn't work back at my place, because my soils are different.'

Farmers do all the emergence counts, the weed counts. We only do the soil testing. That's been very important because then they own the results. The whole group does it. We have measure sticks and clip folders and pens and papers and off they go into the paddock. [One hears comments such as] 'Gee, it's amazing what you see when you walk through a crop isn't it?' Many of them after those sessions have gone back to do their own crops, looking at plants per square metre and the weeds and things like that. They notice things like the direct drill sites were really firm and could take more rain, whereas on the other site we were up to our kneecaps [in mud].

Since the first year it's been more and more the group determining what we're going to do on the demonstration sites and what we're going to do as a discussion group. Each group will set its own goals, direction and action plan. The whole aim is that groups would develop and take on wider issues and in fact become Landcare groups. In the long run they'll be pretty much self-determining and self-running and our role will be servicing them.

We have a newsletter that goes out to every landholder. It's sent to both partners. A lot of women have said to me that that was a thing that they were really impressed with. All the information is addressed to both partners and that's something that they really appreciate.

Each year I organise a little bus trip for each group around their own district, looking at different people's crops and pastures. It stimulates an enormous amount of interest. They don't know that so-and-so had sown Phalaris and they look at it and they say, 'Wow, that's great!, so what was the variety? What was the seeding rate?' and they're asking him, not me. It helps people recognise the skills and the knowledge that they have in their own district.
In terms of extension it would have to be the most effective, because you’ve got farmers in their natural groups. Basically I could talk until I was blue in the face about the advantages of direct drilling and stubble retention, but if one farmer in that group said, ‘Yeah, I had a go at direct drilling …’ you could hear a pin drop. When one farmer talks about his experiences, they lock onto that …

Demonstration sites give them hands-on experience without their having to take the risk themselves. One farmer said to me the other day: ‘The biggest thing I had to overcome was after the first summer rain. I was sitting inside and every one of my neighbours was out on their tractor [cultivating in preparation for conventional crop establishment]. You have no idea the pull of that. I almost had to chain myself down.’ I would never have considered that. It really shows how important it is to work with many of the people in a district together, because it creates a supportive atmosphere for change. He was feeling very isolated.

I see my role as a facilitator of learning. Sometimes that may mean that I have some information to offer the group, sometimes I say, ‘Well what do you reckon; what’s been your experience?’ If you are working with discussion groups, then your role is to promote discussion. If you are answering all the questions, you are not promoting discussion. If they are going off on a tangent, then you say, ‘Well look, my information is slightly different, let’s discuss it.’

A lot of us have underestimated the knowledge within the farming community. Given half a chance they come up with the right answer. I really enjoy working with the people. They’re great people, they’re lovely, they’re fantastic. You get to know people really well, you get to know both partners …

There are many problems that can’t be tackled by individuals—like drainage or remnant vegetation. They’re noticing that their trees are dying and want to do something about it. They recognise that, unless they work as a group, it’s just going to be hopeless. The task is just too enormous for an individual.

As for the future—I would have to say that train-
ing of extension officers in facilitation is just vital. Understanding people, understanding how discussion groups work, understanding how you can get consensus. I think it's vital for people who are working with groups that they know that they have got a tool bag. You've got to have people skills. Some people have them naturally, but there are so many things you can learn about how people learn, how adults learn. It just changes your approach. Instead of seeing farmers almost like kids and you're out there teaching them, you're treating them as adults.

These quotes illustrate a dynamic, evolving relationship between extension staff and farmers in Landcare and associated initiatives such as Farm Advance and SoilCare. The impacts of these changes are clearly not confined to farmers. They evince important changes in the roles and emphases of professionals in agriculture.

Research

Much has been made of the need to change farmers' attitudes, and of the crisis in agricultural extension which is contributing to perceptions that useful research is getting dusty on scientists' shelves while farmers plod on oblivious using land degrading practices. It is often said that if we only applied what is already known we would be way ahead. This may be so, but it assumes that answers exist and that it is merely a matter of getting farmers to apply them.

Reviewing the history of major land conservation practices in Australian agriculture and summarising recent research on direct drilling, stubble retention and tree planting, Neil Barr and John Cary assert that the major determinants of the adoption of a conservation practice are its attributes. If the practice is profitable, low risk and easily incorporated into the farming system it will be quickly adopted, whereas risky or unprofitable practices are unlikely to be widely adopted. Complex or difficult practices may be adopted, but only slowly. The following quote is illustrative:

*Perhaps our greatest concern is with a widespread belief that the most important task to achieve a more sustainable agriculture is the raising of community awareness and changing of farmers’ attitudes to their land. Our retelling of agricultural history helps to provide an understanding*
of the barriers to adoption of sustainable land use practices. A few practices have been widely adopted and have been of major importance in sustaining agricultural land use in Australia. The clearest feature of these technologies was that they offered realisable advantages to the landholder. The benefits of superphosphate drilled with wheat were clearly obvious and testable. Farmers saw the results in one year. Improved pasture offered the prospect of dramatically improved production, though because it entailed greater changes in farm management it took longer to be fully accepted. Ley rotations restored 'grainsick' farm land and improved yields. The implications of these observations are simple yet profound. What is required are profitable and practical conservation farming techniques and management strategies. Where these are not available the best assistance is research directed at producing and promoting practical and profitable solutions, rather than a reliance on evangelical calls to better farming and changing attitudes. General community awareness is needed to maintain support for the funding of this work.²¹⁵

Do we really have practical and profitable solutions which can be easily incorporated into farming systems for: irrigation-induced salinity? vertebrate pests (including foxes and cats) in the rangelands? woody weeds in the rangelands? soil acidification? nutrient contamination of watercourses and wetlands? rural tree decline? No, we do not. Solutions either don't exist, are impractical or are not profitable.

Maybe this is because we are trying to refine existing systems to become more sustainable, rather than starting with a clean sheet of paper and asking ourselves, for each land type, what a sustainable system would look like based on some elementary ecology, much as Dean Melvin did on 'Paradise Farm' in Chapter 6.

Promising directions are apparent. In some cases they have been for many years, but there is massive institutional inertia when it comes to thinking about new and potentially more sustainable ways of using the land. For example, developing grazing industries based on native herbivores (ie developing markets and management systems for kangaroo and emu) is one potential solution to rangeland degradation, yet how many scientists are working on this compared with the number trying to make the rangelands grow more beef? Various forms of agroforestry (getting perennials back into the sys-
Supporting Landcare groups

present solutions to a mélange of land degradation problems in agricultural areas. Developing profitable uses for the harvested products is a function of research (viz, technology for ethanol production), but this research is unlikely to be done by institutions whose dominant agenda for the last few decades has been breeding new varieties of crops and pastures, or controlling internal parasites in sheep.

More sustainable farming systems will almost certainly be more complex. Quick fixes for environmental problems are unlikely. Taking a mission-directed rather than problem-centred approach, moving towards sustainability in terms of social cohesion, profitability, water, nutrients, energy and biodiversity, even at the paddock scale, will require a great deal more knowledge than we have gained to date. But it also requires an open mind and a willingness to consider substantially different uses for land.

While we are considering the 'how' of research and extension, we must not forget the 'who', a factor which ultimately may be more important in the evolution of more sustainable farming systems. It is not in the nature of institutions to conceive radical alternatives to the status quo, but farmers are not bound by the same shackles which impede bureaucracies.

Landcare groups can speed up the recognition within rural communities of the need for change. After three years talking to some of the more far-sighted land users in Australia we are sure that many farmers are more willing to confront the challenge of developing original Australian farming systems than are many scientists, who are constrained by their peer group, their narrow disciplinary base, their recognition and reward system and the culture of the institutions within which they operate.

If lack of sustainable technologies is a constraint to landcare, then surely research is the answer! Without doubt, research has a critical role to play. A great deal more research, basic and applied, is required if Australian farming systems are to become more sustainable and more internationally competitive. The enforced cuts in research budgets and attrition in staff and resources make a mockery of the 'clever country' rhetoric. Barr and Cary describe many instances in Australian agricultural history where technical breakthroughs have improved the sustainability and profitability of farming practices with consequent impacts on the Australian economy and balance of payments. Such breakthroughs will be needed again and again as we chase the ever-shifting target of sustainable land use.

But dollars alone are not the answer. The type of research which
has traditionally occurred in Australia, and the relationship between research, extension and land users, is a key to current environmental problems. In terms of the effectiveness of Landcare groups, and of the goal of sustainability, the way in which research is carried out is as important as which issues are explored. There is a definite place for basic or pure research and for 'blue sky' research to extend the vision, in which scientists remain the primary actors. But for developing more sustainable farming systems it is clear that land users must become more involved, not as landlords for plots, but as legitimate players throughout the process of generating, transferring and applying knowledge.

The complexities inherent in sustainability and the primacy of farmers in making land management decisions, mean that a recipe approach to land management recommendations is unlikely to be effective. That is, research and extension should focus on improving farmers' decision making (facilitating learning), rather than advising them what decisions to make—focus on tools instead of recipes, on the learning process as well as the technical content. This will require a new mode of thinking and acting for researchers.

Fortunately, the Landcare movement is already benefiting from an increasing number of examples of innovative projects in which the participation paradigm has infiltrated research practice.

Harm van Rees enjoys interaction with farmers, is quite comfortable saying 'I don't know', and admits to learning more from farmers than they learn from him. He sees the legitimation of farmer involvement in all stages of research and development that is slowly occurring through Landcare as an essential direction that science must encourage if it is to be relevant to the solution of environmental problems. To illustrate what this means, Harm describes further aspects of MEYcheck, which now involves more than 800 farmers in north-central and north-west Victoria:

We use it as a training program for farmers so they get a better understanding of crop growing technologies. Farmers really have to think about their rotations, and about herbicides, about fertilisers, about spraying, about a whole range of things they never had to think about previously.

This whole training program is not me standing up in front talking to farmers about MEYcheck, it actually means them going out into the paddock collecting plants, analysing them for nitrate content with a field-based test them-
supporting landcare groups 235

selves. Then we come back inside and go through fertiliser requirements and what fertiliser does to wheat. It helps them interpret their own results so it’s not just me or someone else standing there lecturing to them, because that doesn’t work.

Few farmers are trained university graduates. They are used to getting their hands dirty. The commonest response when they’re asked why they like it [MEYcheck] is, ‘Because it gets me into the paddock’. It gives them an understanding of what crop-growing really means so they understand how they should be controlling diseases, and how particular herbicides work so that they can start thinking about resistance. We can then nip resistance in the bud before it becomes a problem.

Fortunately, Harm is among a growing number of researchers with similar views about the changing relationship between farmers and researchers, in which an atmosphere of co-learning is becoming more prevalent. Phil Dyson, former director of the Centre for Land Protection Research at Bendigo, traces this shift in philosophy emerging through the participation paradigm:

People here are looking at research in terms of the product that they are actually able to supply to their ultimate client—which is the community. Our feedback in terms of the research comes much more from those people [rural land users] than the traditional publish or perish mould.

In the early days of the Salinity Program the government actually took the salinity dollars off the departments and pooled them. We now put in submissions for research every year. Now that the management plans are either being developed or are about to be implemented, the community has been given responsibility for their plan. If I submit now for research funding on salinity that applies to a particular catchment, my submission goes to the community group and they decide whether they want to fund the research or not. Almost all research projects are done on farmers’ land.

If anyone threatens the scientists, it’s the academic bureaucracy, it is other scientists asking where the publications are or where are the replications. We just don’t
have time. Those papers that are produced tend to go to conferences. The replication and getting hung up on lots of little plots can detract from the big picture. If we're looking to test the differences between species we might go to a plot type of research design but more often than not the plots tend to be put in the corner of a very large paddock ....

Basically what we are trying to do here is not research in its own right or extension in its own right but to achieve change.

Angus Howell, sheep farmer and coordinator of the Warrenbayne Boho Landcare Group, points out the mutual self-interest which is bringing scientists and Landcare groups closer together:

There is a lot of interaction between Landcare groups and the cutting edge of science. This is increasing with an increasing awareness among researchers that they need their research to be relevant and an increasing awareness among landholders that they not only have access to researchers, but they also now are starting to have some say as to where the research dollars go.

But attitudes to Landcare among scientific researchers are not all as positive as the above quotes suggest. Many scientists remain more comfortable in the laboratory or measuring many replications of small plots on the research station. Such people, and the institutions which employ them, still measure their effectiveness by the number of publications in refereed journals, which very few non-specialists read, or could understand. They respond to the opinions and judgments of their peers rather than the amount and type of contact they have with farmers or the wider community.

For these scientists, there are two principal aspects of Landcare which are potentially threatening. The first is simply the continual drift in the focus of the community, policy makers and funding agencies away from increasing production and towards the environment. The other aspect which causes some disquiet among scientists in both extension and research is the emphasis in government policies and documents (even if mostly rhetoric) on 'empowerment', on encouraging the community to assume responsibility for environmental problems, on encouraging community involvement in developing solutions to these problems, and giving community groups resources to do so—even to the extent of allowing
Landcare groups to commission and supervise their own research. 'Where does this leave the professional scientist?'; they ponder, or, in the case of extension agents, 'If researchers are talking directly with farmers, and they've started to pay farmers as group coordinators, and to employ regional facilitators as specialists to work with groups—where do we fit in?'

Like extension staff, few researchers have had any training to help them interact effectively with community groups. The extent to which they do so at present is determined almost entirely by their personal characteristics and natural inclinations. Those who enjoy the involvement of non-scientists in their work generally work well with Landcare groups, and those who are uncomfortable with such involvement do not. For researchers, Landcare is a threat and/or an opportunity, depending on their perspective.

We have only glimpsed a few developments in extension, research and development, but hopefully the lessons are clear. Agricultural research and extension organisations, if they are to remain relevant in the sustainability era, must extend their ambit beyond the plot, the paddock, the farm and the farmer, to consider the community, the catchment and consumers. The participatory paradigm demands a change in focus: from transferring information to asking the right questions; from presenting to skilled listening and interpretation of feedback; and from starting with research outputs to building upon the diverse knowledge and inputs of many stakeholders. This breaks away from limiting notions such as 'top-down' and 'bottom-up'. Facilitating community synergy, assisting communities to work together to assume responsibilities for defining and tackling their own problems, can inform research and extension approaches at both the individual farm level and at the institutional level.

The changes happening in research and extension in Australia are profound. Furthermore, they are manifested in operational practice, not just in theory or rhetoric. We have some outstanding working examples of new models of research and extension, with exciting implications for the way in which society learns about and refines its relationship with the land.

OTHER PLAYERS

So far we have focused on people involved in extension, research and facilitation roles with Landcare groups. But they are not the only players in the unfolding theatre of Landcare. Other groups have played key roles in the initiation and shaping of Landcare, and will continue to have an important influence as Landcare evolves.
Conservationists

The conservation movement, in particular Phillip Toyne, Director of the Australian Conservation Foundation from 1987 to 1992, played a key role in securing the large increase in funding which accelerated the development of Landcare from 1989. There is little doubt that, without the support of the ACF and the political capital they represent, the increase in momentum and funding for Landcare would have been much more modest.

The main focus of the conservation movement in Australia has always been to preserve natural treasures such as tropical rainforests, the Great Barrier Reef, the South West Wilderness in Tasmania, and Shark Bay in Western Australia, from logging, hydroelectric dams and other forms of ‘development’. As Australia is one of the few countries in the world with large tracts of land which have not yet been significantly modified by modern man, this has been an understandable focus. Some major environmental battles have been fought and won by the conservation movement: including the cessation of sand mining on Fraser Island; the prevention of uranium mining in Kakadu; the fights against the construction of the Wesley Vale pulp mill and the Gordon below Franklin Dam in Tasmania; and World Heritage Listing for ecologically important areas. In these battles the conservation movement has made effective use of astute political campaigning and lobbying, sophisticated use of mass media, careful targeting of issues and strategic application of scarce resources to maximum political effect, particularly in marginal seats during election campaigns.

However, soil conservation has never caught the public imagination as have other more glamorous and easily depicted conservation issues. When Phillip Toyne encouraged the ACF council to support Landcare, in a sense he was acting without widespread public support from the grassroots of the conservation movement. The stereotypical images of farmers in the eyes of many conservationists were either of rural conservatives in tweed jackets whose children attend boarding school, or of sunburnt men in blue singlets and battered old utes, scratching a living from the dust and the flies of the outback. Both of these caricatures were perceived by conservationists to have been instrumental in the demise of many native species, the increasing use of synthetic fertilisers, pesticides and herbicides, and the dust storms blowing over capital cities in dry years. The high-profile partnership between the directors of the ACF and NFF over Landcare was not (and still is not) reflected in relations between the conservation movement and
farmer organisations at state and branch level. Many conservationists and many farmer leaders were nervous about their respective organisations getting into bed together.

Landcare raised the profile of rural land conservation issues among conservationists, who began to turn their gaze inland in the early 1990s. The environmental legacy of agricultural land use in Australia is lamentable. Issues such as species extinction, declining soil structure and fertility, rural tree dieback and water quality decline are extremely disturbing for those people aware of them. To date, the conservation movement has taken a restrained and pragmatic position on rural environmental issues. They recognise that many land degradation problems are historical, caused as much by government policies as by the need, greed and ignorance of farmers; and they are aware that they lack the resources to mount a large campaign on a complex issue away from their main support base, the cities. Furthermore, many individuals within the ACF and other conservation organisations have some form of contact with Landcare groups and have been impressed by the commitment of many of the farmers involved. So they support Landcare and funding for Landcare groups.

Kate Walsh highlights the essential common interest between farmers and conservationists and the value of building upon this: "Farmers" and "greenies" can seem poles apart. But actually they've got more in common than they think. At least the farmers and greenies have both got an emotional commitment to the land. Start on that basis and find common ground and work from there.'

For the significant number of conservationists who live in rural areas, Landcare groups provide a forum and an opportunity for positive interaction with farmers. Conservationists often have valuable skills to offer a Landcare group. Where conservationists do become active in Landcare groups, it is usually a revelation for farmers to realise that their stereotypical images of 'greenies' are somewhat astray, that their opinions are often thoughtful and their inputs constructive. Conservationists, on the other hand, usually get a better appreciation of the realities of the farmers' life worlds; they become more aware of why some land is managed in the manner it is, and realise that very few farmers have anything but deep respect for their land.

Many members of the conservation movement have played important roles on the various committees and planning groups established across the states and at the national level since the late 1980s. These groups include State Assessment Panels which recommend projects for funding, Decade of Landcare planning com-
mittees, Total Catchment Management Committees and several others. Usually conservationists are in a minority (often of one) on such committees. However, their broader view of the whole question of land management, usually promoted in an articulate and passionate manner, and their political skills, have given them influence beyond their numbers. Landcare is stronger and broader-based as a result. Individuals such as Jane Elix and Jill Reading, representing the ACF on the National Soil Conservation Advisory Committee (SCAC), ensured that debate and deliberations (and consequently Landcare project guidelines and assessment procedures) reflected a more holistic view of sustainability and of the role and potential of community participation than would have been the case if the committee had been entirely composed of farmers and government officials. Such involvement is not attention-grabbing for the ACF, but it does give the conservation movement a voice within the system. Just as important, it ensures that conservationists have a better appreciation of how and why some decisions are made, and that they have a much better insight into both farmer and government perspectives on issues close to their heart.

So far the conservation movement has played a catalytic and constructive role, providing strong political support for Landcare. But this may not necessarily always be the case, particularly if farmers are not perceived to be genuine in their quest for sustainability and willing to confront some of the unpalatable changes in land use and management (eg in the rangelands, irrigation districts and marginal cropping lands) that any 'fair dinkum' assessment of sustainability implies. In comparison with the money spent on subsidising industrial agriculture under the Common Agricultural Policy of the European Community (approximately sixty billion ECU’s, or 3400 times the amount spent on the entire National Landcare Program for roughly the same geographical area), or the United States Farm Bill, Landcare funding in Australia is minuscule. And, crucially, it is not linked with agricultural production. Nevertheless it does offer a point of entry for the conservation movement to influence agricultural policy.

**Farmer leaders**

The latter point has not been lost on several leaders of state farmer organisations, who have used clichés like ‘the thin end of the wedge’ and ‘a foot in the door’ when referring to the involvement of conservation groups in rural land use issues. While they can see
the importance of winning the hearts and minds of urban Australians to preserve the lobbying power of agriculture, state farmer leaders are often coy about the fact that it was only with the support of the ACF that Landcare funding was increased so substantially from 1989. There are certainly members of Landcare groups who are frustrated with the farmer organisations for not providing more progressive leadership on environmental issues, but there are probably other farmers who would see the role of the farmer organisations more in terms of fighting the conservation movement and any hint of further land management regulation, such as clearing bans. There is a tension here between the representative role and the leadership role of farmer organisations.

