Australian Nature Conservation Agency

Land & Water Resources Research & Development Corporation

Socio-economic Aspects of Maintaining Native Vegetation on Agricultural Land

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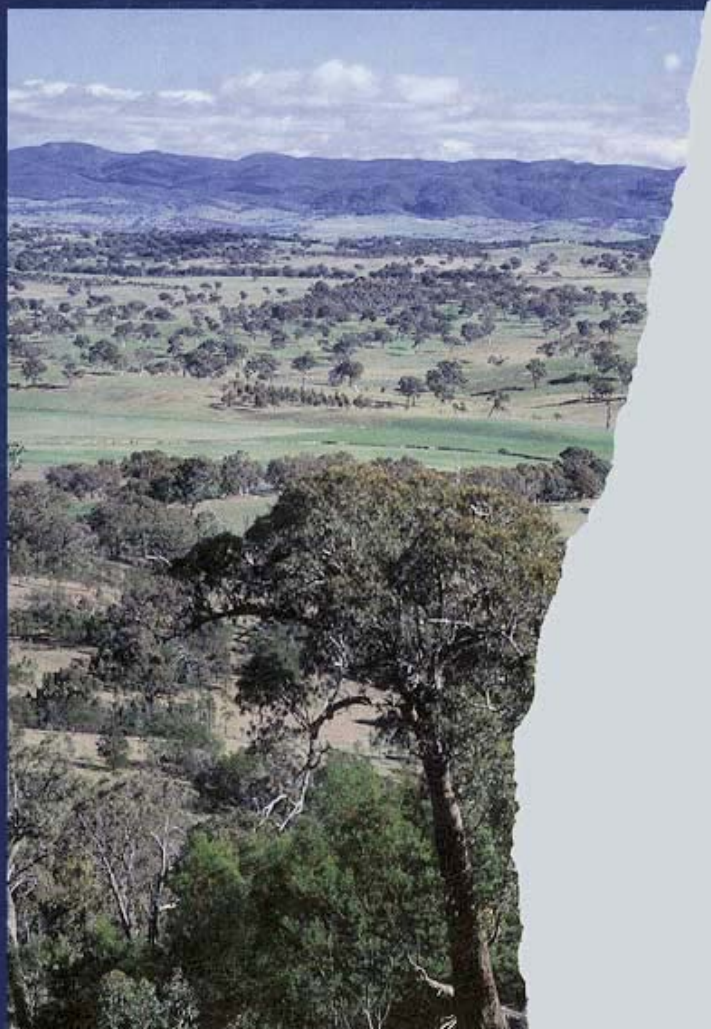

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Cover photo: Before the suburbs: patterns of native vegetation—original forest in mountainous Namadgi National Park, mostly cleared yellow box woodland in the valleys and farm tree plantations, northern Gungahlin, ACT.
Photo courtesy of Rodney Falconer.

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Preface

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A study commissioned by the Land and Water Resources Research and Development Corporation (Lambert & Elix, 1993) concluded that present research on the rehabilitation, management and conservation of remnant native vegetation is fragmented and poorly coordinated, and that the methods used to provide research knowledge to individual landholders or community groups have not been particularly effective.

As a result of this study, the Australian Nature Conservation Agency (ANCA) and the Land and Water Resources Research and Development Corporation (LWRRDC) agreed to join forces to develop and fund a national program of research and development (R&D), to help overcome the shortcomings identified. The aim of the program is to assist government agencies, community groups and landholders to better manage and protect remnant native vegetation through the application of improved knowledge and understanding gained from R&D. The program was established in 1994, with a strong emphasis on practical outcomes in managing remnant native vegetation; it also seeks to develop better links between vegetation managers and researchers. Other benefits of the joint program include bringing together conservation interests with the practicalities of managing remnant native vegetation within a landscape used for rural production. As well, by pooling resources the program is able to support larger, integrated research projects involving a variety of skills and research groups and over longer periods. This will help to develop broadly-based understanding which can be applied in different landscapes and regions. The two funding agencies have taken a proactive role in helping to define R&D priorities, and to build links between researchers and research users.

Responses

Comments

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Funding

The Australian Nature Conservation Agency and the LWRRDC have each agreed to commit approximately $300 000 per annum over each of the five years, from 1994 to 1999. This is a modest sum in comparison with what needs to be done, but represents a significant step forward in gaining the knowledge base required to support improved management and conservation. This funding will be directed to research and development; funds for on-ground work and community projects continue to be made available through the Save the Bush Program.