Agripoliticians are aware of which way the environmental wind is blowing, so they are publicly enthusiastic about Landcare and keen to be associated with successful Landcare groups. The Victorian Farmers Federation have been co-sponsors of Landcare with the Victorian government since 1986, with three staff in a Landcare Liaison group. Their counterparts in Tasmania and South Australia have appointed staff specifically to liaise with Landcare groups and to improve farmer organisation inputs into Landcare. In most states there are farmer representatives and professional staff with a genuine commitment to Landcare who have been prepared to stick their necks out and show real leadership in getting their organisations more involved, challenging the perceptions of some of their more reactionary members.

As mentioned earlier, the joint National Farmers Federation and Australian Conservation Foundation proposal for a National Land Management Program was influenced by a 1988 paper written by Jock Douglas, a grazier from the Mt Abundancedistrict in southwest Queensland, who at the time was President of the Queensland Cattlemen’s Union. This paper advocated support for community groups and property planning, the cornerstones of the ACF/NFF proposal. Jock has continued to make an important contribution to Landcare, through his role as Chair of the Queensland Landcare Council and as a member of the National Landcare Advisory Committee, which replaced SCAC in 1992. The Queensland Landcare Council has seventeen members, of whom ten are land users, and its role is to oversee Landcare in Queensland, determining funding priorities, assessing Queensland Landcare projects submitted for funding under the National Landcare Program and providing advice on land conservation to the Queensland Minister for Primary Industries. There are similar councils with similar roles in each state, although the Queensland Landcare Council differs from
most in that some of its members are elected directly by Landcare groups at the annual Queensland Landcare Conference.

The following extracts from an after dinner address by Jock Douglas to the Eastern Zone conference of the Queensland Graingrowers Association at Jimbour in February 1993, illustrate the leadership role being played by Jock and people like him in other states, and they provide a useful illustration of a more progressive, politically aware farmer perspective on landcare:

... You may have heard about the grain farmer who won a million dollars in Tattslootto. He was asked what he would do with the money and said, ‘Just keep farming until it is all gone’... There is a lot resting on us as farmers. There is a lot of pressure and a lot of risk for us. And then there is our base—the land. It can be under pressure also. The economic and climatic conditions can be tough, they can be devastating, but we cannot allow our base, the land, to decline or deteriorate. If we do, the other pressures simply increase.

Which leads me to Landcare ... The burning question is, can we move to a sustainable use of our natural resources? Agriculture has an unwritten contract with society. All around the world these contracts are being renegotiated, each country in its own unique way. There is a collective responsibility to renegotiate agriculture’s social contract. We in agriculture must be in a strong position to negotiate that contract. Political priority comes from public priority! We must be able to show that we are capable caretakers of the Australian community’s most vital resource asset—its land. Then we become part of public priority. In Australia the move to sustainable land use—both doing it and showing that we are doing it—is exemplified by Landcare.

... Let’s get back to where it all happens—on our farms, in our paddocks. The condition of land is something which shouldn’t be generalised—the variations are too great. The focus has to be on locality, right down to within our paddocks and what is happening within each of them. That is the first part of the brilliance of the Landcare concept. The second part is that the leadership for having land in good condition—having sustainable production from it—comes from the landholders and the community. Governments support with project funding and incentives. They facilitate, research and extend technology. But the leadership and the application is in our hands.
Locally, Landcare groups determine the local priorities of best farming practices ... Landcare groups create information exchange. They bring about a powerful blend of the best local knowledge and most suitable technology to focus on land management. They encompass the whole family farming unit in the process. Groups also undertake federally-funded projects to demonstrate solutions ... Here in the heart of the grain belt, departmental and Landcare groups' projects are focusing on flood plain management, conservation tillage, fertility trials, viable farming systems, salinity control, woody weed control, gully stabilisation and reducing watertable height by pumping.

... I know the frustrations of seasons and markets. But we can't neglect or let deteriorate our land resource. Through Landcare we can not only move to sustainable land use but bring our families, our local communities closer together. The pioneering days of individualism are changing to stewardship, group information and action. Landcare is about us, acting together now, to make the future better.

When pointing out the contributions of individuals there is a great risk of omitting worthy people, but, like Jock Douglas, Heather Mitchell and Bob Carrail in Victoria, Alex Campbell in Western Australia, George Rance in Tasmania, Neil Smith in South Australia and Rick Farley at the national level, have all invested personal credibility and time into Landcare, well in excess of official requirements.

In addition to these better known individuals, there are scores of other farmers whose leadership stems from their contribution to Landcare per se, rather than through formal involvement in agripolitics. In each state, such people sit on State Assessment Panels to scrutinise projects for funding, they put many hours into the various planning processes, they travel thousands of kilometres to attend meetings in cities with policy makers and representatives from other sectors of the community, and they are often invited to talk to Landcare group meetings about the 'bigger picture' and to demystify some of the paperwork associated with Landcare. They perform a critical function from a government and a community point of view. They are able to lead the process of thinking about and changing towards more sustainable systems of land use and management. They are accessible to people at a Landcare group level. They are not bureaucrats but can speak the language and
know all the acronyms. And at the end of the day, these people sit around the table with policy and decision makers to ensure that there is at least one voice coming from a community level.

This is not a glamorous or high-profile contribution, and it is certainly not well rewarded. Quite the reverse in most cases, as the cost of travel, of compensating for the labour no longer available back home on the farm, and the extra stresses of time away from the farm and family are rarely matched by the government mileage allowance, if there is one. Furthermore, there is a constant danger of becoming bureaucratised, of becoming absorbed by the formal system to the point of no longer effectively representing, or being seen to represent, the interests of Landcare groups. This danger would be magnified if government paid voluntary members of the various higher level panels and committees a fee commensurate with the time, expense and opportunity costs of their contribution. Thus there is a constant tension between running a system of community representation on a shoestring, relying to a large degree on altruistic voluntary effort, risking burnout of key individuals, and making Landcare more professional and structured with adequate financial reward for individual contribution to the larger effort, risking the alienation of those receiving some financial support from those at a group level battling away entirely under their own steam.

**Politicians**

We have noted John Bradsen's observation that parliamentary records at both state and federal level over the past hundred years reveal a litany of speeches about the severity and extent of land degradation in Australia and eloquent calls for something to be done. However, as mentioned earlier, soil conservation has never been seen as a vote-winner, so politicians' concerns were largely rhetorical until John Kerin, as Minister for Primary Industries in the incoming Labor government of 1983, initiated the National Soil Conservation Program and increased its budget each year until the intervention of the joint ACF/NFF proposal in 1988, which set the scene for a dramatic increase in budget allocations.

Several other politicians played pivotal roles in this process. Joan Kirner, as Minister for Conservation, Forests and Lands in the Victorian government, was certainly not a 'hands-off' Minister in the Jim Hacker mould. Her hand in the early development of Landcare was unmistakable, and her background in community development was a key factor in the parameters she established for the embryonic Victorian LandCare program in 1986. As well as naming the
program, she stipulated that it be community-based; that it should develop integrated approaches to the various problems of erosion, salinity, pests, weeds and tree decline, rather than tackling them in a piecemeal way; that community groups should develop ownership of the program by planning and implementing their own projects, not just participating in departmental initiatives; and further, that the department should respond to the needs and priorities of the community, rather than the other way round.

Heather Mitchell, in her role as President of the Victorian Farmers Federation, is an agripolitician who was also prepared to cross the political divide to deal constructively with a Labor Party Minister, a species traditionally regarded as hostile to farmers and farmer organisations. Heather Mitchell was prepared to invest her personal credibility in Landcare and to take the long view on what was in the best interests of her members and agriculture in general. The activity and enthusiasm of Victorian groups was an important influence on Rick Farley and Phillip Toyne, Senator Peter Cook and John Kerin.

It is unlikely that the ACF/NFF proposal would have been received so warmly by the Prime Minister had it not had the support (carefully secured by Toyne and Farley) of his then Minister for the Environment, Senator Graham Richardson, the man credited with the Labor Party's successful electoral strategy of wooing green votes. So the proposal presented to the Prime Minister was drafted by two powerful lobby groups from opposite ends of the political spectrum, with the endorsement of two of his most senior and respected Ministers. It was also publicly endorsed by the opposition Liberal and National parties, whose respective shadow ministers for Primary Industries and the Environment, Bruce Lloyd and Fred Chaney, were explicitly supportive in the development of Landcare as a national movement in the early 1990s.

This bi-partisan unity illustrates the political attraction and safety of Landcare, and the fact that politicians are prepared to put aside party differences to support programs they think are genuinely worthwhile. Individual politicians, both inside and outside parliaments, have played pivotal roles in the initiation and consolidation of Landcare. As a whole, however, the body politic has tended to treat land conservation as a low priority—probably reflecting its perception of public opinion.

**The state**

Landcare is an enigma for many senior administrators and drafters of departmental policies. It is essentially an environmental movement within a traditionally conservative sector of the community,
which has a considerable momentum independent of policy inputs and which is growing faster than policy has anticipated. A gallant aspect of Landcare for some public policy makers (capitalised upon by others) was that the main policy inputs into Landcare initially were contributed by two lobby groups outside the formal process—the ACF and the NFF. In addition, the critical social aspects of Landcare represent unfamiliar territory for many policy makers in agricultural bureaucracies.

Nevertheless, policy makers have not been slow to see the potential of Landcare to be more effective than traditional approaches to soil conservation, particularly at the federal level which does not have constitutional responsibility for land conservation. Australia as a nation does not yet allocate sufficient resources to tackle land degradation and develop more sustainable systems of land use and management. Nevertheless, the contribution that the federal government has made to land conservation activity through the National Landcare Program (formerly the National Soil Conservation Program) since 1984 and particularly since 1988, has been extremely significant. The NSCP began funding land conservation groups in 1984–85 and deserves credit for recognising the potential of the community group-based approaches in the mid-1980s and for altering funding priorities accordingly.

That there are now almost 2000 rural community land conservation groups in Australia is a highly significant development. The funding provided through the National Landcare Program has been of fundamental importance in building the platform of community participation. Without this catalytic national funding, land conservation activity in Australia would be insipid. Commonwealth funding, particularly through the NLP, has established a platform from which new plateaus of activity can now be reached.

But the level of resourcing is only part of the picture; the other critical element is the process by which funds are allocated. Funding, whether too much too soon, too hard to access, or obviously spoken for by state agencies, has a profound impact on groups’ perceptions of Landcare. It can be a catalyst or a constraint to Landcare group effectiveness. Canberra policy makers, through the guidelines established for funding community groups, have forced some states to take more community-based approaches to land conservation, and have tried to use national funding as a lever to ensure a consistency between states on issues such as land resource assessment and drought management.

Policy makers at state and national level (especially the states) have also ensured that the budgetary interests of the Ministries in
which they serve have not been disadvantaged by a move to funding the community directly. The major recipients of increased national funding for land conservation have been state government departments.\textsuperscript{218} We should point out that the National Landcare Program was never intended to be a bank for community groups; and that, as the institutions with constitutional responsibility for land conservation, state agencies are deservedly key players in any national funding program. A significant amount of this funding is used to assist departments to better service Landcare groups, for example by employing facilitators and coordinators. However, there is no doubt that national funding has become an extremely important component of state land conservation budgets. This effectively ensures that government departments are competing with community groups for money from the same source, and that policy makers thus have a vested interest in drafting guidelines and project assessment procedures which ensure that the program does not become community-based at the expense of departmental budgets. In doing so they are illustrating the power of the politics of access, whereby administrative systems function to control who gets what and in what ways, through mechanisms such as eligibility procedures, labelling, and establishment of ‘gateways’ for access.\textsuperscript{219} These gateways can look very different, depending which side of the gate one is on.

The most important category of institutions in Landcare are undoubtedly the state government agencies responsible for land management and land conservation—the various departments of Agriculture, Primary Industries, Conservation and Land Management, Conservation and Natural Resources. These agencies are the primary source of technical advice for Landcare groups; they employ the facilitators; they spend the majority of National Landcare Program funds and they carry out most of the administration of funding to community groups, as well as being traditional providers of land management research and extension.

State land conservation ministries invariably consist of competent people with a genuine commitment to Landcare, albeit with differentiated perspectives on how best to foster sustainable land use and management. But often the actions of the institution as a whole, as reflected in encounters with various clients, intended beneficiaries and the general public, seem inimical to effective community participation, at odds with the espoused objectives of the Landcare program, and inconsistent with the personal opinions of most individuals within that institution. Institutional cultures, the intangible, unwritten emergent properties of bureaucracy, may
have far more influence on Landcare than institutional structures and formal policies.\textsuperscript{220}

The Landcare movement is both a reflection of and a catalyst for changes in the way government agencies interact with community groups. The consolidation of the participation paradigm is changing the relationship between community groups and land conservation agencies. However, there remain some pervasive attitudes and institutional cultures which are a formidable constraint upon Landcare groups taking the step from raising awareness of problems to being key players in developing solutions. This is not a criticism of the individuals within state agencies—rather, it is directed at the organisations and cultures within which these people work.

Terms such as ‘empowerment’, ‘community-based’ and ‘bottom-up’ are becoming hackneyed in government landcare literature, which is seen by many farmers as propaganda. Yet the rhetoric is rarely followed through (or even acknowledged) by all layers and sections within government agencies. The trouble with empowerment is that, in the Landcare context, it is seen to mean:

\textit{.... transferring power for decision making and the allocation of financial resources from government bureaucracies to community groups and joint community/government decision making forums. Such a change can be threatening to existing institutions and power structures ... The risk is that those with the power and resources attempt to use community participation for their own ends and organisational goals (even if those ends may be directed towards their view of what is ‘good’ for a particular community) and hence are not genuine about empowerment.}\textsuperscript{221}

Here are a few samples of encounters illustrating government agency attitudes and cultures which militate against the effectiveness of Landcare groups:

- the expression ‘my Landcare groups’, often used in the context of, ‘Anyone wanting to talk to my groups has to go through me’, or ‘Why wasn’t I informed that you were talking to so and so?’
- empire building: the securing of extra resources for the department, the focus on means rather than ends: ‘Never hand any money back, we must spend it or commit it before June 30 or we won’t get it next year; it’s better that we spend it than the other mob.’
- the expert syndrome: ‘We’ll do the inventory/monitoring/plan-
Kate Walsh in the Strzeleckis.

KATE WALSH

Members of the Waggamba Conservation Committee (Qld) at one of their demonstration sites.
Above all, Landcare is about people
ANDREW CAMPBELL (All photos this spread)
Learning to manage an agroforest on the property of Ian and Bev Lynch, Mt Barker.

Learning to foster group synergy in a Landcare group facilitation course—one of many practical and theoretical exercises in group process.
ning/set up the trial and we’ll let you know the results/provide you with a map or plan. We know what’s best!'

- paternalism: ‘We’ll look after the funds/employ the person/buy the vehicle for you—don’t you worry about that!’

To be fair, the latter two quotes could be a legitimate, negotiated outcome between a Landcare group and an agency in which there is an open consensus about who does what—but more often the group feels it has little say.

Changing institutional cultures and developing the ability of institutions to learn requires more than just training the individuals within the institution. Of course the structure of government agencies does have some influence. Hierarchical lines of command tend to preclude ‘bottom-up’ decision making within agencies, making it extremely difficult for agencies to act corporately in a way which gives meaning to ‘bottom-up’. But even within an hierarchical structure, institutional cultures are critical. An institutional culture which fosters constructive dialogue between senior and junior staff, which encourages initiative from below and which approves of genuine delegation, can do much to offset the effects of an organisational chart shaped like the Eiffel Tower. In reality, the two issues are intertwined, and it is unlikely that an institution with a participatory, bottom-up culture would tolerate for long a top-down structure.

Involving the community can be time-consuming and frustrating and it is scary for people who are not naturally disposed to dealing with people and/or have not had relevant training. Seen through the prism of technocratic institutional cultures, community participation is tedious, its outcomes are often intangible and its cost/benefits debatable. But the complexities of developing new ways of using the land which meet environmental, social and economic objectives mean that genuine community participation in generating, using and exchanging knowledge in decision making and in resource allocation simply cannot be side-stepped or fudged.

The basis of the Landcare movement is the recognition that land degradation is a community problem, not a farmers’ problem or a government problem, and that tackling land degradation is as much a social challenge as a technical challenge. Ensuring the development and adoption of profitable, non-degrading land management systems will require all available resources to be more effectively applied, complemented by changes in individual and social attitudes and priorities. It follows, then, that a much broader range of land users must be involved than just a small proportion
of farmers. This involvement cannot be merely passive reception of research findings, improved technology or government planning and regulatory documents. Involvement of land users in Landcare embraces defining problems, planning better land use and management, participating in relevant research and development, and becoming active agents in extension and community education. In other words, local groups of land users assuming responsibility for land degradation problems and for developing better systems of land management.
When one looks at what Landcare groups and the people involved are doing, one cannot help but be inspired by their enthusiasm and commitment. But is this enough? What is Landcare really achieving? Is it merely salving the collective conscience of a sector of the farming community, or adding lustre to the ‘warm inner glow’ of rural environmentalists? Or is it paving the way for profound change in Australian agriculture and systems of land use and management?

This chapter draws on a flurry of recent studies analysing Landcare in Australia or particular aspects of it, including national surveys based on mail questionnaires; quantitative and qualitative national studies involving structured and semi-structured face to face interviews; statewide evaluations using action research, telephone interviews and workshops and analysing annual reports compiled by groups; national and statewide assessments and ‘informed insider’ reviews by program managers; quantitative sociological research at a regional level examining changes in attitudes, beliefs and behaviour over time; action research in the form of Rapid Rural Appraisals involving Landcare groups in assessing their own achievements, directions and priorities; and detailed case studies of particular groups and projects.

WHO IS INVOLVED IN LANDCARE?

While the gross number of Landcare groups is at best a crude indicator of progress, the rate of growth of the program has meant that just keeping up with the number of groups is difficult. Systematic
collection of more useful information, such as what Landcare groups are actually doing, has been beyond the administrative resources of state land conservation agencies to date.

Despite severe economic constraints in rural communities, the explosive growth of the Landcare movement has continued. Figure 8.1 shows the number of groups in each state in October 1993, compiled by the respective state Landcare coordinators.

It is difficult to get a precise figure in each state, as there is no single blueprint as to what constitutes a Landcare group, and they go by a variety of names and vary in emphasis in different legislative and physical environments. But it does seem safe to say that, in 1994, Australia has almost 2000 local groups of people, whose primary aims are to tackle land degradation and develop more sustainable land management practices.

Figure 8.1 suggests that the number of Landcare groups still appears to be increasing exponentially. Certainly the number of groups almost doubled each year in 1988, 1989 and 1990, but it is likely that the graph understates the rate of growth in the number of groups in 1989 and 1990, and overstates the number of new groups since 1990. To a significant extent, the increases in 1991 and 1992 can be explained by state agencies compiling more accurate data on the actual number of groups. Landcare coordinators are starting to see substitutions; consolidations and subdivisions of groups, which seems likely to be an increasing trend as groups evolve, come to grips with their relevant area of concern, and move beyond the initial burst of enthusiasm into a longer-term course of action. However, if we started to look carefully at urban conservation groups which identify with a particular piece of land, and ‘friends of’ groups, we would find that these groups share many characteristics with Landcare groups. If they were counted, the total number of groups would be substantially higher.

Unfortunately we do not have a profile of group membership (or leadership) in any state—indicating, for example, what proportion of group members rely solely on the land for their income, what proportion are women, what proportion of group members are responsible for group direction, vigour and so on. So at this stage the analysis is confined to bald numbers, which must be interpreted with caution.

The map opposite page 24 gives an appreciation of the distribution of Landcare groups in Australia. The national picture was compiled in June 1992 by Sarah Ewing, from maps provided by the Landcare coordinators in each state. Landcare membership is patchy. In some regions of Victoria and south-west Western Aus-
Involvement, Impacts, Influences, Impediments

Figure 8.1  Landcare groups in Australia

Australia and some pastoral zones more than half the farmers are involved, but fewer than fifteen per cent of land users in significant areas of Queensland, western New South Wales, South Australia and Tasmania are active in Landcare groups.234

A desk calculation based on the number of groups and the number of people per group would suggest that the range in Landcare group membership extends from at the very least 10,000 people to possibly 50,000 people. Twenty-five thousand reasonably active Landcare group members regularly contributing to meetings and group activities would be a conservative estimate based on experience and observation in all states during the National Landcare Facilitator project. Depending on the definition of a farmer, and the proportion of Landcare members who are farmers, these calculations suggest that between twenty and twenty-five per cent of broadacre farmers are involved in or with Landcare groups. This estimate is consistent with the findings of national surveys carried out by the Australian Bureau of Agricultural and Resource Economics in 1991.
and 1992, and by the University of New England in 1991.²³⁵

So one in every four or five broadacre farmers is involved in Landcare to some extent. That is an extremely significant penetration of Landcare into rural communities, which has occurred during a period when many people could have been expected to be preoccupied with pressing short-term financial difficulties. It is heartening that there are so many people working towards the long-term health of their land, their business and their livelihood. Their success or otherwise will ultimately influence livelihoods throughout Australian society.