R&D program priorities

Four topics have been identified as priorities for support under the national R&D program. These are:

- developing methods for determining the appropriate size, configuration and location of native vegetation patches required to maintain ecosystem function and to conserve biological diversity within agricultural landscapes
- devising simple and cost-effective methods to determine which species, communities or particular remnant patches are most important for ecosystem function, or as indicators of the health of remnants
- identifying and measuring the key processes by which disturbances (grazing, fire, weeds, nutrients, soil erosion, altered hydrology and edge effects) influence the long-term maintenance and conservation value of remnant vegetation
- developing and demonstrating practical and economic measures to reconstruct, rehabilitate or manage remnant vegetation in highly degraded or altered landscapes; this could include an assessment of the value of vegetation corridors.

Applications for funding to address these R&D issues were sought in April 1994, and nine projects have been funded as a result. Eight of these are concerned primarily with ecological research, with a particular focus on better management of woodlands, while the ninth involves a novel approach to promoting the better management of remnant native vegetation and implementation of research findings.

In addition to developing broadly-based ecological understanding which can be transferred and applied generally, the national R&D program also has a particular interest in socio-economic and policy research. The report by Lambert & Elix showed that there continues to be a large gap between the knowledge and understanding gained by researchers and its application by private and public managers of remnant native vegetation. There are large differences in the way that this vegetation is managed between states and territories, between regions, between government agencies, and between individual landholders. These may reflect actual differences in the value or significance of the vegetation in different locations, or differences in awareness, or differences in willingness or ability to carry out sustainable management even when it is recognised as a desirable goal. Whatever the reasons, it is clear that these impediments to ecologically sustainable management of remnant native vegetation must be addressed if current knowledge is to be used effectively in managing our rural landscapes. Funds have therefore been set aside within the national R&D program for R&D into socio-economic, policy or other impediments that act to prevent the application of ecological knowledge and research findings in the management of remnant native vegetation.

A national workshop on these topics was convened in order to identify knowledge gaps about social and economic aspects of managing remnants, and to develop a priority ranking of the R&D required to address them. The workshop was held in Melbourne on 19 June 1995. Attendance was by invitation only, with the 65 or so participants being selected to represent a good spread across the states and territories, and between researchers (ecological and socio-economic), people responsible for extension or for programs that fund on-ground work, and landholders and public vegetation managers. Participants were provided with short background papers aimed at identifying some of the key issues, and had each been asked to address four specific questions relating to the impediments to sustainable management of remnant native vegetation. These issues were then discussed in more detail during the workshop in order to identify key knowledge gaps and R&D requirements.

This publication records the background papers, discussion and outcomes of the workshop. It represents the views and conclusions of a wide cross-section of people with interest in the long-term management of remnant native vegetation within the agricultural landscape. Not all of the issues discussed can be dealt with within the national R&D program; many are broader issues of philosophy and policy which need to be addressed by all tiers of government and by other groups. They are reported here to help promote their uptake by others.

Six main research objectives were identified by the workshop. These will now be used to commission further work within the national R&D program. Workshop participants also provided many valuable ideas on how research and practical management could be better linked and these too will be taken up within the national R&D program.

We believe that the workshop represented a significant step forward in identifying actions that are required to help improve the management and conservation of remnant native vegetation in Australia. In addition to funding work to address the six identified objectives for research, ANCA and the LWRRDC will also raise with government agencies and other organisations the other conclusions of workshop participants. We urge everyone concerned about the future of our rural landscapes, and particularly the place within them of native vegetation, to read this document and use the information gathered here to help support their own programs and activities.

Phil Price

Proceedings of a national workshop

Background to the workshop

The workshop was organised jointly by the Australian Nature Conservation Agency (ANCA) and the Land and Water Resources Research and Development Corporation (LWRRDC) as part of their national research and development (R&D) program on 'Rehabilitation, management and conservation of remnant vegetation'. The two organisations wished to give special attention to the socio-economic, policy and related aspects of managing remnant native vegetation as there is ample evidence that current knowledge is not being applied effectively in practical management, and that the condition and management of such vegetation varies widely across the country between locations, agencies and individuals. The R&D program is funding several large projects to quantify the factors that influence regeneration and health of remnant vegetation, and to develop improved, practical methods of bushland management. An equal priority is to examine the economic and social factors that influence attitudes to, and management of, remnant native vegetation; this is considered essential in order to build effective links between research and landholder/community needs, and to provide support for practical management.