What are the characteristics of people involved in Landcare?

The studies to date do shed light on the characteristics of farmers who are in Landcare groups or who receive advice from Landcare groups. On average they are younger, earn higher levels of cash income, have higher levels of debt, are more active seekers of information from a wider range of sources; they are more concerned about the future, more positive about and receptive to government advice and involvement, and they undertake more land conservation practices than other farmers.²³⁶

These characteristics could have been predicted by anybody experienced in agricultural extension. But it is not correct to assume that Landcare groups consist only of innovative, progressive farmers with a conservation bent—in other words that Landcare is preaching only to the converted. Landcare groups typically are based on a neighbourhood or catchment. As long as the group is reasonably active, participation of people within that catchment tends to be very high. It is common to hear extension officers and researchers comment that they are meeting and talking to farmers in Landcare groups who have never had any previous contact with advisory or technical services. It is also common to hear group leaders express considerable satisfaction ‘that so-and-so is now coming to our meetings and field days—we didn’t dream that he/she would be interested!’ While the average age of Landcare farmers may be slightly less than for farmers overall (in the early fifties rather than the late fifties), there is a wide distribution of ages within most Landcare groups.

The information summarised here should be interpreted with caution, as these studies do not distinguish between cause and effect. Farmers may be adopting recommended land conservation practices because of contact with Landcare groups, or they may
have contact with Landcare groups because they are interested in land conservation. Either way, the proportion of farmers receiving information from Landcare groups is extremely significant, albeit geographically patchy. Landcare has already wrought profound changes in the style of land conservation activity in Australia, and in the relationships between the various institutions of government and the community.

**WHY DO PEOPLE GET INVOLVED IN LANDCARE?**

When people are asked 'Why are you in the Landcare group?' their answers usually fall into three main categories: to gain personal benefits on their own farm in terms of knowledge or support; to influence others or to work cooperatively on district problems with others in their community; or to counter perceived external regulatory threats by demonstrating that farmers are responsible managers of natural resources.

A considerable diversity of perceptions of what Landcare is about emerges when people in Landcare groups are asked what they hope their group will achieve and about their personal criteria for assessing the success of their group. Some people are focused on a particular task, such as fixing land degradation or implementing land rehabilitation works; others are concerned to increase awareness of landcare issues, and the involvement, commitment and ownership of local people with respect to land conservation activity; others are focused on improving farming systems and generating new knowledge; and others are more concerned simply with the development and survival of their Landcare group *per se*, rather than with the impacts of the group.

Despite the diversity of perceptions of what Landcare is all about, it is possible to discern some consistent threads. The perception of Landcare as being government-initiated hype, bureaucratic and a forum for do-gooders and 'disoriented public servants' seems to be mainly associated with people who are not members of groups, who are rationalising their non-involvement. But the perception that Landcare is a defensive move for rural communities in the face of perceived threats from urban-based conservationists is real and is held by some Landcare group members as well as non-members. There are many people in Landcare groups (often the leaders) who have strong local community motives for being involved and who gain great satisfaction from stimulating cooperative action. There is probably an even greater number who are in Landcare
because they want to learn and to improve their own farms, preferably with some form of external support.

**WHAT INFLUENCE IS LANDCARE HAVING?**

There are two key domains of influence of Landcare groups—their immediate impact on the people involved, and their subsequent impact on land management practices, which is presumably eventually reflected in the landscape itself. First, let us examine the impact of Landcare on the people involved.238

The tendency for Landcare members to be younger, better educated, active information seekers with higher turnover and higher debt, is probably most true of Landcare group leaders, many of whom are outstanding individuals within their districts who play an active role in a range of community activities. Among the leaders of Landcare groups there is often a desire to influence other farmers through Landcare, and to raise the general standard of land management in their district. Leaders of Landcare groups tend to be more focused on the district or community level, and to be more concerned with the cooperative, as opposed to individual aspects of Landcare, than other members of Landcare groups.

Interviews during the National Landcare Facilitator project reveal a common suite of feelings among Landcare group leaders—satisfaction, learning, and frustration that things are not happening more quickly. Landcare group leaders are often sick of meetings; they know they are necessary, but are impatient with paperwork and bureaucracy and keen to see things happening on the ground. Landcare is attracting many leading farmers who are not at all interested in agripolitics, but are very interested in farming and they enjoy the intellectual stimulation of their leadership role in Landcare.

For the farmers in Landcare groups who are not leaders, their involvement in Landcare is not so demanding as for the leaders, mentions of frustration are far less frequent, and their priorities are directed far more towards the potential influence of landcare for their own farm than for the district as a whole, although many enjoy the constructive interaction with other farmers through the Landcare group.

There are also likely to be those farmers who are involved in Landcare because it is now seen as ‘the done thing’, particularly in areas such as central Victoria, where Landcare membership is now more than 70 per cent of the farming community.239 This is consistent with the normative influence of their social situation. Such
Landcare members are often the 'sleepers' within groups, who turn up to field days and major events, but rarely attend regular meetings or contribute to the running of the group. Sometimes their involvement enhances their enthusiasm for landcare and they become gradually more active. Research by John Cary and Roger Wilkinson at the University of Melbourne suggests that farmers' attitudes are influenced by their behaviour, rather than the other way around, as is more commonly assumed. In other cases they gradually drift away, albeit with a better idea of landcare and the sources of technical and financial assistance available to them. The interventions of a facilitator or coordinator can often make the difference between having a significant number of people only marginally involved in group activities, or having a majority of members making genuine contributions to the group and in turn being influenced by this involvement. Even inactive members of Landcare groups usually have greater contact with extension and research workers than would otherwise be the case.

There are many members of Landcare groups who are not farmers, particularly around the coast where most Australians live. Landcare groups in these areas tend to have a more diverse membership, drawing from the ranks of hobby farmers and 'alternative lifestylers' who have chosen to live in rural areas and who are often environmentally aware and committed. Traditionally, relations between the full-time farmer and his/her hobby farming neighbour are often strained, as each fails to understand the world view of the other. A myriad of issues such as goats, dogs, cats, horses, fire protection, mishaps with borrowed equipment, boundary fences, and control of pests and weeds, conspire to foment conflict and misunderstanding. A Landcare group can often provide the bridge to cross this understanding gap.

In general, Landcare groups with diverse membership tend to be more active, more self-reliant and also less dependent on the energies of a few, than groups in traditional farming districts suffering from all the pressures of rural decline. For non-farmers, membership of the local Landcare group is often the first constructive opportunity they have had to mix with conventional farmers from their district to talk about farming and land management. Many find it a terrific learning experience, and a useful forum to seek advice or to borrow or hire equipment from conventional farmers. From the group's perspective, hobby farmers and rural lifestylers do have some desirable characteristics. They have often had professional training of some sort, are more comfortable with paperwork, writing submissions; dealing with the media etc, and thus
have a lot to offer the group. They usually have more time to put in to the group than conventional farmers, and the tax deductibility of all their inputs is much more of an incentive to them (it can be offset against off-farm income) than it is to conventional farmers. For these people, Landcare is a great opportunity both to improve their own land and to become more involved in their local community, to break down some of the feelings of isolation common to people making their first move from the city to the bush.

For people in rural areas who are not members of Landcare groups, there appear to be three dominant perspectives on Landcare. People are either indifferent to Landcare and/or say they have not heard of it; they have heard about it and are positive about it (in which case they are often already involved); or they have an openly sceptical or antagonistic perception of Landcare. Not everyone in the bush thinks Landcare is wonderful. We still have a long way to go before a land stewardship ethic supersedes attitudes which condone systems of land use which deplete and degrade land, water and biodiversity.

But great strides have been made, particularly in areas where Landcare is already involving a majority of land users. These areas tend to have a common focus of concern, such as salinity, drainage, pests or weeds, where a cooperative approach is obviously more effective. One of the consequences of the rural crisis of the 1990s is that now all of rural Australia has a common concern—financial and social survival: While not as clear cut as salinity, these issues also seem to demand a concerted, coordinated effort from rural communities to act in a strategic manner, and to confront challenging questions about their future and the changes required if they are to become active agents in shaping their future, rather than passive victims of it.

Summing up the impact of Landcare on the people involved, the dominant themes which emerge are satisfaction, learning and frustration. Many people involved in Landcare are learning a lot about their own property, about the land in their district and about issues they may have rarely considered in the past. Group leaders in particular have gained great satisfaction from seeing other people get involved, from their interaction as a group and occasionally from group projects. But this learning and satisfaction is often accompanied by growing frustration: about the level of knowledge and resources available to seriously tackle problems; about the few people who really understand what needs to be done and the amount of poor land management still occurring; and about the bureaucracy, paperwork and politics of Landcare, particularly project funding.
The wider influence of Landcare groups

When people involved in Landcare and others are asked about the impact of Landcare groups in their local area, their answers tend to fall into four categories: Landcare has increased awareness of land degradation problems (bringing them into the open so that people are less reluctant to discuss them) and some of the potential solutions; people involved are learning a great deal about their land and options for improving its management; Landcare has dramatically increased the involvement of some people in land conservation who previously seemed uninterested; and Landcare has influenced increased adoption of improved farming methods. Landcare groups may also have influenced land management practices through creating a more favourable climate for the trying of new practices, but it is common to hear that 'it's too early yet', or 'we would do it all, if only we had some money!'

Allan Curtis and colleagues at the Johnstone Centre of Parks, Recreation and Heritage at Charles Sturt University in Wagga have been analysing annual reports submitted by Landcare groups in Victoria since 1988–89. In these reports, Landcare groups summarise details of their membership, their direction and priorities, their activities and their achievements. For the 1991–92 year, 117 Victorian Landcare groups submitted annual reports, which provided a 'strong sense of the scale of action and public participation facilitated through Landcare groups and suggested that almost all of these voluntary groups had been successful in assisting the move towards more sustainable resource use'. According to the Curtis et al sample, in the areas of Victoria where Landcare groups exist, they are mobilising an average of 55 per cent of rural landholders.

Extrapolating from the sample of 117 groups to the 1993 total of 407 Victorian Landcare groups, the analysis of Curtis et al suggests that Victorian Landcare groups in 1993 comprised about 14 800 people, with an incredible 17 000 people visiting to assist or study Landcare work. Similar extrapolations suggest that in 1991–92, Victorian groups planted 3.2 million trees and constructed 7700 kilometres of fencing. Such extrapolations are dubious, as it is likely that those groups submitting reports are the more active and effective groups. Nevertheless, Allan Curtis used conservative assumptions, and the figures do suggest a high level of practical action and participation. We need to analyse practices and activities in the field to test the accuracy of such extrapolations. We also need similar reporting systems in other states to get a handle on the
overall scale of Landcare group activity, which seems to offer tremendous 'bang for the buck' in terms of government funding.

Another impact of Landcare which seems evident to an outsider is the extent to which it has widened communication networks within rural communities. Enhanced contact between some farmers and resource management professionals has been mentioned already. But possibly even more important are the personal networks, particularly between like-minded younger farmers from different districts, and more formalised networks in some regions where Landcare groups have formed regional associations. These networks in turn bring a number of benefits, including socio-psychological support in times of crisis; more effective information management; wider participation in local and regional policy decisions; and increased synergy and cost-effectiveness of service provision for government agencies.

But before examining the constraints to Landcare in a wider context, we will focus again on the achievements of a particular group, seen through the eyes of a pioneer who has had the opportunity to move well beyond his own territory in fostering the growth of Landcare.

**CASE STUDY**

**WARRENBAYNE BOHO**

Angus Howell is a sheep farmer and full-time coordinator of the Warrenbayne Boho Land Protection Group. The Warrenbayne Boho Landcare Group was one of the first. It involves 150 landholders in the foothills of the Strathbogie Ranges less than two hours north-east of Melbourne. The Shire of Violet Town convened a meeting in 1982 after a few landholders began talking about the spread of salinity on their properties. More than one hundred people turned up. Clearly they had hit a raw nerve. The landholders realised that the time had come to stop blaming others or waiting for someone else to fix the problem. They would have to take responsibility for themselves.

Since then the Warrenbayne Boho Landcare Group has planted over 150,000 trees, it has fenced twenty kilometres of remnant vegetation and planted 600 hectares of perennial pasture. It has prepared a wildlife corridor plan for the whole
area, initiated a status report on its rivers and streams, and has assisted with the development of a Roadside Management Plan for the Shire of Violet Town. It is now conducting a comprehensive investigation of the prospects for commercial on-farm timber production in the area.

Several thousand of the trees the group plants every year are grown in Melbourne backyards. Farmers gather the seed from local trees. Their ‘Tree Project’ city friends grow them on and return one-year-old seedlings at a cost of about twenty cents per seedling. They often come up to help plant them. The group hosts two to three thousand visitors every year. These range from unemployed Melbourne youngsters helping to plant trees to bus loads of schoolchildren to international experts. Because the group has adopted a positive, self-help approach, it has received excellent support from government, tertiary institutions, corporate and philanthropic bodies and many others.

As an inspiring speaker to emerging Landcare groups in several states and in New Zealand, and a founding board member of Landcare Australia Limited, Angus Howell has been one of the Landcare movement’s more prominent members. In an interview with Helen Alexander, Angus described the early days with the Warrenbayne Boho group and the wider ramifications of Landcare for rural communities:

*It all started with a few landholders and government people, including Pam Robinson, Darrel Brewin and myself, talking together about dryland salinity. When huge numbers turned up to the meeting convened by the Shire, we realised the level of interest. Until then, salinity hadn’t been a priority for us or the Department [now DCNR], and at that stage we didn’t have a good technical understanding of it.

We decided to put together a small report on the size of the problem. There was a post-graduate student who wanted to do some work on salinity, so we mounted a campaign to raise some funds for him. A few people just drove around the countryside and banged on people’s doors explaining what we were trying to do. It was amazing how many people were prepared to put in.

When we got the group up and running we didn’t*
really have any idea what was happening. We didn’t have any concept that we were setting up something that might go on for a long period of time. We were much more interested in getting a group of people together to deal with an immediate problem. But it did become obvious to us in the early 80s that groups of landholders working together, taking responsibility, was going to be the most efficient way of using government services.

It feels very exciting to see this thing go national. It’s important though that we don’t lay claim to starting Landcare, because there were a number of initiatives around the country and many people feel responsible for the beginnings of this movement.

I don’t know why Landcare works, but I think it’s because people get some enjoyment out of working together and out of the opportunity to achieve something together.

The best thing to come out of Landcare for the community is a positive attitude towards land degradation. The majority of people feel that there is something they can do about it. There has been a marked change in attitudes about our farming resource and a very significant increase in the number of people that actively want to do something about land degradation problems.

This is not necessarily combined with a positive attitude towards the future of the rural economy generally. This has been exacerbated in the last couple of years since the bottom fell out of the wool market. Currently there is a fair amount of doom and gloom, but I believe our Landcare group will survive. I guess we will see some changes in land use, but that won’t kill the Landcare movement.

People are very frightened about the future. The rural community has been frightened for a long time. They are frightened about the rest of the world going past and they don’t know what to do about that. They are frightened because their standard of living has significantly changed. They don’t even quite know why they are frightened. In some places Landcare is helping to allay those fears.
Most farmers have no concept that they have the ability to influence things beyond their farm gate. Landcare has some potential to change that, but it has much more potential to change what is happening within our property boundaries and in our catchment...

I get quite pessimistic about the future for agriculture in Australia. I can't see where the leadership is coming from.

My personal rewards for being involved in Landcare are a great sense of achievement and an enormous thrill out of having been able to work amongst the landholders locally and see this develop into something in which people have great pride, and something that has achieved something significant. I have had the opportunity to assist other groups to get established, and it is a real thrill to have been asked to come and talk to others and to realise twelve months later that something has really fired up there.

One of the group's significant achievements is real changes to the landscape. It is rewarding to drive around and see previously bare hills with trees on them. Another is the improved management of creeks and streams with the removal of grazing animals and the revegetation of eroded banks. It feels good to have stopped that erosion which had been going on for years.

The role of women has been very significant in Landcare because it has tended to involve a section of the community who have a real understanding of the farming situation, but with a different attitude to caring for the land and the people.

I don't know if the wider community has a perception of what we are doing. I suspect not. I think that matters ... I don't think the farming community is going to be able to afford to turn things around to protect land and water resources on their own. It's going to need to be a national effort.

At the moment I don't think this country is trying to look long-term at properly managing its land. We are at a significant time in our history when we actually know that many of our land use practices are not sustainable, and that we can actually make some
choices. We have to decide either we are going to do something about that or recognise that we are only going to make token attempts. I think it is a real test for the nation to take some of those decisions.

In terms of wider community attitudes, I don’t think it’s going to change the world, but it’s going to change some of the world.

Peter Cock provides a useful summary of the main influences and potential of Landcare groups:

Landcare groups are significant in that they draw upon social values and networks of support that constituted a more prominent aspect of rural life in the past. They provide an opportunity for community redevelopment focused on a group approach to care of the land, while at the same time empowering the individual’s capacity to act. They offer a structure for more efficient use of departmental, private and community resources, and a social context for moral support and the development of a new ethic of land management. Farmers who participate in cooperative groups exert a collective social pressure upon non-members who are either ignorant of land degradation issues or reluctant to become involved in land repair, as well as exerting a continuing supporting pressure upon fellow members.242

The international significance of Landcare

With a quarter of the farming community involved in voluntary conservation groups, supported by a national partnership between government, farmers and the conservation movement, Landcare in Australia is a large-scale non-coercive approach to improving land management in a climate of great stress on human, financial and land resources. There are no comparable programs elsewhere, but there are many countries suffering rural crises in the face of environmental degradation and declining returns to farmers.

The 1992 United Nations Earth Summit in Rio de Janiero saw most countries sign up to Agenda 21, committing their governments to a range of environmental initiatives. Chapter 14 of
Agenda 21 deals with ‘Promoting Sustainable Agriculture and Rural Development’, major elements of which are: ensuring people’s participation and promoting human resource development for sustainable agriculture; fostering rural people’s organisations; decentralising decision making; providing support services and training; the optimal use of resources; and the establishment of networks for information exchange. Chapter 32 is called ‘Strengthening the Role of Farmers’, based on the premise that a farmer-centred approach is the key to nearing sustainability in both developed and developing countries.

Most governments have thus made a commitment to involve farmers in the development and promotion of sustainable agricultural techniques and to decentralise decision-making processes. It will be fascinating to see the extent to which the Rio rhetoric is translated into practical action. Australia is one country in which land management research and extension activities and decision-making processes are evolving along the lines of the principles laid out in Agenda 21. As we have seen, there are a number of forces driving this evolution, not least of which are the demands of Landcare groups. There is no grand strategic blueprint—plans are evolving through experience and through the participation of local people. The Australian experience certainly suggests that the devolution of control ensures greater commitment to change and consequently much greater return on public investments.

Is all this awareness, learning, involvement and peer pressure enough? We’ll take that up in the next chapter, which attempts to place Landcare in the context of Australia’s overall quest for sustainable farming systems. But we can hardly discuss where Landcare groups fit in without first drawing a few conclusions about some of the constraints and fundamental forces they are up against.

**SHACKLES**

This section is more difficult to write than most because it works over old ground which has been tilled many times before. Constraints are recurrent, tenacious and oft-lamented.

Ken Keith and Max Roberts, of the Queensland Department of Primary Industries, reflecting on constraints to soil conservation catchment groups concerned with improving production and preventing erosion on the Darling Downs by improving the adoption of measures such as strip cropping, note that at a group leaders workshop in 1963, the following difficulties were identified:
inexperience in leadership;
keeping members interested beyond personal problems;
overcoming the fear of coercion;
overcoming the tendency to make decisions for people;
organising meetings of sufficient interest;
a lack of evidence of immediate benefits of soil conservation;
encouraging respected but disinterested farmers to get involved.

External factors contributing to the decline of these informal groups may have been:

- financial constraints as cost/price squeeze pressures and drought took effect after 1965;
- pressures on [DPI] staff to use more formal project planning approaches through legislative means where coordination of soil conservation works was essential;
- the departure of a key facilitator who had worked with technical officers to help the groups analyse problems and develop a whole-property approach.

These issues of 30 years ago are unfortunately all too familiar to most Landcare groups and the people working with them in Australia today. But they do not tell the full story, so at the risk of descending into melancholy, we will explore some of the challenges for Landcare in more depth.

**People, people skills and ‘burnout’**

Landcare group leaders, along with coordinators and facilitators, are key actors at the interface between government agencies and Landcare groups. They usually find that their involvement in Landcare increases the frequency and intensity of their contact with bureaucracy, in particular with their local land conservation extension and research staff. However, being progressive farmers in the main, they have often had some contact with government prior to their involvement in Landcare.