The overall purpose of the workshop was to help provide for the maintenance of native vegetation in the agricultural landscape. Workshop participants were asked to discuss the values placed on remnant vegetation by landholders and rural communities and its ecological significance, as well as the barriers and constraints to active management of remnants and how to overcome them. Three main outcomes proposed for the workshop were:

- ideas on ways to improve policies and programs aimed at promoting and supporting on-ground management of remnant native vegetation
- identification of knowledge gaps about social and economic aspects of managing remnants, and priority ranking of R&D to address them
- ways of improving the two-way interaction between landholder/community needs and biological/socio-economic research.

It was anticipated that some of these outcomes would be referred to other groups for action to improve policies and programs. The Australian

Nature Conservation Agency and the LWRRDC would use the results on socio-economic aspects to commission new R&D within the national research program.

Attendance at the workshop was by invitation only. About 65 participants were selected on the basis of providing a good spread between geographic regions and between researchers, those involved in extension and funding for on-ground works, and landholders/public vegetation managers. The organisers believed it was essential to make sure that all points of view could be expressed and considered in order to reach consensus on the actions needed.

Conduct of the workshop

The workshop was held on 19 June 1995 in Melbourne. Because of the limited time available, four background papers were commissioned to raise the main issues for discussion, and situation statements were also provided on the legal, policy and program basis of managing remnant native vegetation nationally and within the states and territories. These papers, which were provided to participants well ahead of the workshop, can be found in the next section of this publication.

In addition, each participant had been asked to provide their individual views in response to four questions about impediments and change in managing remnant native vegetation. The individual responses, and a summary of them prepared by the workshop facilitator, Andrew Campbell, can be found in the Responses section of this publication. Many of the individual comments had also been provided to participants before 19 June.

The workshop began with a presentation and discussion of the four background papers by Alex Campbell, David Paton, Clive Thomas, and David Goldney and Geoff Watson. Participants were then divided into six discussion groups in order to consider and reach agreement on the following points.

- What are the major threats to, and the benefits of, remnant native vegetation from the viewpoints of landholders, ecologists and the general community, and hence what is the common ground?
- What are the main factors that limit or prevent sound management of remnant native vegetation by private and public landholders, and what new knowledge is required to improve our understanding of these factors and to find ways to overcome them, and to help resolve differences between individual and community expectations for management of remnant native vegetation?
- What then are the priorities for socio-economic research, based on the knowledge needs identified, how can this be linked more closely to existing programs and projects, and what organisations should be responsible for improvements?

Each group was given a priority topic to consider (technical knowledge required, cultural constraints, and so on), and asked to deal with other topics if time allowed. The groups' responses, which reflect each one's priority topic, are listed below.

Results of working group discussions

Group one: socio-economics

Top priorities for socio-economic and related R&D

- Determine the socioeconomic characteristics of land users and associated groups and organisations:
  - link with national property management planning review and Landcare review
  - use Australian Bureau of Statistics (ABS) information
  - use existing ANCA/LWRRDC projects
  - link environmental databases.
- Measure the costs and benefits of maintaining bushland values (economically quantified where possible):
  - use on-ground studies at local and regional scales
  - evaluate off-site benefits
  - determine off-site beneficiaries, e.g. local farmers, industries (tourism), government agencies (conservation agencies).
- Develop improved incentive mechanisms:
  - examine direct vs indirect
  - include equity issues
  - assess cost-effectiveness and socio-economic impacts
  - review current types of incentives, and develop model to assist assessment
  - examine and compare current programs.

Other issues and topics

- Assess extension and education methods:
  - newsletter vs personal contact
  - measure success rating of different approaches for different landholder groups
  - who will be the future land managers?
- Promote farmer and community participation in research
  - how can people identify their own research needs and support methods
  - better linking of on-ground needs with research methods.
- Undertake analysis of native species industries.
- Improve local government involvement incentives
  - identify roles and works programs for the operators.

Group two: marketing

Top priorities for socio-economic and related R&D

- By issue, identify areas where enlightened self-interest is insufficient to conserve remnant vegetation, and assess the size of the gap between private and social interests and include the cost of not closing that gap (identify the ecological and economic consequences of not maintaining a minimum of native remnant vegetation).
- Examine when enlightened self-interest is not sufficient, which incentives and/or controls are effective and most cost-effective for use by different administrative structures.
- Investigate and measure the use of existing information and support services by private and public land managers. (To what extent is remnant vegetation information available and being used for 'rule of thumb' management decisions by private and public land users?)