There are two sides to this increased exposure to government: Landcare group leaders often become quite close to individual extension workers and research staff in districts where the latter are competent and responsive, enhancing technical learning and empathy on both sides. But increased contact with bureaucracy often also increases the level of frustration of Landcare group leaders, who spend valuable time in meetings of dubious immediate value, coping with
the seemingly endless paperwork of the project-funding process, and who see apparently large amounts of money being spent in ways which to a farmer seem extravagantly inefficient. This is a classic 'interface discontinuity', between the life world of the practical farmer and the massive inertia and appetite for minutiae of the bureaucracy.\(^\text{245}\) Landcare group leaders are often very supportive of certain individuals within government agencies, but cynical about the agency as a whole, and scathing about the way in which technical resources and money are allocated and managed.

The leaders of Landcare groups are pivotal in the effectiveness of the whole movement. Their ability to lead, to delegate, to involve people, to communicate; their understanding of group processes for dealing with apathy, conflict, making decisions and translating them into action; and their ability to organise and run interesting meetings with a clear purpose; are all critical factors influencing the effectiveness of Landcare groups. The limited number of people in rural areas with these skills or the capacity to develop them is a fundamental constraint to Landcare. One keen individual can be the difference between a dynamic group and a dormant group. Many existing group leaders are already the busiest people in their community and as their Landcare workload increases they face the prospect of burnout. These people need support if Landcare is to be effective in the medium term.

At a macro level, a major constraint to Landcare group effectiveness is simply the number of people in rural communities who have the talent and the inclination to be Landcare leaders. The demography of rural communities, the age and education profile of farmers, levels of debt and stress, the vitality and provision of facilities and services in country towns—all of these factors have a bearing on Landcare groups and ultimately on the quality of land management. Social issues are a critical but often-overlooked element in the sustainability debate.

One possibility for developing the human resources available to Landcare groups is simply to bring outside people in to rural communities to work on landcare issues.\(^\text{246}\) Many pressing environmental issues require labour and human resources which simply do not exist in rural areas, while there are many underemployed and unemployed people in urban and semi-urban areas, particularly young people. There is an obvious symmetry here. There is great scope for a multi-faceted national initiative linking training with employment in environmental restoration. The importance of the training component is hard to overestimate; if people feel they are merely a cheap source of labour then the amount and quality of work done is likely to be poor.
Providing resources to enable existing agencies and community organisations, including Landcare groups, to train and employ young people on worthwhile projects would be a tremendous fillip to groups overawed by the scale of the problems they are trying to beat. But in the short term, we have to work with existing human resources. Most Landcare groups in Australia are still running on the energy of the people who established the group. The prospect of 'burnout' among these key individuals is frightening. If it is not recognised and treated, the energy of many Landcare groups will dissipate.

Burnout also applies to Landcare group facilitators, coordinators and state agency extension staff dedicated to Landcare groups. Most of the solutions require a knowledge of group processes, the analytical skills to stand back for a moment to see what is happening and the facilitation skills to intervene to alleviate burnout without creating further problems for the group. Ideally, group members should be able to recognise such problems and deal with them themselves, which underlines once again the importance of training programs for group members as well as professional facilitators.

Where the victim of burnout is a facilitator or coordinator, they usually have to fix it themselves. This requires higher-order facilitation skills, to wean groups off support (often away from the long, boring night meetings which are a significant cause of fatigue, disruptions to personal life and stress), and to negotiate better working arrangements.

Natural resource management agencies do not have sufficient people trained in group processes, community consultation or participatory planning. Investment in training programs (both in technical aspects of land management and in 'people skills') combining land users, Landcare group leaders, local government, agribusiness, community groups and state agency staff, across institutional and discipline boundaries, is essential.

It is critical to realise that Landcare groups are only a part of the land conservation picture. They will not achieve sustainable land management on their own, but they have a critical role to play within an overall strategy.

'The system'

Much of the framework within which Landcare groups operate is not within the groups' control, but within the dominion of governments. Redressing some of the mistakes of the last century or more will require governments to change, just as they are asking farmers to change. Government policies over many decades have encouraged land degradation. For example:
• tax concessions for clearing native vegetation, which lasted until the 1980s;
• drought assistance schemes, which discriminated against conservation-minded managers; encouraged exploitation of resources, were open to rorting,248 and lasted until the 1990s;
• closer settlement schemes, which settled returned soldiers and others on blocks of land which were often too small, forcing land users to flog the land merely to survive. There are still areas, particularly in leasehold country, where block sizes are too small for sustained viability given current farming systems;
• irrigation schemes, in which water has been delivered to extensive areas, often on inappropriate soil types, and almost always with inadequate drainage, under pricing structures which do not reflect the true cost of delivery and maintenance and which have encouraged inefficient irrigation practices;
• lease covenants which for a century or so made exploitation of land compulsory, for example by insisting on land being at least 90 per cent cleared (SA), or establishing minimum stocking rates (NT);
• departments of agriculture, accountants, stock firms and banks which urged farmers to ‘get big or get out’, encouraging higher levels of debt and lower levels of equity.

Government management of its own land at all levels, commonwealth, state and local, has not always set an enlightened example to other land users. Improving land management is not simply a matter of improving the attitudes and practices of farmers.

There are encouraging signs (e.g. in the Decade of Landcare Plans, the Ecologically Sustainable Development Reports and various parliamentary inquiries) that governments are at least recognising these issues. However, John Braden of the University of Adelaide249 has pointed out that this has been so for at least half a century, without being reflected in legislation, nor in enforcement of existing legislation.

Institutional structures and policies at all levels of government are intricately related to institutional cultures, which are like a glass ceiling, preventing Landcare groups from reaching their potential. Rhetoric including terms such as ‘bottom-up’, ‘community driven’, ‘grassroots’ and ‘community based’, flows freely from government agencies. Yet these same organisations tend to be hierarchical and paternalistic, in which top-down modes of decision making are the norm.

• While many staff within these agencies are attracted to the ideal of empowerment, the organisations within which they work rarely foster such an approach. Seen through the prism of their institutional cultures, empowerment is a threat. Empire building and
the expert syndrome militate against shifting resources from government to community control. This issue stems not from malice, but from the scarcity of people with social skills in natural resource agencies. Few managers realise that empowerment can increase the power of both parties, nor do they have the skills, confidence or support to operate in other than a technocratic mode.

State agriculture and natural resources agencies are admittedly operating in a very difficult climate at present, characterised by constant change—renaming, restructuring, reorganising, relocating, regionalising. The motives for current reforms are mostly sound, and in theory many of the changes could improve institutional cultures. But, in practice, budget imperatives tend to preclude the long view, limiting staff consultation on more fundamental issues such as the mission of the organisation. Structural reform tends to take precedence over staff training, morale sinks with increasing uncertainty and stress, and human resource development becomes very difficult.

From a landcare perspective, it certainly seems that government agency structures are less important than the organisational cultures within these agencies, which need to change markedly if communities are ever to take responsibility for improving land management.

Social and cultural hurdles
Farmers are a small sector of the community, declining in number and influence. Many feel this keenly, and are acutely aware of the way they may be perceived by the rest of society. Landcare group members and other land users often still feel that they are being blamed for land degradation, which triggers a defensive reaction and tends to reinforce the status quo, frustrating considerations of alternative systems of land use and management. Such defensiveness is fomented by the tendency of the media to paint green issues black and white, to sensationalise and polarise complex environmental issues.

Certainly there are miscreant land managers (including government agencies) who knowingly overstock, overclear, or neglect to control pests such as rabbits and weeds, just as there are individuals, companies and government agencies in urban areas who cause pollution. But the causes of land degradation in Australia are complex and longstanding. To simply blame farmers has never been accurate or useful.

The social and cultural factors which have compounded European impacts on the Australian landscape include:

- faith in the combination of man's ingenuity and hard work to get production from any land;
• failure to understand or appreciate the Australian climate, landscape, soils, flora and fauna—how Australia differs from elsewhere in the world and the constraints and opportunities which arise from these differences;
• inability to appreciate that land is a finite resource—an historic belief that Australia has more than enough land for all demands on it and when a piece of land is worn out, you just move on;
• belief that private property rights are inviolate, and confer a right to exploitation;
• short-sighted, narrow-minded self-interest which cannot begin to take seriously the time scales or interrelationships implicit in sustainability.

In the prevailing institutional and cultural environment in which land managers operated for at least the first 150 years of European settlement in Australia, land degradation was rarely mentioned and sustainability was not a word in the lexicon. Attitudes towards the land which we have only recently regarded as contributing to unwise land use, were (and still are among many people) shared by farmers, staff in departments of agriculture and lands, stock and pastoral inspectors, stock agents and rural merchandisers, municipal engineers and shire councillors, rural financial advisers including bankers, accountants and solicitors, and land administrators and politicians.

Turning around such deeply and widely held attitudes will not happen quickly and it will require technological, institutional and structural change; not just awareness campaigns focusing on farmers. Lia Bryant, discussing the personal crisis experienced by those ‘inefficient’ producers forced out of agriculture, notes that their own deeply held and socially reinforced ideologies—of independence, individualism and expectation of reward for years of hard work and sacrifice, and respect for the ‘self-made’ person—actually serve to compound the crises experienced by those leaving agriculture. It also helps to explain why farmers tend to hang on long past the ‘economically rational’ point of departure from the land. These farmers tend to blame themselves and see themselves as having failed. Bryant suggests that ‘the notion of individualism discerningly masks economic and political realities and is tied to the concept of the free market. It translates into a discourse that neatly overrides the reality that markets are shaped by political forces.’ The myth of the resourceful, independent farm family producing for a free market masks the influence of macro-economic policies in Australia and elsewhere, the lending policies of financial institutions and the market manipulation of transnational corpor-
This leads in turn to an overwhelming emphasis on developing technocratic solutions to the symptoms of environmental problems, conveniently overlooking or ignoring the underlying causes of these problems, which are first and foremost social and political. We must get it into our collective heads that land degradation and other environmental issues are above all social issues. Solutions, and processes to develop solutions, will only be effective if they reflect an awareness of the socio-economic and political context of farming families, communities and the Australian food and fibre sector as a whole.

The continued, widespread failure throughout the populace to understand or appreciate the Australian climate, landscape, soils, flora and fauna is not just an education issue or a conservation issue. It also limits our appreciation of the economic opportunities which arise from Australia’s location on the planet and its uniqueness. The narrow primary production base, dominated by the same products that Captain Phillip landed with, supports an economic paradigm which assumes that resources are substitutable and that technology will extract production from any land, correcting any mistakes along the way. This is reinforced by the belief in private property rights and by the dogma of economic fundamentalism which deifies economic growth and insists that the main justification for government intervention is to alleviate ‘market failures’. As Ted Lefroy and Richard Hobbs note dryly: ‘The implications of the discovery that the earth is a finite sphere, and not infinitely flat, are taking a very long time to enter the human consciousness.’

According to Neil Barr and John Cary, many farmers are not insensitive to community attitudes to environmental issues. Based on recent research over four years in central Victoria, they conclude that farmers’ beliefs can be divided into ‘symbolic’ environmental beliefs, which influence farmers’ expressed attitudes but are insignificant in explaining farmer behaviour, and salient or ‘substantive’ beliefs in the real value of environmental work such as tree planting, which do influence farmer behaviour. There are two points arising from this research which are relevant to any debate about environmental commitment and actual behaviour.

First, the notion of symbolic beliefs is instructive and is undoubtedly applicable to sectors of the community other than farmers. For example, urban wage or salary earners may be members of the Australian Conservation Foundation or Greenpeace; pay annual subscriptions to Habitat (at a total cash cost of less than $100 per year); display environmental bumper stickers; and take an
active interest in nature documentaries. Yet these same people are likely to use non-renewable energy sources for heating, cooling, lighting, cooking and transport; use processes and appliances which emit ozone-depleting substances; use cars rather than bicycles or public transport; live on large blocks with lush, green, energy-intensive lawns; recycle only a small proportion of waste—yet still call themselves conservationists. Quite justifiably, these people could claim that ‘the system’—the design of cities and buildings, the transport and energy sectors, waste management infrastructure, the accessibility of recycling schemes etc, does not foster sustainable lifestyles.

So can farmers.

Second, even ‘symbolic’ land conservation activities on farms can cost farmers money. The 50 per cent of sheep farmers in the upper Loddon and Avoca catchments who plant one hundred trees or more per year, probably spend at least $500 per year including labour, rabbit control and fencing, and the sixteen per cent of farmers who plant an average of 500 trees per year would spend over $2000 each per year.254 Barr, Wilkinson and Cary suspect that most owners of large and medium-sized properties in the upper Loddon and Avoca catchments do not believe extensive tree planting to be in their own economic interest—yet half of them are planting trees in very tight times. Few urban dwellers have to confront the cash costs of conservation in such a direct way, and few would spend as much money on conservation measures each year. Of course farmers have a responsibility commensurate with the area of land they occupy. Someone with 1000 hectares should spend more than someone with one-tenth of a hectare (the traditional quarter-acre urban block in Australia). Furthermore, urban people contribute to conservation through their taxes. But the point remains that farmers confront the tension between conservation and exploitation in decisions they make every day, whereas the vast majority of the population is insulated from these realities.

It may well be simplistic and inaccurate to blame farmers for land degradation, but how is this a constraint to landcare?

Blame hinders constructive dialogue about how to do things better. In this case, blame is also a product of ignorance. Where farmers perceive criticism to be ill-founded, unjustified or too narrow in its focus, it can be seen (along with the continued existence of some of the institutional constraints discussed above) to indicate that governments and others are not yet fully committed to sustainability. ‘They haven’t thought it through, they haven’t got their own house in order.’
If we had the money, would we know what to do with it?

A fundamental constraint to Landcare group effectiveness is the lack of practical and profitable sustainable farming technologies and land management systems. Sure, Landcare groups can be effective up to a point in generating commitment to sustainability among land users, and in providing a more fertile environment for the propagation of new ideas. But for even medium-term effectiveness, groups need to know what sustainable farming in their district entails.

Extension and research institutions in Australia are undergoing significant reform. At the same time, the relationship between farmers and scientists is undergoing profound change. However, institutional reform appears to have been driven more by budget cuts and current buzz-words such as 'accountability', 'user pays' and 'market driven', than by a re-evaluation of the fundamental nature of Australian farming systems in the light of a long-term economic, environmental and social outlook.

Competition for scarce resources between government agencies has tended to lead to accommodations with conventional technology transfer services, with their massive inertia invested in the status quo. Given the way research priorities are established and funding is channelled, most technology transfer projects, even those tagged with the now trendy label of 'sustainable agriculture', are directed to fiddling with the margins of existing farming systems, leaving scant intellectual space or resources for considering new systems of land use. Change is directed far more by the market than as a result of any critical re-examination of farming systems according to the ecological, economic and social principles of sustainability.

Consequently, in the name of efficiency and competitiveness, farmers' terms of trade continue to decline, the number of farmers also, and agriculture is able to externalise the social and environmental costs of this myopia.

Rural decline

While rural decline is not disputed, the links between the social and economic well-being of rural communities and the quality of land management are not recognised (apart from generalities about 'socioeconomic environments' and 'institutional frameworks') in recent government documents.²⁵⁶

It may seem paradoxical that the number of Landcare groups has grown rapidly over a period when rural communities have been
Involvement, impacts, influences, impediments

under great stress. Certainly the influence of the funding available for Landcare is significant. National Landcare Program funding has been a tremendous catalyst for land conservation in Australia over the last decade, and for Landcare groups in particular since 1988. Landcare groups now find it relatively straightforward, albeit time-consuming, to apply for and receive funding for demonstration projects, planning and training activities and so on. It must be said, though, that the amount of money involved ($16.3 million in national grants to community groups for 1993–94) is trifling compared with the task confronting Australian society to put systems of land use and management on a more sustainable footing.

The proliferation of groups cannot be accounted for solely by the funding available. Many land users are deeply concerned about the condition of the land and feel a need to do something positive. Landcare groups also provide a social outlet, enabling people to feel that they are all in the same boat, that their individual problems are not unique, in a constructive forum which is focused on longer-term issues. For group leaders at least, Landcare also provides a stimulating intellectual challenge, and the satisfaction of imparting knowledge or stimulus to others.

But when Landcare groups are three to five years old, when the first flush of enthusiasm is gone and the initial group leaders are tired, the problems of farmers and rural communities become the problems of Landcare groups. The extent to which local voluntary groups can generate commitment and contribute to developing new systems of land use and management, is inextricably entwined with the social and economic vitality of rural communities.

The links between farm profitability and improved land management seem obvious. When farmers are under extreme financial pressure, they tighten their belts and are unlikely to spend money on land conservation, although desperation may lead to innovations to find cheaper ways of doing things. But the impact of social decline is more insidious. Where rural communities are losing human resources, they are losing intellectual horsepower—often the people who provide the spark to initiate community activities and ideas for change. In districts where the population is declining and services are being withdrawn, Landcare groups are likely to struggle and their lifespan may be limited. Where there are no technical breakthroughs and farmers have no financial room to move other than out of farming, Landcare groups will tire of raising awareness of land degradation problems and chasing land management solutions.

Of course, the converse is also true, and apparent in many districts where hobby farms have proliferated. Along the eastern seaboard and the great divide, in dormitory ‘feral suburbs’ around
capital cities and around major regional centres, population has increased, rural communities are more diverse in terms of the backgrounds, attitudes, spare time, disposable income and education levels of the people, and Landcare and Dunecare groups consequently seem to be more vigorous and likely to persist. In such communities, Landcare groups can be a focus for constructive interaction between traditional farmers and the rural lifestylers who now outnumber them, especially with the help of a facilitator.

At a broader level, the linkages between pressure on land, water and biodiversity, and rural social and economic decline, appear to be poorly understood by policy and decision makers. These linkages should be the subject of systematic rural social research, so that governments become more aware of the wider implications of rural decline and of the environmental consequences of laissez-faire economic and social policies in the bush, and so that more constructive, creative policies can be developed and implemented. Landcare and its associated land literacy programs provide a basis for community involvement in this process of investigation and policy development, which could help to ensure that subsequent government interventions are informed with a rich sense of local context.
Paths to the future are made, not found—sustainability and Landcare

We have looked at some Landcare groups in action and related initiatives within the Landcare movement, and we have summarised the impact of Landcare to date and some of the constraints to landcare. This chapter is based on the premise that the overall goal of the Landcare movement (consisting of community groups; local, state and national government agencies; non-government organisations and agricultural businesses) is sustainable land use and management.

WHERE ARE WE GOING?

Phillip Adams, writing in The Australian, makes a succinct case for thinking about the future and planning for it: ‘The future is not some place we are going to but one we are creating. The paths to it are made, not found.’

This is more positive than its flip-side, as Mark Twain observed: ‘If you don’t know where you are going, any road will get you there.’

In developing a framework for Landcare, let us start with the purpose or mission to decide where we are going, then consider what is required to get there. Historically, soil conservation in Australia has had a focus on problems—fixing land degradation. This was understandable in the 1930s and 1940s, given the spectacular nature and immediacy of some problems, notably wind and water erosion. But the emergence of more complex issues such as salinity, soil structure decline and acidification, the stirrings of some ecological literacy among agriculture and land management professionals in the 1970s and 1980s, and the relentless socioeconomic
squeeze between the pincers of rising costs and diminishing returns, necessarily shifted the focus to the development of sustainable systems of land use and management.

This is not to suggest that significant sectors of the Landcare movement are not still preoccupied with particular land degradation problems, or that it is invalid to concentrate on rabbits, for example, if they are the key agent of destruction. We must reiterate, though, that Landcare will progress only if it is mission-directed—‘work together to develop sustainable systems of land use and management’, rather than problem-centred—‘fix land degradation problems’.

**SUSTAINABILITY—IN THE EYE OF THE BEHOLDER**

The 1980s and early 1990s have seen a major new thrust in environmental discourse—a move away from merely highlighting problems such as waste disposal, pollution and natural resource depletion (pointing out what is wrong with the system), towards proposing new systems for managing natural resources and producing food and fibre which meet the needs of society without compromising the ability of future societies to meet their needs. The word which characterises this discourse is *sustainability*. Sustainability is the preeminent issue in agriculture and natural resource management today, and the concept of sustainable development is gaining increasing attention in mainstream politics.

The essence of the sustainability debate is how to safeguard nature’s productive capacity to support human existence in a way which best fits the lifestyle aspirations of current generations. Let us attempt to deconstruct this chameleon of a concept, as a prelude to focusing on the role of Landcare in a wider policy setting.