Other issues and topics

The major objective is to get practical research leading to well managed and valued remnant vegetation within farming systems and in the rural landscape.

Group three: policy, institutional

Top priorities for socio-economic and related R&D

- Identify the most effective ways to use money to protect bushland? Who to target, everyone or a few?
- Undertake action research on approaches to identify effective processes and structures for remnant vegetation R&D, for example, integrated multidisciplinary planning/research project (regional scale) and how to get from current approaches to better ones.
- Develop ways of managing the transfer of benefits.
- Measure the values of bushland in economic terms.
- Undertake sociological research on factors affecting policy development to identify mechanisms which make policies work on the ground.

Other issues and topics

- This group looked only at institutional constraints.
- There are very small bits of important bushland.

Group four: cultural

Top priorities for socio-economic and related R&D

- Document successful and unsuccessful strategies for cultural change for protection of bushland such as regulation, incentives and voluntary measures.
- Identify effective marketing mechanisms to communicate research results to end users (all end users) such as 'sell' useful results of management techniques on-farm and achievements of champions, and then review and monitor their effectiveness to see if attitudes have changed.
- Investigate landscape management techniques with respect to collating ecological information and importance of cultural background perceptions and management of landscapes.
- Investigate mechanisms for marketing to satisfy community-wide willingness to pay for remnant vegetation.

- Investigate barriers, including administrative boundaries, to appropriate remnant vegetation management by other government agencies and local authorities, especially local government.

Other issues and topics

- Collate ecological information and the importance of cultural background in perceptions of landscapes and approach to their management.
- Examine the R&D needs of public land managers to help develop better remnant vegetation management.
- Examine community use of native wildlife and feral animals and how this can benefit native vegetation.
- Influence tertiary education to include topics on remnant vegetation in courses.
- Prepare inventory of resource information on remnant vegetation, including social influences (i.e. that are already available).

Group five: infrastructure

Top priorities for socio-economic and related R&D

- Set the dimensions of the problems:
  - ensure baseline understanding of the issues of land cover change and farming systems
  - collate existing information
  - identify regions for priority case study research (recognise that issues vary widely between regions).
- Widen roles and responsibilities:
  - undertake targeted research to identify implementable policies and programs
  - examine off-reserve conservation as a legitimate farm enterprise
  - assess the nature and values of public vs private benefit and costs as the basis for determining cost-sharing
  - examine why managers do what they do now and why they don't do other things?
  - describe resource base and priority roles for bushland in a given region.
- Technical and institutional arrangements:
  - assess the adequacy of institutional arrangements
  - research the 3 Fs, fire, fencing and finance
  - review the lack of integration of objectives and actions of funding bodies, government and research disciplines
  - reduce uncoordinated research, including at the farm level
  - assess the lack of ecological knowledge applicable for management

Other issues and topics

- Information sought is at level appropriate to the problem.
- Whole process should be client-driven and aimed at achieving outcomes.

Group six: economics

Top priorities for socio-economic and related R&D

- Obtain economic data including:
  - opportunity costs of managing and clearing
  - values of retention
  - value trade-offs
  - recurrent/capital.
- Assess public and private benefits from work in managing remnant vegetation on private land.
- Include urban populations in the R&D:
  - what values do they hold for native vegetation
  - what is their relationship with landscape
  - what perceptions of a healthy environment do they have
  - what campaigns will be most effective
  - consider use of environmental levies and/or user pays
  - develop educational curriculum re ecologically sustainable development
  - link economics and public benefit with attitudes, values, support of the urban population.

Other issues and topics

- Strengthen linkages with revegetation, property management planning, catchments/regional planning, etc.
- Develop incentives for both private landholders and local government.
- Consider political opportunities associated with the community's interest in forests.
- Examine how to assist groups (government, non-government, academic, extension, industry) to work together.

Summary of objectives for socio-economic and related R&D

Objective one

To identify and measure the costs and benefits to our society of different management options for remnant native vegetation (RNV).

Outcomes required

a) Estimates of the range of private and public benefits and costs of managing RNV based on major case studies from the main agricultural regions of Australia.

b) A generic method of determining potential private and public benefits from RNV that can be used readily by land managers.

c) Guidelines for appropriate cost-sharing arrangements that flow from (b).