The current debate about sustainability was anticipated early last century by Thomas Malthus, David Ricardo and John Stuart Mill who, from various perspectives, questioned the viability of continued economic growth. The following quote (from Mill’s *Principles of political economy*, 1848) forecasts a state of affairs which could be taken directly from a contemporary green critique of industrial agriculture:

> Nor is there much satisfaction in contemplating a world with nothing left to the spontaneous activity of nature; with every rood of land brought into cultivation, which is capable of growing food for human beings; every flowery waste or natural pasture being plowed up, all quadrupeds
or birds which are not domesticated for man's use exterminated as his rivals for food, every hedgerow or superfluous tree rooted out, and scarcely a place left where a wild shrub or flower could grow without being eradicated as a weed in the name of improved agriculture.260

Since the United Nations Conference on the Human Environment at Stockholm in 1972, the term 'sustainability' and the momentum of the sustainability debate has increased, particularly after the World Commission on Environment and Development published Our Common Future (commonly referred to as the Brundtland report) in 1987, and in the period leading up to and including the United Nations Earth Summit at Rio de Janeiro in 1992.

However, despite a great deal of attention in the environmental literature, a precise definition of sustainability remains elusive. The concept of sustainability is like democracy—difficult to define given a diversity of social settings, elusive in its applications, yet essential as a goal for the future.261

The best known definition of sustainability is that in Our Common Future:

Sustainable development is a process of change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potential to meet human needs and aspirations.

This is an all-embracing definition which of course has very different dimensions depending on whether the defining perspective is economic (sustainability as food sufficiency), social (sustainability as community, based on equity) or ecological (sustainability as stewardship, maintaining the productivity of renewable resources).262 Gordon Conway builds on this point, noting that there is a tendency to mix up social, economic and ecological parameters within the notion of sustainability (comparing apples and oranges), which limits its usefulness and makes it impossible to measure. In developing criteria for analysing the performance of an agroecosystem (or rural development as a whole), Conway used a narrow definition of sustainability, complemented by productivity, stability and equitability, as discussed in Chapter 6.263

Agriculture is one field of human endeavour in which the concept of sustainability has had, and can potentially have, most impact. The broad definition of sustainable agriculture below highlights
its value-laden nature, hinting at possible reasons for the relative tardiness of the agricultural and scientific establishments in coming to terms with the challenges implicit in sustainability.

*Sustainable agriculture is both a philosophy and a system of farming. It has its roots in a set of values that reflects a state of awareness of ecological and social realities and of one's ability to take effective action. It involves design and management procedures that work with natural processes to conserve all resources, minimise waste and environmental impact while maintaining or improving farm profitability.*

Modern science has tended not to question, or even be conscious of, the philosophical assumptions and values upon which scientific endeavour is founded. New processes, institutions and organisational cultures need to be developed to inform scientific endeavour with an explicit recognition of ethics and philosophies, and to involve all the relevant stakeholders, making deeper research into how sustainability might be approached more feasible.

Reviewing definitions of sustainability, it becomes obvious that parameters of sustainability are often confused with parameters of ecosystems, or communities, or markets, or societies. The latter are not parameters of sustainability, but when considered together, they can be used to give an indication of relative sustainability. Relative sustainability is a descriptor, a characteristic of an entity, phenomenon or system which emerges out of the interaction of a range of ecological, social and economic descriptors of the object of study.

**Scales and parameters in space and time**

Most people agree that the concept of sustainability embraces ecological, economic and social indicators, but there is confusion as to how these diverse perspectives with their different languages and schools of thought can be integrated to develop better systems of land use and management. Some of the confusion in attempting to integrate social, ecological and economic perspectives of sustainability can be removed by creating a hierarchy of dominant constraints and goals at different scales in space and time. Figure 9.1 illustrates such a hierarchy. This diagram should not be interpreted as suggesting that at the field scale, only agronomic considerations are important, or that only macro-economic indicators
Monitoring a peizometer in the northern wheatbelt (WA).

Shearing north of Carnarvon—a farming system which is fundamentally the same after more than a century. But for how much longer?

ANDREW CAMPBELL
There is great potential for Landcare within country towns, such as here in Hamilton, where the Hamilton Institute of Rural Learning (foreground) has established a protected habitat for the endangered Eastern Barred Bandicoot *Parameles gunnii*, and the town-based Landcare group is actively trying to improve land management within the city of Hamilton.

ANDREW CAMPBELL
A Farm Advance bus tour.
HELEN ALEXANDER

Below: Urban volunteers planting trees for the Warrenbayne-Boho group.

ANGUS HOWE with a see-through piezometer showing positive groundwater head—making a problem more visible.
ANDREW CAMPBELL

IAN and Joan Walsh.
This spectacular, stinking, poisonous outbreak of blue-green algae, along a 1000-kilometre stretch of the Darling River in November 1991, was an eloquent call from a river threatened by excessive regulation of its flows, draining of its former natural wetland filters, runoff of agricultural chemicals and soil, and conflicting and unsustainable demands on its water.
count at the national level. Rather, it is suggesting that at each level some perspectives assume particular importance, and it is useful to be conscious of that and to start with the parameters arising from that perspective.

In the paddock, agronomic considerations predominate, over a time scale of several seasons. Parameters such as soil stability, structure and fertility; water, mineral, energy and nutrient budgets; pest and disease management and productivity are important at this scale. These are the building blocks of a sustainable system, and these parameters provide a starting point for assessing the sustainability of existing land management practices and for defining agronomic research priorities. A great deal of useful research has been done at this scale, especially with a view to improving production. However, we still have a lot of work to do to integrate
existing knowledge, and to focus on gaps in knowledge in order to develop a practical and informative suite of indicators which farmers can use to keep track of the relative sustainability of their farming practices at the paddock scale.

It is important not to confuse indicators with absolute thresholds, which are more problematic. We are talking about indicators to help land users see in which direction they are moving for a given parameter, along a spectrum which has 'more sustainable' at one end and 'less sustainable' at the other. We have already discussed some of the tools being developed (eg soil structure assessment kits, farm monitoring handbooks, MEYcheck) and the work being done to help farmers manage this information—for example, by the FM500 project and the various property planning initiatives.

At the farm scale, the survival of the farm business over several generations is paramount, dominated by micro-economic constraints. When farmers say that they can't afford to be sustainable, that current best practices are beyond their existing means, this is often a rational response which cannot be dismissed by talking vaguely about the 'long term' or 'the good of the catchment'. Leaving aside for a moment the overwhelming evidence of ecological dysfunction, many farming systems in the industrialised world are unsustainable because they are not profitable. Inexorably declining terms of trade provide compelling reasons to change farming systems, even if there were no land degradation. Simply put, profitability at the farm scale is an essential ingredient of sustainability, within the structural context of capitalist, export-oriented agriculture. While we have seen in Chapter 6 that some farmers are still managing to be environmental innovators during a terms of trade squeeze, available evidence suggests that farmers under financial pressure tend to respond by placing greater pressure on their land, with tighter rotations, higher stocking rates and lower inputs.266

Much less research has occurred at the farm family scale. Some pragmatic and valuable work has been done by the hardworking (and often stressed) people in the rural counsellors' network, who help farm families in desperate financial straits with advice, with assistance in negotiations with their creditors, with debt restructuring and, if necessary, with planning an exit from agriculture. There is a wealth of anecdotal information and raw financial and social data which we could be using to add depth to an admittedly depressing picture, which could inform the socioeconomic components of more holistic analyses of farming systems. Of course ecological concerns such as nutrient, energy and water budgets, and biodiversity, are also important at the farm scale. At the risk of
repetition, this information is best applied by farmers themselves, ideally with the assistance of facilitation in a group context. The role of the outsider is then one of facilitating learning processes rather than transferring information.

At the catchment or landscape scale, ecological concerns of maintaining life support systems over hundreds of generations predominate. At this scale, issues such as energy inputs, solar energy interception, wildlife habitat, waste management, water use and water quality, catchment hydrogeology, and the ability of agroecosystems to recover from droughts, floods, fires, pests and diseases, are potential parameters which can be used to indicate relative sustainability. These are complex issues, poorly understood by modern science, as most agricultural and land management research has concentrated on understanding the function of systems at the cell/plot/crop scale and occasionally farm level. This scale could also be called the community scale, where the social issues (such as the demography of the population, access to education, health and other facilities) which have a critical influence on the quality of rural life also emerge. Once again, little work has been done, nor is much being done, to explore the linkages between these issues and agricultural sustainability.

Ted Lefroy and colleagues have developed a framework for assessing the relative sustainability of land use in the Western Australian wheatbelt, at the landscape scale. They suggest that four ecological processes—the cycling of water, the cycling of nutrients, the flow of energy, and the extent to which biodiversity is conserved and restored—should be the initial assessment criteria. Within each of these ecological parameters, they propose a number of indicators (e.g., surface water quality, soil biological activity, diversity of native fauna and solar energy interception), going so far as to suggest units of measure, present known levels, realistic transitional levels and desirable levels. Again, this is not an attempt to define absolute 'givens' within a land use system, but it does provide a useful framework for debate and negotiation, and it serves to expose gaps in existing knowledge and areas where research is needed.

A system which is ecologically promising should then be assessed according to economic parameters such as profitability, cash flow, equity and debt, net present value, practicality and acceptability. We would add some social indicators, for example, the extent to which the system is:

- appropriate: reflecting, and adapted to the needs, skills, training and finances of land users as well as to environmental constraints;
• **self-reliant**: based on the efforts and ideals of land users themselves on a regional level—minimising the dependence on non-renewable, imported resources;

• **non-disruptive**: compatible with the socio-cultural environment—not, for example, forcing people to adopt practices against normal behaviours and traditions, or resulting in migrations of rural people to cities.268

There is great potential here to develop technologies which combine ecological insights with social technologies being developed in the various land literacy programs to involve a significant proportion of rural populations in gathering, interpreting and using this information.

At regional and national levels, the dominant constraints are *macro-economic*, and unfortunately planning horizons are limited by politics and economics. The platform of community participation and commitment being built by Landcare groups has the potential to ensure that sustainability is a bi-partisan issue insulated from short-term politics. Many people in Landcare groups, though, are still not convinced that ‘Canberra is fair dinkum’ in its commitment to sustainability. Talk of ‘level playing fields’, and the apparent confidence of commentators and spokespersons in the capacity of the market and technology to ‘fix’ environmental problems, merely feeds cynicism in the bush about whether the Australian government or the larger mass of voters cares about farmers at all. There is a link between macro-economic and trade policies and pressure on the land which is all too clear to farmers struggling under the combined weight of high real interest rates, increasing input costs and declining returns, ostensibly due to ‘unfair’ American and European trade policies.

It is salutary to ponder the outlook for Australian farmers if the Americans and Europeans ever stop subsidising the export of their surpluses. After a probable short-term improvement in world commodity prices, the long-term trend of rising costs and diminishing returns for the raw products is likely to continue. Thus, even if there are favourable developments in the external political/economic environment, more fundamental changes in Australian agriculture are required.269

If one accepts the simple proposition that human consumption of natural resources cannot continue to double each generation, then one has implicitly entered the sustainability debate. Sustainability is in the eye of the beholder. It is a relative concept which cannot be defined, measured or broken down into compo-
nent parts. But social, ecological and economic parameters, or attributes of systems, entities or phenomena can be defined and measured, which, when considered together, give an indication of relative sustainability. For a given parameter, certain levels or trends may be 'more sustainable' or 'less sustainable' or 'non-sustainable', or even 'sustainable' (in a narrow ecological or economic sense). However, the evaluation of social, ecological and economic attributes of an entity to assess its relative sustainability is never an objective process governed by natural laws or mathematical formulae. Such evaluation is a matter of weighing up and trading off values, beliefs, priorities and goals, and it is thus inevitable that assessments of relative sustainability are socially constructed.

To emphasise the point that determining relative sustainability will always be a matter for negotiations and trade-offs, one has only to realise that in any discussion of sustainability it is necessary to clarify some simple questions: sustain what?, for whose benefit?, measured by what criteria?, over what area?, for how long? We have discussed some possible criteria and assessment frameworks, but clearly these are subjective choices which should be considered by the whole population, not left to the so-called experts.

The concept of sustainable development (development in the sense of improvement or realising potential, rather than growth or expansion) can be an extremely powerful and heuristic force in the global environmental debate. However, we must stop trying to define the indefinable, and focus instead on developing the social, political and economic technologies, processes and institutions required to put this concept to work, in a spirit of discourse, learning and constant adaptation with changing technologies, values and environmental indicators. We need a hierarchy of institutions and social learning at national, bioregional and local levels, with as much decentralisation and devolution of economic and political processes as possible, to ensure that decisions and trade and their consequences are rooted in local soil, but accompanied by sufficient mechanisms of communication, accountability and influence to enable assessment and interventions with respect to sustainable development at higher levels of aggregation and human agency.

Developing these institutions and processes is not just a matter for the technocrats and the politicians. If we are to be at all effective in tackling the root causes of environmental problems, then we must change values, beliefs and attitudes. Such changes must be both deep and widespread, and they will not occur by remote control, but only through the involvement and commitment of people
at all levels and from all walks of life. So we need new ways of learning and communicating and making big decisions if we are to capitalise on the line of thought opened up by this slippery notion called sustainability.

The role of Landcare groups is critical, both at local and regional levels. Landcare and its associated land literacy initiatives have the potential to help society to re-examine and re-define its relationship with the natural resources upon which it depends, in a climate of high decision stakes, clashing interests and technical uncertainty, at scales in space and time which frustrate traditional political institutions.

The activities and perspectives of those people attempting to practise sustainable agriculture are the main focus of this book. As our thinking on sustainability develops, evaluative tools will emerge. The thinking about the sustainability of existing systems and how to improve them, should occur most of all inside the heads of those managing natural resources. This thinking is likely to be stimulated by personal involvement and participation, which is why Landcare is a foundation stone for more sustainable systems of land use and management.

**HOW DO WE GET THERE?**

So the ultimate goal of Landcare is sustainable land use. How do we get there? We have posited that land use is only likely to become more sustainable or less sustainable—sustainability is not an end state which we can reach and then sit back to enjoy the view. The focus, then, is how do we become more sustainable, and what is the role of Landcare groups in this quest?

The most important roles for Landcare groups, against which their performance can best be assessed, are to increase the commitment of individuals and communities to the development of more sustainable land management systems, and to be active participants in the learning processes (gathering, interpreting and using information) necessary at a community scale to devise, implement and refine improved systems of land use and management.

But commitment on its own is not enough. Moving through the wider Landcare movement, one can sense that Landcare is almost by osmosis becoming Australia's main thrust against land degradation, such are the hopes being vested in raising awareness. Awareness and commitment are essential conditions for sustainability, but they are not sufficient conditions.

Land users may be aware of a problem and committed to do
something about it, yet be constrained by a lack of technically feasible, economically profitable solutions. Anyone criticising land conservation extension in Australia should first look at the technologies farmers are being asked to adopt. In many cases the problem lies with the technology rather than with extension or farmers.

John Cary from the School of Agriculture and Forestry at the University of Melbourne has spent many years researching the social and economic aspects of land degradation, with particular emphasis on farmer beliefs, attitudes and behaviour, and the relationships between them. He suggests that beliefs about the conservation value of particular practices are relatively unimportant determinants of adoption compared with their profitability, practicality and riskiness, and that land users have generally not adopted conservation technologies as an insurance against future loss of production. Cary concludes that land users are not unresponsive to changing community values about land management, but they will generally see through simple prescriptions to complex land management issues. Where existing knowledge about problems and solutions has a high degree of uncertainty or lack of specificity for local districts, then people may well be aware, concerned and committed, but they are acting rationally in deferring investment of money and effort until outcomes are better understood.270

However, as Landcare groups mature and gain credibility, many appear to recognise the need for standards of land management to be set and adhered to. The logical next step in this development is for Landcare groups to have some say in the regulatory process. It would seem preferable from a farmer’s perspective if agriculture can regulate itself rather than have regulation ‘externalised’ or put in the hands of others. There are elements of this approach in the land conservation legislation of South Australia and Western Australia, and in proposed new legislation for Tasmania and Victoria.271

Regulatory activity is at the margins of Landcare, which is really about voluntary change. While the objectives of Landcare may also be worked towards by other policy instruments such as regulation and taxation, the Landcare movement and particularly community Landcare groups are primarily concerned with influencing the voluntary behaviour of individual land users to develop and apply more sustainable land management systems at the farm and catchment scale. Niels Röling of Wageningen Agricultural University in the Netherlands has examined rural development and agricultural extension initiatives in most parts of the world over the last 30 years and has some firm views on the ingredients required for voluntary change:272
A crucial tool in the management of human affairs, especially 'development', is deliberate voluntary change, through such non-coercive policy instruments as education, information and persuasion. To be effective, these instruments must be based on anticipation and participation: they will work only when the change interests or benefits the people whose change is deemed desirable. Hence, their effectiveness depends on 'upward' communication...

Knowledge is a vital ingredient in voluntary change. People will change voluntarily if they have the required (1) knowledge and (2) capacity and (3) motivation, and (4) if the change is socially acceptable. Since deliberate knowledge management can anticipate the other three to some extent, knowledge has been seen as a key manipulable factor in voluntary change. There is a great deal of truth in this, as long as one accepts (a) that mobilisation, organisation and training for empowerment not only requires knowledge development (eg, awareness building), but also organisation and leadership development and participation, and (b) that applying knowledge requires resources, even if development is increasingly knowledge intensive.

Paraphrasing Röling, there are three key ingredients required in order for land use and management to become more sustainable: land users must want it, they must have technically feasible options which are economically viable and socially acceptable, and they must have the capacity (resources) to implement change. There is also a fourth ingredient which is equally important—the processes required to change from existing systems in a coordinated way, particularly at the landscape scale, to anticipate and plan for change, rather than reacting to it. This is not to suggest that sustainability is something which can be ordered in a prescriptive way, that there is a blueprint which everyone should implement. More sustainable systems of land use are much more likely to occur through a diversity of approaches as land users and communities evolve new systems of land use according to their own circumstances. Figure 9.2 represents four key ingredients underpinning the goal of sustainable land use. It also attempts to place Landcare groups in context among some other key influences on land use.

However, this diagram does not adequately convey the feeling that, if any one of these ingredients is missing, the whole house of
cards falls down. Nothing substantial happens if any of these is omitted. In fact there is the danger of going backwards if false hopes are raised and early enthusiasm becomes soured by frustration and cynicism. Without commitment, other priorities will always be more urgent than developing sustainable farming systems. Without resources, people will become burnt out by anxiety and frustration. Without a knowledge of where we are going and how to get there, the fast start fired by initial enthusiasm will lose momentum. Without a process for planning for change, involving the relevant players and determining actionable first steps, adhockery and false starts will result.

**Figure 9.2 Ingredients for sustainable land use**

This is why Landcare groups and their role must be seen in a wider context. It is simply unfair and totally unrealistic to expect voluntary groups of people, even if there were a hundred thousand active Landcare members, to fix land degradation or develop more sustainable farming systems without significant external support—financial, technical, institutional and moral. The institutions and processes required to provide this support are not just important to consolidate the impact of Landcare groups, they are essential if Landcare groups *per se* are to be sustained.

Most Landcare groups are less than five years old, firing on the enthusiasm of the ‘goers’ who initiated them. However, the Landcare movement is now at a critical stage after its first few years of rapid growth. There is an emerging debate within the Landcare movement about the extent to which Landcare needs to become institutionalised into the mainstream of rural policy in Australia.
There are those who believe Landcare needs to be organised into some form of democratic structure with clear links from Landcare groups to regional, state and national representative bodies with direct control over financial and technical resources. Others believe such a move would bureaucratise Landcare, swamp it with meetings and rob it of its key feature—diversity and lack of formal structures.

Past experience with cooperative community-based movements suggests that some structure and regulation through which collective decisions can be made and implemented, and through which resources can be delivered and accounted for, is inevitable if voluntary group action is to achieve wider and more lasting impacts on environmental and social issues. Peter Cock acknowledges that participatory models of consensus building and decision-making processes have much to teach us, but he asserts that corporate models of socio-economic organisation are equally important to establish mechanisms for following through:

The environment movement ... has been strong on participatory decision making but weak on organisational clarity, efficiency and accountability. Afraid of any hint of hierarchy, it has often stripped itself of the collective authoritative capacity to act ...

A lack of effective social organisation leads to the following processes being set in train. In order to function at all there is a privatisation of decisions by the few, often in an informal way, that is difficult to access or challenge. Alternatively, or additionally, this disorganisation results in the formal monopoly of the most able, who become exhausted and burnt out in a few years. (In one sense the most committed tend to be consumed by the least committed.) The lack of explicit group power generates confusion, withdrawal and powerlessness, and adds to the burnout of those previously committed. Decision making meetings are no longer valued because they are so exhausting, further weakening the capacity for participatory democracy. The lack of clarity of structure—arising from fear of an emergent bureaucracy—results in confused lines of communication and coordination between components.274

These problems are already starting to surface within individual Landcare groups, and are even more likely to arise when it comes to 'scaling up', to considering issues over whole catchments or re-
regions such as irrigation districts where cooperation and collective decision making are required across areas which are too large for everyone to know everyone else. If Landcare is to have a lasting impact, a degree of institutionalisation seems inevitable.
Landcare groups have already been influential in catalysing participation in and commitment to land conservation among rural communities and a substantial proportion of individual land users in Australia. However, Landcare can potentially catalyse much wider changes.