Background

One of the major concerns of stakeholders in keeping and managing native vegetation in the agricultural landscape is the perceived differences in understanding about the costs and/or benefits that can be provided by that native vegetation and how they are linked to management practices. For example, there appears to be a disparity between management units (paddocks, stands of trees) and the scale at which action is needed to retain RNV for ecological purposes (ecosystems and landscapes). Some stakeholders consider that land users are reluctant to accept the legitimacy of public interest in the maintenance of RNV.

The Land and Water Resources Research and Development Corporation and ANCA are seeking R&D that will help to resolve cost–benefit anomalies and to establish methods that can be used to estimate those anomalies by private and public land managers.

Areas of research and issues involved could include:

- collating or undertaking case studies that include cost and benefit analyses
- examining examples of successful management that include analysis of costs and benefits, and identifying the scale of the management units in this analysis
- summarising private and public costs and benefits: that is, both on-farm and off-site, and identifying the payers and the beneficiaries
- developing a practical method that can be used by private and public landholders to assess the actual or potential value of RNV in their situation, and then reviewing the costs and benefits of alternative management options
- considering both long-term and short-term views of RNV in analysing costs and benefits and identifying the key differences
- identifying gaps between private and social interests in managing RNV and considering any costs associated with these gaps
- researching effective methods for transfer of benefits across identified gaps, for example so that there is a linkage between society's long-term aims and the short-term economic needs of land managers
- developing guidelines for benefit-sharing and cost-sharing by stakeholders and for managing the transfer of benefits.

Objective two

To clarify the roles, rights and responsibilities of various stakeholder groups and to establish methods for collaboration between tiers of government.

Outcomes required

a) Getting the issue of RNV on the national agenda in order to develop a coordinated framework for policy development, resource delivery and institutional reform.

b) A set of criteria and/or guidelines for a coordinated approach on policy, programs, responsibilities and collaboration between tiers of government.

Background

Some of the issues raised by the workshop in this area included the lack of a long-term policy framework and state-Commonwealth–local government partnership process, the lack of appropriate legislation/political will in most states, no specified government strategy to invest in public good aspects of RNV, confusion/suspicion over responsibilities at the state and regional level combined with poor integration of remnant

vegetation in catchment/regional planning. In addition, state (government) investments in RNV are low, and government-funded and industry-based research and development marginalises public interest research.

Areas of research and issues involved could include the following:

- collating existing data on the legislative basis, policies and programs for management of RNV nationally, within the states and territories and at a sample of regional, catchment and local government scales; instituting new surveys only if essential
- identifying the key differences in approach, and the characteristics that are related to success or failure; this may involve objective measures of success and surveying the opinions and responses of land managers
- identifying issues of scale (national through to paddock) related to the different tiers of government, rural industries, community groups and landholders; this will help to identify the key stakeholders for each scale level
- recommending improvements that could be made to legislation, policies and programs and identifying the stakeholder groups who should be responsible for them.

Objective three

To identify effective market and non-market mechanisms /systems that would assist landholders to retain native vegetation on private land.

Outcomes required

a) Case studies of effective instruments/systems for retaining RNV.

b) Recommendations on the use of incentives, regulations, controls or other mechanisms for the retention of RNV.

Background

There is a limited ability for many land users to take the long view in terms of economic benefit that may ensue from native vegetation. There is little analysis of the costs of clearance and establishment of farming systems against the profits and benefits of native vegetation. On the other hand, there are real costs in undertaking the management of RNV in capital, opportunity, and recurrent costs. Many farmers see neither visible economic incentives to retain RNV nor effective ways to protect and manage bushland.

Areas of research and issues involved could include:

- analysing the costs of clearing vs the costs of retention in at least two major farming systems (e.g. dryland cereal cropping, improved pastures in 600 mm+ rainfall)
- comparing the costs of retaining natural vegetation with replanting programs
- itemising and comparing the components of management to retain RNV, e.g. fencing, weed control, fire management; separating capital and recurrent costs
- identifying and quantifying market-based incentives to promote retention of RNV that would be required to take account of the price structures developed above
- examining the use of native species for industry such as tourism, cut flowers, other incomes
- examining the role of non-market mechanisms, e.g. voluntary programs, regulations and controls to retain RNV
- collating and providing case studies of successes using market-based incentives, regulations, controls or other methods in Australia and overseas
- establishing the criteria to determine which type of mechanism is most likely to be successful in 'specified' situations.