Let us sketch a vision of a preferred future for landcare. Andrew Campbell first drafted these ideas in a twelfth-floor student flat in Holland—a country which has almost as many people as Australia in two-thirds the area of Tasmania and yet which is the world's third largest agricultural exporter (albeit not known for its mountains). From there the natural advantages of Australia and of being Australian seem remarkable, and the tenor of most political and economic debate in Australia seems all the more pessimistic, diffident and myopic. While the following is a personal view on the potential of Landcare, this view was developed through contact with many Landcare people all over Australia during the National Landcare Facilitator project.

By the end of the century Landcare could be accepted as a major plank of rural, environmental and social policy by the entire political spectrum. No government would want to reduce allocations to Landcare because so many Australians each year are involved in monitoring the condition of their local environment and thousands of rural and urban Landcare groups draw support from throughout the population. Active exchange programs and 'friends of' relationships between rural and urban Landcare groups could further enhance the political potency of Landcare.

A revolution in environmental education (both 'top-down' and 'bottom-up') and innovative land literacy programs through schools,
adult education and the mass media, could ensure that the community is as well informed about Landcare as it is of the ‘Life, be in it’; anti-smoking or anti-drink driving campaigns, with similar results in changing human behaviour. Ecology and ‘people skills’ could be a core element of all post-secondary agricultural and natural resources education and training.

Widespread recognition of the links between the condition of land and water resources and the quality of human life could ensure ready acceptance that substantial funding for land conservation is an essential investment in helping to maintain Australia’s natural capital. This will be supported by reformed national accounts which more accurately reflect the costs of resource depletion and environmental degradation, which shed light on the environmental and social costs of rural decline, and which provide some guidance in establishing some social and environmental boundary conditions within which markets can operate.

Farmers must accept the need for the farming community to set and maintain standards of land management, to establish a few ‘speed limits’. The focus of Landcare groups need no longer be on patching past mistakes, but could be directed much more towards developing more sustainable systems of land use, encompassing economic and social issues, exploring preferred futures for rural communities. Landcare groups could be key agents in environmental monitoring (licensed and paid by government to collect and collate information on land status, using their own information systems, including GIS) and in land use planning processes at farm, catchment and regional scales.

Local government, with extra resources and appropriately trained staff, has the potential to be the key level of government servicing Landcare. Local government councillors and staff would participate in Landcare training, environmental monitoring activities, community-based regional planning, environmental employment initiatives and land literacy programs. This involvement would do much to change the conservative, reactionary culture of many local governments, enabling them to play a much more positive and responsive role in developing new systems of land use.

Regional planning processes which examine land resources, identify constraints and opportunities and establish a framework for evaluating the sustainability of farming systems could be in place in all agricultural areas. Linked with these planning processes (which are continuous, not just the one-off production of maps), community-based monitoring activities and regular national assess-
ments of land status would be carried out according to commonly accepted methodologies. The information generated would be accessible by personal computer.

Landcare groups can play a key role in design, implementation and interpretation of research and extension projects, as the extension, research and development (R&D) system becomes much less linear, putting scientists in more direct contact with the community, dissolving the boundary between extension and research and making greater use of practical experience and local knowledge. Widespread use of interactive, lateral communication networks between Landcare groups, people working with them and R&D providers can further break down isolation and provide more open access to technical information. Natural resource management and land conservation R&D offers major economic opportunities for Australia.

Landcare groups could also be active participants in programs introduced to alleviate structural unemployment, whereby school leavers or university graduates can opt for a year of environmental service during which they would receive training and practical experience in land management, nature conservation, mapping and inventory skills, waste management and rehabilitation techniques. These programs would tackle major land conservation projects within Australia, with local and export spin-offs through consultancies and specialist firms in environmental rehabilitation products, as many participants move on to full-time employment in this international growth industry.

The flourishing environmental literacy of the Australian community could underpin a cohesive, long-range national plan for the use of rural land, encompassing social, environmental and economic issues. This plan would be predicated on the assumption that Australia's future lies not in trying to compete on distorted world markets with undifferentiated raw products, but in helping rural communities:

- to make the most of Australia's position on the globe and its uniqueness, marketing products and technologies which are sustainable, innovative, unmistakably Australian and of the highest quality;
- to act cooperatively for themselves, to consider possible new enterprises and to access the best technology available;
- to get in touch with processors and consumers of their products and perhaps become off-farm or off-shore investors in joint ventures with processors, wholesalers and retailers.
We could easily replace our current reliance on producing high volumes of low value products at the expense of the land (with accompanying media images of dust storms, sheep being shot and algal blooms), with a distinctive image for Australian produce of 'clean and green', associated with blue skies, wide open spaces, low energy inputs and unique, high value products.

However, let us not kid ourselves that Australian products can be clean and green in image alone, or that this is enough to succeed on world markets. Many other countries can argue that their produce is similarly 'clean and green'. But none can match the landscape, the native flora and fauna, the sunlight, the seasons, or the ancient immensity of this mythical Great South Land. We need to differentiate our produce, to emphasise our uniqueness.

The entire culture of Australian agriculture needs to broaden from economic efficiency to embrace environmental and cultural integrity. Achieving this demands a much clearer sense of who we are, where we are going and what is important to us. Many of the necessary ingredients (community participation, institutional reform, external threats, recognition of the need for change) are already there, but we have yet to establish a clear vision and strategic framework for action. This is needed if all the crew in this boat called Australian agriculture are to paddle in the same direction, and to have the persistence to be patient and keep paddling.

**CONCLUSION**

Landcare in Australia is a working example of a community-based response to the challenge of sustainability during a period of severe resource constraints. The key ingredients of Landcare are its lack of structure, the primacy of land users in determining group directions and activities, the integration of conservation and production issues, the involvement of people other than farmers in groups and the extent to which groups assume responsibility for their own problems and resources. Landcare group activity often involves, and is complemented by, innovative approaches to monitoring land status (land literacy) and by participatory approaches to planning better systems of land management at farm and catchment scales.

Landcare has been a national initiative only since 1988. At this early stage in its development it is an outstanding success in terms of its penetration into rural and coastal communities and the enthusiasm with which the voluntary land conservation group concept has been embraced in very tough times. Comparing the level of involvement and activity with the money directed to Landcare
Landcare groups, it is clear that the Landcare program has been a bargain for Australia.

Landcare groups have enormous potential to generate commitment to, and to play a key role in generating, exchanging and applying the knowledge necessary for, the development of more sustainable systems of land use and management in Australia. However, commitment is only one ingredient for developing sustainable systems of land use and management, the others being resources, knowledge and processes for planning and managing change over large areas and long time frames. In other words, Landcare groups have no hope of achieving sustainability, or even the much more limited goal of fixing land degradation, on their own. Other complementary initiatives and reforms are essential.

The problems and constraints limiting Landcare groups are also those of rural communities—lack of time, people, knowledge and resources. Economic and social decline in rural areas is inextricably linked to environmental issues. While National Landcare Program funding and other government initiatives have been extremely important in fostering landcare activity, a substantial increase in funding for land conservation in Australia is essential, to provide the people involved in landcare with support, training, knowledge and skills, and to assist communities to implement projects of substantial community benefit. Attracting additional resources will not just require better figures to justify expenditure; it means involving a much greater proportion of the Australian community in activities such as urban landcare, land and water monitoring, education programs and employment initiatives.

While it is reasonable to expect good land management to prevent land degradation, it is simply unrealistic to expect farmers to pay for rehabilitating degraded land and water resources unless it will be profitable for them to do so, which is rarely the case. So more and better research into profitable and sustainable land management systems is essential, research which involves land users as key players from the start of the research and extension process. This may well require joint involvement in participatory training from researchers, farmers and extension staff to erode some of the institutional and disciplinary boundaries which limit possibilities under existing systems.

The problems of rural Australia will never be overcome by remote control; they must be tackled with conviction by the people of rural Australia. The first step in this process is community awareness and participation. The fact that there are almost two thousand Landcare groups scattered all over the country, compris-
ing perhaps one in four land users, and that the number continues to increase in tough economic conditions, is cause for great optimism.

Landcare is uniquely Australian. The combination of relatively unstructured community participation at a district level, tackling a broad range of environmental and production issues, supported by government funding and major non-government organisations including farmers and conservationists, is without parallel in other industrialised countries.

While flying and driving around Australia, talking to individual land users and attending Landcare group activities in all states, two impressions are overwhelming. The first is the awesome scale of the task to develop better systems of land use and management. The challenge is economic, ecological and social. The second dominating impression is the time, energy and thought being put into landcare by thousands of very committed land users and dedicated people working with them. The community participation platform is being built and consolidated in very testing times.

If we can back up the initial commitment and enthusiasm which has spawned landcare with sustained support, Landcare groups will have a profound influence on prevailing attitudes and cultures within rural communities, creating the potential for lasting improvements in management of land and water resources.

We will also have set an example of how governments and communities can work together to evolve a more sustainable balance between human activity and nature. This is truly one of the most important issues facing the world over the next generation.
I can report that this part of Queensland is in the fierce grip of the best season for twenty years. There are dangerous possibilities that some farmers will slide back into credit with a few descending as far as self-reliance—a frightening prospect.

Doom and gloom prevail as accountants are consulted over an unexpected return to the payment of tax, a habit most farmers thought they had successfully kicked. There are also widespread rumours of trauma outbreak, brought on by agonising decisions over which farm equipment and picnic race outfits should be replaced. This is dividing previously united families, but social adjustment agencies claim that they can meet this challenge and are planning a series of strategy workshops.

Thankfully this unseasonal turnaround appears not to be widespread, leaving the resilient majority of farmers comfortable in the warmth of the public concern for their inherent adversity and secure in the embrace of government programs. Vive Hanrahan!

Jock Douglas
Notes

1. With the possible exception of larger producers enjoying hefty subsidies in the European Community and the United States.
2. Daly (1991) refers to the concept of scale or carrying capacity as the physical size of the human presence in the ecosystem, measured by population times per capita resource use. So reducing the scale of the human economy could involve reducing population levels, or per capita consumption, or both.
3. Myers 1985
4. Myers 1985
5. Myers 1985
6. Oil is about 6 million tonnes per year, 30 per cent of it deliberate dumping, 46 per cent run-off from land—mainly cities, and 24 per cent in accidents at sea (Myers 1985).
7. But beware of national averages, because inequities between the wealth of the top fifth and bottom fifth of the population in poor countries are just as stark as in rich countries. At least one-third of Americans over the age of 40 are obese, and in 1982 British citizens spent nearly five times more on slimming aids than the total of donations to private international aid agencies such as Oxfam. An intake of less than 1500 calories per day leads to severe malnutrition, which affected about 435 million people in 1974–76, a figure which could rise to 588 million by 2000. Each year 40 million people die from hunger and hunger-related diseases—equivalent to 300 Jumbo jet crashes a day with no survivors and almost half the passengers children (Myers 1985).
9. In Britain in 1961, there were 127 pesticide products based on 14 chemicals, but by 1985 there were more than 3000 products based on 420 active ingredients (Clunies-Ross and Hilary 1992).
11. For example, in California in the 1970s, 24 out of the 25 major agricultural pests were ‘secondary’ pests which had emerged because their natural predators had been dramatically reduced by pesticides. While insect pests destroyed seven per cent of US crops each year in the late 1950s, pre-harvest losses doubled by the 1970s, despite a twelvefold increase in insecticide use. In addition, some pests always survive, and natural selection ensures that pesticide resistance is inevitable. The United Nations
12. An issue which is possibly even more disturbing, however, is the increasing research effort which industrial agriculture is putting into 'biotechnology', which used to be called (more accurately), 'genetic engineering'. Transnational corporations (primarily the chemical companies, which have recently purchased large sections of the seed industry in the interests of vertical integration and increased control over the food production system), are sponsoring research programs aimed at breeding herbicide tolerance into crops—to encourage increased use of their product, and to ensure that farmers return each year to buy the related seeds or seed coatings. The next step is to genetically engineer varieties that can make better use of synthetic fertilisers and which are resistant to various pests and diseases. This seems fine at first glance, but as well as accelerating the reduction of genetic diversity and increased chemical dependence already occurring in industrial agriculture, it will introduce new organisms into the environment. Resistance to transgenic biopesticides has already occurred in laboratory experiments, and all evidence suggests that strong selection pressure for resistance will develop new problems as soon as this technology is commercialised (problems mainly for farmers and the environment, not agri-industry, as it will create a market for new chemical/genetic quick fixes). In addition, some geneticists are concerned that genetically engineered plants may transfer their herbicide resistance to weeds, they may mutate and harm beneficial insects as well as pests, and that their long-term impact on the natural balance of predators and pollinators is simply unknown (Clunies-Ross and Hildyard 1992).

13. Indonesia, for example, has introduced IPM to rice farmers on a national scale, using a community-based approach which shares many principles with Landcare and which is described in detail in a fascinating study by Elske van der Fliert (1993). There is also a general move within Australian agriculture towards IPM, accelerated by farmers' needs to lower input costs and for more effective pest management. This issue is discussed in more depth by Barr and Cary (1992: 179-206) and in a short article by Harry Combellack (1993) who suggests that much agricultural research work in the field of weed science has been of little use in helping farmers with everyday decision making, especially as they move from a philosophy of 'control' to 'management'.


15. It is not the only example of course. For descriptions of a range of grassroots initiatives from all around the world, stimulating wiser use of natural resources, see Ghai and Vivian (1992), and Conroy and Litvinoff (1988).

16. Beale and Fray 1990

17. In another allegory pointed out by Ted Lefroy and colleagues, the length of white settlement is equivalent to a day and a half out of a year compared with the known period of Aboriginal occupation in Australia (Lefroy et al 1992).

18. The nature and uniqueness of Australia's natural resources are well described in Chapter 2 of Doug Cocks' book *Use with Care*, University of New South Wales Press 1992.

19. Cocks 1992

20. Lines 1991; Beale and Fray 1990


22. Hughes 1987

23. Barr and Cary 1992: 279. Squatters were opportunistic graziers who took up grazing 'runs' in a largely uncontrolled expansion across the landscape (from the 1840s to the 1870s in the higher rainfall areas of south-eastern Australia, and through to the turn of the century in the arid zone), mostly with the intention of making a quick fortune before returning to England.
The impact was devastating. They dispossessed the native population. The grasslands were overgrazed and debilitated. Few squatters held tenure long enough to notice or record the changes on their runs. The obvious exploitation by the squatters was eventually ameliorated by more socially constrained self-interest as social structures developed. Successful squatters, with security of tenure, indulged their genteel aspirations by building permanent housing, even mansions. The unstated assumption of these self-appointed gentry was that their social position and the resources on which it depended were founded on a permanent system of farming. It was social, not ecological, pressures that stressed the squatters' farming system beyond the limits of its own resilience.

24. One could argue that this is still taking place—for example in the Burdekin catchment in Queensland and in the Coal River valley in Tasmania.

25. Rolls 1969
26. Campbell 1992a
27. Bradsen 1988. John Bradsen, an environmental lawyer from Adelaide University, in a landmark study commissioned by the National Soil Conservation Program of soil conservation legislation in Australia, found passionate calls for action in the parliamentary records of state and federal parliaments from the 1940s and 1950s.
28. Bayliss-Smith 1982. Australia exemplifies this point. Australian plant breeders for years have collected seed from southern Spain, Morocco, Greece and Israel, precisely because the soils and climate are so similar to south-western Australia. Yet the farming systems could not be more different—one dominated by goats, olives, almonds, grapes and shrubs, the other a sea of wheat dotted with mobs of sheep—because it was settled by the British, not the Moors.
29. Many of Australia's problems of soil erosion and loss of perennial native vegetation stem from the impact of cloven-hoofed grazing and browsing animals, which were ill-adapted to Australian conditions, especially the climate, in comparison to the indigenous soft-footed marsupial herbivores. Paradoxically, kangaroos now contribute to overgrazing during dry spells in the rangelands, because their population levels have increased with the provision of permanent water in troughs and bore drains installed by pastoralists. The solutions to rangeland degradation are not as simple as just removing the sheep, cattle, goats, donkeys, camels, pigs and horses and reverting to grazing systems based on kangaroos and emus. We cannot wind back the clock to pre-European settlement conditions, we cannot eradicate all the introduced plant and animal species, we cannot replace the species we have lost or the soil which has washed and blown away. Accepting the present situation as a starting point, we can move to develop farming systems which learn from the structure, functions and processes of undisturbed Australian ecosystems, and which will inevitably be more uniquely Australian (see 'Paradise' case study, Chapter 6). Kangaroos and emus could potentially be the basis of much more sustainable land use systems, and some small scale initiatives are underway in various places, but there remain complex moral, economic and technical issues to be resolved if we are to move to pastoralism based on native herbivores on a large scale. John Cameron and Jane Elix provide an excellent discussion of these issues in relation to wild harvesting of the three most common kangaroo species (the Red Kangaroo Macropus rufus, the Eastern Grey Kangaroo Macropus giganteus and the Western Grey Kangaroo Macropus fuliginosus) in their book Recovering Ground, Australian Conservation Foundation 1991.
31. Owing to the mis-matching of land resource assessment methods and data sets between states, national aggregations of land status are problematic in Australia. The figure of 52 per cent of agricultural land in need of some form of treatment for land degradation is oft-quoted but extremely rubbery. As Barr and Cary (1992) point out, it was derived (in a 1977 commonwealth-state collaborative study) by taking soil conservationists' subjective estimates of whether any degradation occurred within
sample areas of two-kilometre radius and, if so, assuming the whole area as needing treatment. Aggregating this to the national level, it was translated into public statements that half the land was degraded, creating visions of vast gullies and salt pans. But, as the study took a fairly narrow view of land degradation, ignoring the status of native vegetation, species losses and issues such as acidification, and as it was difficult to ensure consistent assessment standards between states (which meant that the resulting land degradation maps had stark contrasts along state borders), it is likely that the actual extent of degraded land is much larger than 52 per cent—certainly if the rangelands are considered. Such a figure does more harm than good in terms of explaining such an issue. According to Dr Doug Cocks of CSIRO (1992), dryland salinity alone is a much greater threat to Australian agriculture than climate change.

32. The Standing Committee on Agriculture, cited in Johnstone 1993b. Farmer, historian and poet Eric Rolls (1992) eloquently describes an outbreak of blue-green algae in the Darling River in November 1991, which caused 1000 km of this great river to turn a bright, poisonous green (see photo opposite page 281) until a lucky December flush of fresh water washed it away. This beautifully written article includes a thoughtful discussion on the complexities and the politics of improving water management on Australia's river systems.

33. Department of Agriculture, Western Australia 1991. These are estimated reductions in agricultural production (for example, reduced wheat yields or wool cuts) caused by problems such as salinity, erosion, acid soils, soil structure decline, waterlogging and so on. Losses in GVAP say nothing about the cost of rehabilitating degraded areas or the loss of native species or the decline in the productive capacity of natural resources or the opportunity cost of not maintaining natural capital in good condition.

34. Eckersley 1991
35. Hardin 1991
36. Economists in the Environment Department of the World Bank recently compiled a collection of essays (its contributors including two Nobel Laureates in economics) analysing global development experience, called Building on Brundtland. The opening essay reiterates that human activity has grown to the point where it has either filled the ecological space available or will have within a few years, and that thus we need to distinguish between growth (increasing the scale of human activity) and development (increasing the potential and the benefits flowing from a given level of activity), with the former no longer an environmentally feasible option. Even if it were feasible, the authors (Goodland, Daly and El Serafy 1991) disagree that the three per cent increase in annual per capita income growth proposed by the Brundtland Commission (and endorsed by the World Bank) would alleviate poverty: 'annual 3 per cent global rise in per capita income translates initially into annual per capita increments of $633 for USA; $3.60 for Ethiopia; $5.40 for Bangladesh; $7.50 for Nigeria; $10.80 for China and $10.50 for India. By the end of 10 years, such growth will have raised Ethiopia's per capita income by $41... while that of the USA will have risen by $7257.'

In another contribution to Building on Brundtland, Timbergen and Hueting cast further doubt on the feasibility of sustained economic growth, pointing out that there are only two ways to increase economic output—by increasing the number of people employed (which does little for average per capita income) or by increasing the productivity per worker, historically the main source of growth. But about 70 per cent of economic growth through productivity increases has come from a few key activities—oil, petrochemicals, metals, agriculture, public utilities, road building, transport and mining—the most environmentally harmful activities.

37. Hueting 1991
38. Peskin 1991. A range of measures has been proposed to ensure that national accounts more fully reflect the impact of human activity on its natural resource base, including: pragmatic refinement of existing accounting conventions (El Serafy 1991, Mäler 1991); recognising depreciation of natural resources (El Serafy 1991, Repetto et al
1989); adjusting income for depletion of depletal resources (El Serafy 1991); compilation of shadow or ‘satellite’ accounts based on physical flows of matter-energy, which trace the movement of natural capital through the system and its conversion, diminution and/or degradation, and which are being used more or less officially in Norway and France (Pesklin 1991); and finally the development of alternative accounting frameworks from scratch (Pesklin 1991, Hueting 1991).

39. Cocks 1992. This is not to suggest that Australia’s resources and the benefits flowing from them are equitably distributed or that all Australians enjoy a quality of life second to none. But we have the resources and the potential to provide a high standard of living for all Australians, even if the existing political and economic system seems incapable of ensuring equity among all sectors of Australian society. As former Prime Minister Malcolm Fraser has pointed out (Sun Herald 15.12.91), the current direction in the distribution of wealth is towards greater inequity— in 1980 the richest one per cent of Australians owned ten per cent of total wealth, but this had increased to twenty per cent by 1990.


41. ABARE 1991. A farm business profit/loss is the net result after costs, depreciation and an allowance for family labour are deducted from farm cash income—the amount remaining being the farmer’s margin for new investment or saving for hard times.

42. Fisher 1993

43. ABARE 1992. Broadacre farms include the cereal cropping and other dryland cropping sectors, the sheep for meat and sheep for wool sectors and the beef sector, which together account for more than 70 per cent of the gross value of agricultural production and which occupy the vast majority of the land used for agricultural and pastoral production. This figure needs to be treated with some caution as it is merely an average. More than one-third of broadacre farms have no debt, so the average debt level for those in debt is much higher than $100 000.

44. The graph is from Chisholm 1992, and the quote from Fisher 1993

45. Economic Planning Advisory Council, 1988. Australian agriculture has received decreasing protection since the 1950s and is now one of the least subsidised agricultural sectors in the industrialised world. Table N.1 compares agricultural subsidies in industrialised countries and for groupings such as the EC (European Economic Community) and the OECD (Organisation for Economic Cooperation and Development).

European Community, Japanese and American subsidies, which represent a huge distortion for world markets in agricultural commodities, are represented as a proportion of the Gross Value of Agricultural Production (GVAP). These subsidies are of the same order as those applying in other countries in Europe, Canada and Scandinavia, but they are significantly higher than the subsidies applying in Australia and New Zealand, the leading Cairns group countries. Reform of European agricultural policy should be of vital concern throughout the world, particularly to farmers. Such concern arises from the impacts of European and American surpluses dumped on world markets at prices well below the cost of production in Europe or America, with governments (ie taxpayers) picking up the tab for the difference between the prices received by farmers and the prices their produce is sold for on the world market. The United States Export Enhancement Program (EEP) increases average prices to US wheat producers above export prices, which leads to increased US production and exports, which depress world prices and thus the returns to unsubsidised producers in other countries. Furthermore, markets targeted by the EEP tend to have lower prices than other markets, and thus the direct impact of the EEP on prices received by producers in countries such as Australia can readily be seen (Roberts and Whish-Wilson 1993).
Table N.1 Agricultural subsidies in various countries, 1979–91 (After Buntzel
1993)

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<th>Country</th>
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46. Chisholm 1992
47. The precise figure for the decline in the number of farms is difficult to determine. Australian Bureau of Statistics figures show a decline from 250,000 farms in 1970 to 125,000 in 1991, but during this period the ABS changed the definition of a farm from a business earning $5000 in a year to one earning more than $20,000 from primary production, which meant that by definition 50,000 farms disappeared in one stroke, and even more would disappear from the charts given present farm incomes. According to National Farmers Federation figures, the number of farms has fallen by 69,400 (34 per cent) since 1950–51, although the number of people employed in agriculture has declined by only 22 per cent over the same period. It is interesting to note that this decline in farm numbers is not as high as in Europe and the United States, despite their massive farm subsidies. According to The Economist (19.9.92, p. 20), Europe’s largest agricultural producer, France, has only half the farm population and 38 per cent fewer farms today than in 1970 (it has lost 78 per cent of its farms since 1954). The number of farms in Germany (West) decreased from 1,620,000 in 1960 to 600,000 today, and EC subsidies are received by only 20 per cent of the farms in Germany (Thomas 1999, cited in Campbell et al, unpublished). The United States has lost a third of its farmers since 1960 (two-thirds since 1950), compared with Australia’s 18 per cent reduction since 1960 (NFF 1993).
48. Share, Campbell and Lawrence 1991
49. Lawrence and Williams 1990
50. Bryant 1992
51. Andrew Campbell (1992a), in his third annual report as National Landcare Facilitator. The National Landcare Facilitator project was an initiative proposed by the Australian Conservation Foundation/National Farmers’ Federation soil conservation task force in early 1989, when the increased funding for landcare groups and the Decade of Landcare was announced. Basically the role involved providing feedback from landcare groups and activities all over the country to policy makers at the national level, evaluating the effectiveness of landcare groups and measures supporting them, and networking to lubricate the creaky parochial structure of state and federal agencies involved in natural resource management. Andrew Campbell was National Landcare Facilitator from July 1989 to July 1992, and Helen Alexander commenced in the role in March 1993. The observations and findings of this project are described.
in detail in the annual reports available from the Department of Primary Industries and Energy in Canberra.

52. Bradsen 1992
53. Brewin 1980
54. Roberts 1991
55. Bradsen 1988
56. Hartley, Riches and Davis, 1992
57. Robertson 1989. Dr Graeme Robertson was Commissioner for Soil Conservation in Western Australia, Director of the Division of Land Management in the Western Australian Department of Agriculture and a key architect of the legislation providing for Land Conservation Districts run by local voluntary committees, during the 1980s and early 1990s.
58. Goss 1993
59. Campbell 1991. 'Quango' is short for quasi autonomous non-government organisation, usually a hybrid of government and private interests working in the public interest not for the purposes of profit.
60. With some evolutionary changes in its name and focus (to the Farm Tree and Land Management Group program) and in its joint umbrella organisations—the VFGA became the Victorian Farmers Federation and the GSC was absorbed into Greening Australia, Victoria.
61. The ongoing saga of this amalgamation (in effect from about 1984 onwards) is absorbing for students of politics, personalities and public administration, and hopefully someone will be game enough to write it one day. It is mentioned here only because one offspring from this shotgun marriage was Landcare.
62. The pot-pourri of Victorian government incentive schemes for land conservation from 1950–92 and some of the lessons emerging from experience with these schemes are reviewed by Findlay 1992.
63. The word ‘landcare’ was first coined in Victoria when Marta Hamilton proposed it as a name for the newly created Department of Conservation, Forests and Lands in 1984. It was recast and registered as ‘LandCare’ by the Land Protection Division of that department for the community land conservation group program in 1986. Queensland uses the two words ‘Land Care’ for its committees, the statutory South Australian groups are called Soil Conservation Boards and the statutory Western Australian groups are called Land Conservation District Committees—‘Landcare’ is used in the other states and territories. When the program began to establish a national focus, the word ‘Landcare’ came to be commonly used, and is used throughout this book. We use Landcare with a capital ‘L’ to refer to the programs involving voluntary community land conservation groups and associated programs and activities in all states and nationally, and with a small ‘l’ when the word is used in the sense of a broader view of land conservation.
64. Dr Doug Cocks of CSIRO Division of Wildlife and Ecology, in his book Use with Care (Cocks 1992, p. 249), discusses the problems for wise management of natural resources which stem from Australia’s federal system. He has been known to define a state border as ‘a line on the ground which is impermeable to ideas’.
65. The Lockyer Valley Watershed Management Association can be described as a landcare group in the sense of a voluntary community group integrating research, awareness raising, farm and catchment planning, demonstration works, in tackling a range of land conservation issues within a defined district-scale area.
66. Andrew Campbell describes the development and implementation of the whole farm planning process on a number of demonstration farms in detail in Planning for Sustainable Farming: The Potter Farmland Plan Story, and reviews the evolution of farm and catchment planning processes in Agriculture, Environment and Society—the Australian Experience, edited by Geoff Lawrence, Frank Vanclay and Brian Furze.
67. Bradsen 1988
68. Farley and Toyne 1989
69. Much of this material is gathered in the manual *Working with Landcare Groups*, which arose from the landcare facilitators and coordinators workshop at Hamilton in March 1992 (Oates and Campbell 1992). A more detailed and more theoretical (without being inaccessible) discussion of the dynamics of community land conservation groups can be found in *Working Together for Landcare* by Shankaria Chamala and Peter Mortiss (1990). The factors influencing the effectiveness of landcare groups are also discussed in detail in the Group Extension Workshop papers (Brewin; Howell and Robinson; and Keith and Roberts) in the proceedings of the Fifth Australian Soil Conservation Conference at Perth in March 1990, and in Carr (1992).

70. From Carr 1992a
71. The definition of a committee as a 'cul-de-sac to which ideas are lured and quietly strangled' is particularly apt in these cases, which are unfortunately all too common within landcare and should be a key focus for facilitation interventions.

72. The background information in this section is from Campbell, Lefroy and Melvin (unpublished).

73. The wheatbelt is essentially that part of the Western Australian agricultural area lying east of the 600 mm rainfall isohyet, and west of the 275 mm line, so it is a broad diagonal band from north-west to south-east across the bottom left-hand corner of Western Australia. The Kalannie–Goodlands LCD is on the north-eastern fringes of the wheatbelt, with a consequently lower average rainfall of about 300 mm per year.

74. The relationship between clearing and dryland salinity has been likened by Cocks (1992) to the relationship between smoking and lung cancer—impossible to prove conclusively, but connected by so much evidence that it seems prudent to stop. In essence, replacing perennial, deep-rooted trees, shrubs and grasses with annual crops and pastures has meant that much more of the rain that falls seeps through the soil to the groundwater, which gradually rises, bringing with it dissolved salts, which concentrate initially in the lower parts of the landscape, rendering soils infertile and prone to subsequent erosion.

75. CSIRO 1991
76. Lefroy et al 1992
77. Lefroy et al 1992
78. Richard George (1991) describes research on the effectiveness of tree planting above sandplain seeps, with clear diagrams and before-and-after photographs, in an article in the *Western Australian Journal of Agriculture*. His research has shown that a single belt of trees only 60 m wide just upslope from a sandplain seep was sufficient to prevent groundwater entering the seep and within four years soil salinity levels had dropped to the point where a wheat crop could be grown on previously bare and barren soil. The size and design of the tree plantings required will of course vary for each situation.

79. The history of pests in Australian agriculture and the issues associated with developing and implementing integrated pest management strategies are described in Rolls 1969 and Barr and Cary 1992.

80. Australian for 'extremely full'.
81. The latest in a series of machines for direct seeding of trees invented by western Victorian farmer and farm tree pioneer Richard Weatherly. There has been an explosion in the number of direct tree-seeding machines on the market in Australia in the 1990s, most of which are described in *The Australian Farm Journal*, January 1993.

82. One of a series run by the Tasmanian Department of Primary Industries (Letts 1992)
84. Barr and Cary 1992
85. Barr and Cary 1992
87. In other words, it was compulsory to clear the land in order to be granted title to it. It
is important to realise that, for most people farming in Australia today, clearing land has been either a requirement of tenure or encouraged by governments through tax deductions, for most of their farming career. Official concern about the long-term effects of land clearance is a creature born only in the 1980s and is still fragile, with the possible exception of South Australia.

98. Many Australians still believe that Aborigines were skinny nomads who failed to invent and practise agriculture, or build permanent settlements. But a decade of paining-taking research by Monash University ethnobotanist, Dr Beth Gott, supports a very different view. She suggests that Aboriginal tribes in southern and western Victoria were sedentary for lengthy periods, exploiting a much larger variety of food plants than the Europeans who followed, in particular native tuberous plants such as Mumong (*Microceris lanceolata*), which women harvested with digging sticks. Early records suggest that the harvesting practices of the Aborigines served to expand the area of these favoured plants in a form of casual agriculture. Modern nutritionists suspect that the Aborigines were actually taller and healthier than the Europeans of the day (O'Neill 1993), and they did not have to work as hard to survive in Australian conditions.

99. For various accounts of the more sordid and tragic aspects of the relationship between early European settlers and Aboriginal communities, see Lines 1991.

100. The area subsequently suffered one of the worst floods this century in spring 1993.
101. Curtis et al (1992) analysed Victorian Landcare group annual reports over three years from 1988–89 to 1990–91. Among their findings was the point that Landcare groups reported an average of 148 visitors per year to their activities. The sample total for 56 groups of about 8000 visitors suggests a considerable level of community exposure (at a direct, personal level) to Landcare group activities, although of course a significant proportion of these visitors would already be involved in landcare. Subsequent analysis of 117 1991–92 reports by Curtis et al (1993) extrapolated these visitor numbers for the 407 Victorian groups (as at September 1993), suggesting a possible 17 000 people either assisting or studying the work of Landcare groups in Victoria. This figure is rubbery, as the groups submitting annual reports may not be typical, but it hints at a very significant multiplier effect of Landcare group activities, at least in terms of community awareness.

102. White 1992

103. Some of the classics in this vein are Leopold's A Sand County Almanac, Berry's The Unsettling of America, Jackson's New Roots for Agriculture, and Roberts' How Green Was My Mallee and The Birth of Land Care. Several of these authors point out that warnings about the dangers of over-cropping, over-grazing, clearing and cultivating vulnerable soils have been made for thousands of years. The state of existing farmlands in many parts of the world is testimony to the fact that eloquent warnings, prophecies and calls for change are not sufficient—or as Brian Roberts says, 'one thing man can learn from history, is that man does not learn from history'.

104. For example: soil acidification, soil structure decline, nitrate and phosphate contamination of groundwater, eutrophication of rivers, lakes and estuaries, rural tree decline and loss of biological diversity.

105. Bradsen 1988, after reviewing soil conservation legislation throughout Australia, concluded that more enlightened regulations fostering a cooperative adjustment in land management standards, as opposed to penalising transgressions with punitive provisions under common law, is a much more promising direction to take in enshrining the concept of sustainability in statutes—the formal expression of the values of a society.

106. White 1992

107. White 1992, Lubiczenko and McWaters 1992. The GREEN program was designed by Professor Bill Stapp, 2050 Delaware Ann Arbor, Michigan 48103 USA: Students from Australia, Germany and the USA monitor water for temperature, pH, conductivity, turbidity, suspended solids, total nitrogen, total phosphorus and chlorophyll A.

108. An article by Chris Baines in BBC Wildlife (July 1992) makes this point more provocatively in the European (or at least British) context: 'Are the farmers who did the damage really the best people to take up the task of conservation management? They claim, of course, to be the true custodians of the countryside, possessors of the folk wisdom that helps them understand the land. That may have been true once, when farming was ruled by season, soil and sustainability, but a generation of chemical dependence, mechanical brutality and short-term planning has left many of them punch-drunk… While I have no doubt that most farmers want to care for the countryside and genuinely believe they can, the sad truth is that years of measuring performance by crop yields has cramped their style.'

109. Even viewing aerial photographs of their property can be confusing for some land users. At one farm planning short course during the Potter Farmland Plan project at Hamilton in the mid-80s, we provided dyeline copies of aerial photographs for each farmer. In a couple of cases the photopositive had been put in the dyeline machine upside down, which meant that the farmers received a mirror image of their property—so that their house was suddenly on the east side of the farm instead of the west, and everything was back to front. As one farmer remarked laconically—'It sure does look different from the air.'
110. White 1992
111. White 1992
112. Funtowicz and Ravetz 1991
113. This quote and those which follow are from Keith Bradby's paper to Greening Australia's Catchments of Green Conference at Adelaide (Bradby 1992). Keith stresses that this paper presents his version of events and that others may have seen things differently.
114. More detail about the Aldgate Primary School program can be obtained from Aldgate Primary School, Fairview Road, Aldgate, SA 5154. Fax +61(0)8 339 4308; Ph (08) 339 2377.
115. Campbell 1992a
116. Wegman 1989
117. Duxbury 1992. According to a survey of Curtis et al (1993), 34 per cent of Landcare group members in Victoria are women, 47 per cent of group secretaries are women, but only 10 per cent of chairperson positions were occupied by women. They also found a significant positive relationship between female membership and group effectiveness.
118. Lia Bryant (1992) notes that 'women on farms have better prospects of employment as a result of off-farm work and higher levels of education', and she discusses a study on the Eyre Peninsula, in which more than half the women interviewed had regular off-farm work, compared with less than one-sixth of the men interviewed.
119. Cock 1992
120. An excellent resource book called 'Women in agriculture: part of the team' was developed by women in the Victorian Department of Agriculture and Rural Affairs. It outlines how any government agency or organisation can more effectively get their message to women.
121. Some networks for rural women and their contacts include: Australian Women in Agriculture Inc, C/Cathy McGowan, Wodonga (060) 24 6834; Rural Women's Network, contact Anna Lottkowitz, Victorian Office of Rural Affairs; WA Bush Buzz (for outback women), contact Jenny McIntosh, PO Box 14, Meekatharra 6632; Remote Rural Women's Network (NT), contact Meredith Gazeworth, PO Box 101, Noonamah 0837; NSW Rural Women's Network, contact Margaret Carroll, 161 Kite St, Orange 2800; SA Rural Affairs Unit, contact Lib McClure, Department of Primary Industries, GPO Box 1671, Adelaide 5001.
122. Training for Community Landcare Technicians is only one part of a comprehensive landcare training strategy, which encompasses technical training in aspects of land management, and various aspects of group facilitation and group management. This training is not just for staff of government agencies, it includes people from local government, farmers, conservation groups and of course Landcare group leaders and members. The training strategy is described more fully in Campbell (1992a).
123. According to Goss (1993), in May 1992, 69 of 132 LCDCs had written goals—considered a minimum condition for effectiveness; and about 48 catchment plans or strategies were to be completed in WA land conservation districts in 1993.
124. Campbell 1991a
125. Ingram and Chapman (1993) compared the characteristics of Dunecare members and beach users, and found some statistically significant differences: Dunecare members tend to be older (as expected as they are mainly adults), more highly educated and slightly more predominantly male (62 per cent, which would be considerably lower than in most Landcare groups). The same study found that the key factors contributing to success in Dunecare groups included the support of the Soil Conservation Service, high skill levels within the group, contact with other Dunecare groups and sources of specialist knowledge, recognition and ownership of the problem, and leadership.
126. For more information on farm management and the economies of conservation
127. A farm secretary remarked that the day after the reserve price scheme for wool was abandoned, her client list dropped from twenty down to eight. She examined her records and found that on each of those twelve properties, her fees were exceeded just by the savings she made in discovering book-keeping errors and fine-tuning cash flow management. Yet the organisation of finance was one of the first things these people cut in response to reduced income. Saving money by slashing fertiliser inputs is often similarly misguided. The trick is to be conscious of where the real earning power is within the farm enterprise, and make sure it is not compromised by false economies.

128. The 1980s saw a resurgence in property planning activity in most states of Australia. A private initiative which made a significant contribution to this resurgence was the Potter Farmland Plan. This project established fifteen demonstration farms in western Victoria from 1984–88, funded by the participating farmers and the Ian Potter Foundation. It aimed to show how ecological considerations could be incorporated into farm planning and land management, to improve productivity and redress land degradation. This project, and the whole farm planning process which it spawned, are described in detail in Planning for Sustainable Farming by Andrew Campbell (Lothian 1991). The project was based on key assumptions:

- That land degradation 'problems' are symptoms of inappropriate land management, and are most likely to be fixed if the required management changes benefit the land user. In other words, conservation and productivity must be complementary. Conservation works for their own sake are unlikely to be widely implemented.

- That any plan is best prepared by the people who have to implement it, which means that the best people to be preparing farm plans are farmers. This does not preclude the benefits of consultation with specialist technical advisers, family, neighbours or consultants.

- That farmers are generalists, used to integrating technical, financial and social information from diverse sources in decision making, so the farm planning process must be capable of dealing with more than just the physical layout of the farm.

- A farm plan is not an ideal map of the farm, but simply an expression of the current state of a planning process, which is dynamic, responsive, ongoing.

129. Property Management Planning (PMP) has been officially adopted by state and commonwealth government agencies as the name for planning which integrates natural resource management planning in the interests of sustainability with farm business planning. In this discussion we use the term 'farm planning' to refer to all sorts of planning at farm level, of which PMP is the latest expression.

130. Soil Conservation Authority 1961, Junor 1987
131. Yeomans 1981
132. Campbell 1989a
133. Western Australian Department of Agriculture 1988
134. Campbell 1989b
135. Campbell 1991
136. Letts (1992) reviews property planning projects funded by the then National Soil Conservation Program (NSCP, now incorporated into the National Landcare Program) all over Australia.
137. Goss 1993
138. It is easy to tell how much a farm plan is used. Firstly, a farmer will be able to find it immediately, it will be dog-eared with evidence of constant use and alterations, and ideally there will be multiple copies of it (or at least the map or photo)—in the farm ute, in the woolshed or machinery shed, in the office and on the back of the toilet door. When a farmer becomes committed to the planning process it becomes relax-
ing and stimulating to continually refine the plan, both to make better use of existing resources in tight times, and to make optimum use of resources when prices pick up and farm improvement is possible again. Having such a plan is a great asset in negotiations with bank managers, is mandatory for claiming tax deductions for land conservation work, and can also help a farmer to ask more penetrating questions of advisers, consultants or researchers.

139. For more information on this process, Viv can be contacted at Box 1260, Subiaco 6008, Australia.

140. From Australian Farm Journal, May 1992

141. Eileen Derrick, Temora grain, wool and prime lamb producer

142. Roy Postlethwaite, St Arnaud grain grower

143. Charles de Fegely, Ararat wool grower

144. Involvement of these agribusiness, finance and insurance organisations has benefits for them also, in being able to use the FM500 groups for product research, pilot marketing projects, feedback on the usefulness and effectiveness of their products and services, and first-hand contact with the experiences of progressive farmers—invaluable market intelligence.

145. From an Australian perspective, the MacSharry reforms are of token value in Europe and effectively useless elsewhere (Campbell et al 1993). Even if the set-aside arrangements for cereals and the reduced livestock densities achieve their desired effect (which is unlikely), the world price for wheat is estimated to rise by 0.2 per cent for each 1 per cent of EC cereal land set-aside, and the world price for beef would rise by 0.4 per cent for each 1 per cent reduction in EC livestock densities (Hester et al 1993). This contrasts with the potential impact of the Blair House Accord—the agreement negotiated between the US and the EC in November 1992 as part of the Uruguay Round of GATT, which included measures to reduce the volumes of EC-subsidised exports and to reduce the tariff equivalents of import duties, as well as cuts to domestic support for agriculture. Hester et al (1993) estimate that if the Blair House Accord were introduced, the world prices for wheat and beef would increase by ten per cent and eight per cent respectively, which would benefit Australian agricultural exports by about $900 million (529 m ECU) a year in the long run.

146. The two books can be obtained for $20 from Farm Management 500, PO Box 1, Bendigo North 3550, Australia.

147. Johnstone 1993

148. Up to 70 per cent of the cost of revegetation projects if conventional fencing is used (Campbell 1991a).

149. Campbell 1992a, p. 48. Total commonwealth funding for this program is $47 million over ten years. As the fencing cost alone is at least $2 billion, the government sponsorship amounts to roughly two per cent of the funds required. This illustrates the magnitude of the task. It also shows that government financial incentives in the form of direct grants are necessarily catalytic, and that more far-reaching financial incentives (for example tax rebates) are needed to make large scale rehabilitation more feasible.

150. Campbell 1991a

151. The quotes in this section are all from Jan and/or Garry English.

152. David Bicknell of the Department of Agriculture in Esperance has calculated an internal rate of return of about 40 per cent for this investment on 'Jangarri'. Research results supporting the benefits of shelter on the Esperance sandplain are described in Bird et al 1991.

153. We are indebted to Ted Lefroy and Dean Melvin for much of the information in this section, which is expanded on in an unpublished paper by Andrew Campbell, 'Ted Lefroy and Dean Melvin: Perennials and Paradise' (1992).

154. In Australia it is common for land types which are relatively homogeneous in terms
of landform, soils, drainage and original vegetation, to be known by the name of the dominant native tree species. For example, land which formerly supported a community of Red Gums (E. camaldulensis) is often referred to as 'red gum country', even though most of the original trees may have disappeared.

155. Carter and Findlater 1989. In another study (Marsh and Cater 1983), removing the dust fraction from the top 8 mm of soil resulted in yield reductions of 12-25 per cent in the subsequent cereal crop, and even when only the top 4 mm was removed there was still a yield loss of 8-25 per cent.

156. Bird et al 1991
157. DSE stands for Dry Sheep Equivalent, a measure of relative stocking density. One DSE exerts the same pressure on the land as one adult wether (castrated male sheep).

158. Lefroy et al 1992
159. Bird et al 1991
160. Haines 1992
161. George 1991
162. Campbell, Lefroy and Melvin (unpublished)—energy-efficiency analysis according to the methodology of Pimentel 1984
163. An agroecosystem refers to a farming system (soils, water, plants, livestock, people) and its interactions with the environment in which it is situated (Conway 1985).
164. Bob Purvis's ideas and philosophy are outlined in an article published in the Australian Rangelands Journal in 1986. Rangelands as discussed here are non-arable lands which are mainly used for grazing sheep and cattle on native vegetation. According to Cocks (1992), rangelands occupy at least two-thirds of Australia, of which 63 per cent is sheep and cattle grazing on native vegetation; 21 per cent is vacant Crown land, twelve per cent is Aboriginal lands, three per cent is conservation reserves and one per cent is used for defence and other purposes.

165. Bastin 1991 describes in detail the soil conservation work done on Atartinga over the years.
166. Bastin 1991. There are few areas left in Australia where we are able to be purist in insisting on indigenous species only. Most ecosystems have been severely modified over the last century and there is no hope, nor much sense in attempting to recreate a pre-European settlement Arcadia. But we have much to learn from the form, structure and functions of natural ecosystems in any area, which can give us some clues about the characteristics of land use likely to be more sustainable. On Atartinga, Buffel grass plays a crucial role as an early coloniser, a soil stabiliser, a source of valuable fodder, and fuel for fires which are needed to re-establish a 'more natural' plant community.

167. For a comprehensive critique of the limitations of neoclassical economics—the dominant paradigm in the industrialised world today—and some alternative ways of looking at the economics of environmental issues, see Costanza 1991, and Daly and Cobb 1989.
168. Cocks 1992
169. Daly and Cobb 1989
170. Cocks 1992
171. Cocks 1992
172. Daly 1991
173. Pearce and Turner 1990
175. Green economics is a broad term which embraces many schools of thought, but it is used here to refer to general tenets of a Green economic and political philosophy, which are less radically opposed to the status quo than other philosophical and theoretical positions such as deep ecology, social ecology, ecosocialism and ecoanarchism.
176. Eckersley 1992
177. Daly and Cobb 1989
178. Eckersley 1992
181. Eckersley 1992 p. 144. The economic value of international cooperation to tackle environmental issues was illustrated by van Ierland (1991), in examining the issue of acid rain-causing emissions in Europe. Using the standards already established by the EC, van Ierland applied a linear optimisation model to several abatement scenarios involving different degrees of international cooperation, to compare the impacts of each scenario on the total abatement costs and damage costs for each country, and for Europe as a whole. He showed that there were significant advantages (in terms of reduced costs for the same level of abatement) for almost all countries to be obtained through cooperation — especially between Eastern Europe and Western Europe. Of course air does not observe national boundaries, which means that if one or two key countries choose not to cooperate, the incentive for others to act is significantly reduced — there are no prizes (in fact there are significant costs) for countries to be 'first cab off the rank' in instituting new abatement measures, unless all other countries quickly follow suit. The same might be said for the concepts for reducing throughput proposed by Daly.
182. van der Ploeg 1991
183. van der Ploeg 1990
185. The issues involved in nature conservation on farms are thoroughly canvassed in Roland Breckwoldt's Wildlife in the Home Paddock and The Last Stand. Peter Johnstone and Alan Don's book Grow your own Wildlife presents a series of case studies of private land management for nature conservation (in particular for wildlife on farms). Rob and Steve Davidson's book Bushland on Farms — do you have a choice? also presents a series of case studies on integrating nature conservation with production.
186. Rogers 1982
187. For example, Evenson, Waggoner and Ruttan (1979), reviewing the economics of publicly funded agricultural research in America from the 1940s to the 1970s, found an average annual return on investment of the order of fifty per cent, although some projects yielded vastly higher returns. In Australia, Ralph (1993) reports on a CSIRO (Commonwealth Scientific and Industrial Research Organisation) study of a range of current CSIRO research projects, which found an average benefit/cost ratio to 1990 of 4.5, and a benefit:cost ratio of 13.8 when anticipated future adoption of the respective innovations is taken into account.
188. Rogers 1983, Röling 1988
189. Rogers 1983
190. Röling 1988
191. Goss 1979
192. Chambers and Jiggins 1987a
193. Vanclay 1992
194. Chambers and Jiggins 1987a&b, Conway and Barbier 1990

197. Pretty 1993, Pretty and Chambers 1993

198. Pretty and Chambers (1993) go on to list examples from many countries where these conditions, or conditions approaching them, can be found.

199. Funtowicz and Ravetz 1991


201. Most states have initiated training programs relevant to landcare group facilitation, the most comprehensive at this stage being in Western Australia, where the Community Landcare Branch of the Department of Agriculture delivered about 2000 person days of group skills and technical training in 1991 and 2158 days in just the first five months of 1992. This training is described in more depth in Campbell (1992a).

202. Carr 1992b. At the macro level, Anna Carr’s findings are supported by the conclusions of a consultancy commissioned by the National Landcare Program to review the justification for national funding of Landcare facilitation and coordination projects. The consultants found that national funding for a network of Landcare facilitators and coordinators is easily justified on the basis of the influence of these positions on the effectiveness and achievements of Landcare groups (Rush et al 1992).

203. A ‘gofer’ is a person employed for general duties, to ‘go for this’ and ‘go for that’.

204. There are 883 local governments (including 47 County Councils in NSW) in Australia, administering more than 4.7 million square kilometres of land, directed by about 10 000 councillors, employing a permanent workforce of about 170 000 people, carrying out some 140 different functions as prescribed under the principal Local Government Acts in each state. Local governments are also encouraged to deliver other functions under various state and commonwealth programs—for example in 1988-89 the commonwealth allocated $267.4 million to local governments in the form of roads assistance (Osborn 1990). Campbell (1992a) and Goss (1993) list some promising landcare initiatives of local governments, and Deane and Osborn (1991) discuss the potential roles for local governments in land conservation in greater depth.

205. For example, during the National Landcare Facilitator project we interviewed a farmer in New South Wales who is actively involved in landcare, is well respected in the community and is extremely concerned about rising saline groundwater, waterlogging and acidification which will potentially affect a significant proportion of the district. On his own property, a saline discharge area has spread quickly, taking about 30 acres out of production and causing a minor road to subside. The response of the shire was to spend about $250 000 to rebuild the road, while the farmer is having trouble getting a grant of some $10 000 to establish a demonstration/trial of various agroforestry regimes in adjacent paddocks in an attempt to create a farming system which uses more water, to at least arrest the spread of the discharge area. The shire is spending a fortune on works which will do nothing to tackle even the symptoms of the problem (in fact the extra subsoil compaction they have undertaken across the discharge site will probably exacerbate salinity upslope), while the farmer is battling for assistance to tackle the cause of the problem.

206. Ragwort and Blackberry are both introduced noxious weeds in Victoria, which invade both farmland and native bush, choking out other vegetation. Absentee landowners are people who own a block of land in the country but live and work in the
city. They may visit the block occasionally on weekends, but often their initial enthusiasm for an idyllic escape from urban hassles wanes over time, as they begin to realise the amount of work and expense involved in managing land. Managing land well when one lives and works somewhere else is not easy, especially when it comes to dealing with issues requiring vigilance and prompt attention, such as fencing, weeds and feral animals. The standard of management of such blocks is often a sore point for neighbours, but it is something that traditional modes of extension have been unable to deal with effectively, because landowners are on their blocks only infrequently, rarely during office hours.

210. Now the Department of Conservation and Natural Resources

211. Reeve et al. 1988

212. Government vehicles in Victoria have red lettered number plates, as distinct from private vehicles which have green letters.

213. Bardsley 1982

214. Avery 1992

215. Barr and Cary 1992

216. Barr and Cary 1992

217. Woodhill and Röling (forthcoming), Campbell (1992b), Campbell and Junor (1992), and Woodhill, Wilson and McKenzie (1992) discuss the limitations of the traditional linear model of technology transfer, desirable reforms in the interests of sustainability and some promising theoretical and practical directions, for readers with a deeper interest in research, extension and social learning.

218. Campbell 1992a analysed the disbursement of NSCP funds for 1991–92 and found that, on average, landcare groups received in direct grants only 19.5 per cent of the NSCP monies expended in each state, and only in Victoria did groups receive more than 30 per cent of the funds.

219. de Vries 1992

220. Campbell 1992a

221. Woodhill, Wilson and McKenzie 1992

222. These studies are discussed in more depth by Andrew Campbell (1992a), in his third annual report as National Landcare Facilitator.

223. Black and Reeve 1992

224. ABARE 1992, Mues and Collins 1993


226. Woodhill 1992

227. Holsinger et al. 1991

228. Curtis et al. 1992, 1993


231. Dunn et al. 1991

232. Carr 1992a & b

233. The difficulty in generating something as simple as a map of landcare groups in Australia illustrates the paucity of quantitative data and the difficulties of keeping track of Landcare. While state estimates of the total number of groups add up to more than 1750, there are less than 1000 dots on the map. In Western Australia for example, Land Conservation District Committees are marked, but the 212 catchment groups are not—if they were, there would be a considerable increase in the density of dots in the south-west corner. Similarly, the South Australian map listed the location of NLP Landcare group projects and registered groups, which are only a proportion of the estimated total. In other states, sub-groups of larger Landcare groups, and groups which may have had little formal contact with government do not appear on the map. Nevertheless the map does give a reasonable approximation of the
distribution and density of Landcare groups in Australia, with the exception of the Western Australian wheatbelt where the density of groups is considerably greater than the map suggests.

234. Anecdotal evidence, national surveys and the observations of state Landcare coordinators suggest that participation in Landcare in higher-rainfall districts among intensive vegetable, row crops, horticulture, dairy or sugar cane farmers, is proportionally lower than in broadacre districts, probably less than ten percent. This may well be because farmers in these industries/regions do not perceive that they have significant land management problems.


236. The description of Landcare farmers as 'younger' than average is relative—it means that their average age is in the early fifties, rather than the late fifties, which is the overall average age of Australian farmers. The fact that Landcare farmers generally have higher farm cash income and higher levels of debt is probably influenced more by their age, farm size and future-oriented predisposition than their membership of Landcare.

237. There still appears to be a great deal of reservation within rural communities (particularly mainstream farming communities) about the conservation movement, which they see as urban and unconstructive in its orientation, with which they do not identify, and from which they are quick to distance themselves. Responses to the National Landcare Study (Campbell 1992a), particularly from Queensland, reinforce the impression that there is still a considerable degree of paranoia about the conservation movement within rural communities, which increases in proportion to distance from the coast and the capital cities. This is connected with a perceived threat that governments, prodded by urban conservationists, will seek to regulate land management, and it is reinforced by the traditional farmers' faith in the sanctity of private property rights.

238. This section draws extensively on Campbell 1992a.

239. Wilkinson and Cary 1992

240. Campbell 1992a

241. Curtis et al 1993

242. Cock 1992

243. These constraints are explored in depth in Campbell 1992a.

244. Keith and Roberts 1990

245. For discussions of the sociology of the interactions between farmers and institutions involved in rural development see Long (1989), and Long and Long (1992).

246. There are several existing models as to how this can be achieved:

• The Australian Trust for Conservation Volunteers (ATCV), based in Ballarat, acts as a broker between people who wish to do voluntary conservation work and organisations or individuals who need work done. In 1991 they managed 23 502 volunteer days on tasks such as revegetation, seed collection, fencing, dune stabilisation, rabbit and weed control and wildlife habitat protection.

• The Greenhouse Corps is a non-profit community training organisation with offices in Perth and Denmark (WA), which focuses on environmental issues. Training (of more than 100 people since 1989) is targeted at: volunteers in land repair and reafforestation, people interested in sustainable lifestyles, longer-term unemployed to provide skills (and hopefully jobs—60 per cent success rate so far) in landcare and reafforestation, and educated and skilled people who wish to gain new expertise and work in landcare (75 per cent success rate so far, Duxbury 1992).

• The Lismore (NSW) office of Greening Australia is involved in training long-term unemployed people in skills such as remnant vegetation inventory and mapping linked with Geographic Information Systems, under the auspices of the federal government's Jobskills program.
These initiatives are all exciting in different ways, catering for different types of people, but they share common goals in that they provide opportunities for people (mainly from urban areas) to learn new skills and participate in constructive environmental activity in rural areas.

247. Burnout was a key issue discussed at the workshop for facilitators and coordinators at Hamilton in March 1992, the output of which (Oates and Campbell 1992) lists the symptoms of burnout, its effects and some possible solutions.

248. Rorts are a form of fraud involving manipulation of the system to unfairly maximise the benefits to particular individuals.

249. Braden 1998

250. Many land users interviewed during the National Landcare Facilitator project, when asked how urban people could best contribute to landcare, responded along the lines of: 'if only they could try to understand us better'. Ronald Anderson's work in the 1960s and 1970s showed that lamenting the urban–rural gap has been a consistent refrain from farmers and farmer representatives throughout the western world for decades (Anderson 1978). But in this case the underlying sentiment seems to be that farmers still feel that they are blamed for land degradation and that, if this could be changed, the political power of the city vote might swing behind them in efforts to develop better systems of land use, thus liberating many more dollars for landcare activities (Campbell 1992a).

251. Bryant 1992

252. Lefroy and Hobbs 1992. This notion has been put in another way by Daly (1991) who observes that the absence in macro-economics of any concept of optimal scale for the human economy is evidence of an apparent assumption that the surface of the earth is growing at a rate equal to the rate of interest. The notion that economic growth (measured by growth in GNP) increases human welfare is also pervasive within the dominant world view. This breathtaking assumption has been challenged by numerous authors, including many economists (see Costanza 1991).


255. Campbell 1991b

256. Such as the Commonwealth Component of the Decade of Landcare Plan (Commonwealth of Australia 1991), the report of the Ecologically Sustainable Development working group on agriculture (Green 1991), or the inquiry into land degradation of the House of Representatives Standing Committee on Environment, Recreation and the Arts (1989).

257. Duxbury 1992 and Carr 1992a both discuss initiatives in rural communities with a high proportion of people who do not rely on farming for their income.

258. Cited in Lefroy et al 1992

259. Sauvy 1975

260. Cited in Heijman 1991


262. Douglass 1984

263. Conway 1985

264. Anon 1992


266. Bryant 1992

267. Lefroy et al 1992b

268. International Federation of Agriculture Producers (Anon 1991)


270. Cary 1992

271. Wickes 1992, Goss 1993. In the Western Australian case, a mature and credible Land Conservation District Committee may go as far as 'counselling' a persistent offender (supported by the powers of the Act). In the final analysis it is the Commis-
sioner for Soil Conservation who applies the Soil Conservation Notice. The Department of Agriculture sees great merit in having regulation and LCDC support under one department.

272. Röling 1991
274. Cock 1992
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## Landcare State/Territory addresses and contact numbers

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Information about Landcare groups and activities can be obtained from the respective State Landcare Group Coordinators listed on pages 332 and 333. Information about educational programs, curricula materials for schools and Landcare activities for people other than farmers can be obtained through the respective Decade of Landcare Coordinators, or the contact person for land literacy programs.

For information about Landcare at a national level, contact Community and Regional Landcare Policy Branch, Department of Primary Industries and Energy, GPO Box 858, Canberra ACT 2601, Australia, phone +61 (0)6 272 5560, fax 272 5618. For land literacy contact the National Waterwatch Facilitator, Australian Nature Conservation Agency, GPO Box 636, Canberra ACT 2601, phone 06 250 0337, fax 250 0286. For revegetation contact Greening Australia Limited, GPO Box 9868, Canberra ACT 2601, phone (06) 281 8585, fax 281 8590.

People or organisations interested in contributing to Landcare activities and projects, or to the Landcare Australia Foundation, should contact Landcare Australia Ltd, Level 18, Tower B, The Zenith Centre, 821 Pacific Highway (PO Box 5002), West Chatswood NSW 2057, phone +61 (0)2 414 8888, fax 414 8889.
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Imagine one-third of all families involved in voluntary conservation groups—think of the possibilities for constructive environmental action and change. In rural Australia this is happening, through an extraordinary movement called Landcare. Landcare is about farmers and greenies, government and community, and scientists and laymen working together to change the way we use our land.

Landcare shows how grassroots action with national support can help people look beyond the doom and gloom of environmental problems. This lively and highly readable book tells the story of the people involved in Landcare. It is a story of optimism and constructive action against a background of profound rural decline. Andrew Campbell shows in a compelling way that sustainable farming can't be conceived in scientific laboratories or planned by policy makers but is fashioned by people whose everyday decisions directly influence the health of the land. Landcare shows that this is possible, providing some paving stones for a new path to sustainability, in which people are central to environmental solutions, not part of the problem.

Andrew Campbell is a farmer and consultant and former National Landcare Facilitator. Greg Siepen is a former State Landcare Coordinator (NSW), now with the Queensland Department of Environment and Heritage.