Objective four

To establish appropriate and successful methods (including marketing) to make available to stakeholders existing biological or economic information about RNV.

Outcomes required

a) Understanding of socio-economic characteristics and attitudes to RNV of present (and projected future) land managers, both private and public.

b) Understanding of attitudes to RNV of other stakeholders including urban communities, governments, rural industries and community-based organisations.

c) Guidelines for developing effective marketing mechanisms to each major stakeholder group.

d) Generic model(s) for provision of ecological, economic and management information to the most significant stakeholder groups, and for gaining their support for and involvement in programs for retaining RNV.

Background

There is poor understanding of the value of remnant vegetation amongst land managers and amongst advisers. There is inadequate transfer of biological and economic information about the status of remnant vegetation to stakeholders. On the ground there is a paucity of knowledge, skills, guidelines and people for remnant vegetation management.

The range of stakeholders is often underestimated, from national/state/local government level, catchment/Landcare level, farm level (while coping with both regional diversity and scales, spatial and temporal differences), urban clients (as holders of purse strings), public land managers, and also future land managers.

Areas of research and issues involved could include the following:

- identifying what native vegetation management information exists, and what further information is needed
- identifying the stakeholder groups and their particular interests and needs, and the scale of each group's likely impact on management of RNV
- conducting sociological research to uncover the underlying bases of attitudes to RNV, and what information or activities are likely to be most useful in assisting stakeholders to assess management options and make decisions
- understanding how to engage stakeholders in the processes required for retention and management of RNV
- developing marketing strategies for each major stakeholder group related to their role and needs
- identifying and describing successful methods or approaches that have been tested with landholder groups and other stakeholders (include case studies).

Objective five

To include native vegetation values in capital/ recurrent accounts at the national, government agency and individual property scales.

Outcomes required

a) Practical methods to enable land managers and other stakeholders to assess the importance of RNV to their own enterprise and property, to the district and to the nation, including its environmental, recreational, aesthetic and existence value.

b) Methods to enable these values to be incorporated into financial accounts so that changes in RNV capital stock or annual income are reflected clearly.

Background

Several workshop participants suggested that RNV is often left unmanaged because it has no recognised value as a resource. For example, RNV is not identified or valued as a capital asset at the time land is bought, changes to its extent or status are not reflected in farm or public agency accounts (for leasehold land), and it does not appear in national accounts as an asset with potential to change value or to generate income or expenditure. Some believe that if this were changed, attention would be drawn to RNV as a useful asset, leading to much greater impetus for its sustainable management.

Areas of research and issues involved could include the following:

- estimating approximate capital and annual values of RNV for particular purposes (e.g. recharge control, stock shelter, timber products, aesthetics, conservation of an endangered species)
- reviewing world literature to identify values estimated in other studies, comparing methods used and values obtained and validating as far as possible
- identifying a limited number of opportunities where RNV values could be incorporated into financial accounts, and working with the groups responsible to achieve incorporation
  - at the level of individual properties (e.g. landholders, farm advisers)
  - group of properties (e.g. Landcare group)
  - shire or catchment
  - regional (e.g. within a regional economic development plan)
  - national.

Objective six

To clarify the role and importance of the intrinsic values of RNV in the retention and management of that vegetation.

Outcomes required

a) An understanding of the range of non-economic or intrinsic values held by our society towards RNV and any segmentation of values between stakeholders.

b) An estimate of the ability or willingness of society to maintain intrinsic values and to pay for any gap between economics and ethics.

c) A methodology for resolving conflict.

Background

Environmental beliefs and the benefits that can be provided by the retention of native vegetation are seen by some to be symbolic rather than substantive. In particular, long-term values such as genetic biodiversity and the rights of organisms to exist tend to fall into this category.

There may be a colonial hangover that remnant vegetation is useless and that clearing equals development. On the other hand, much of our culture is built on the ethos of the bush, the look and smell of the gum tree, and the fauna within it such as koalas, kangaroos, parrots and possums.

Differences appear to exist between those who value the vegetation for its intrinsic value and others who value it in terms of any obvious current uses as part of the farming operation.

There may be circumstances where remnant vegetation is incompatible with existing farming systems.

There is no method of resolving whether, when and where intrinsic values can substitute for utilitarian values in the decision-making process. There may be a conflict between 'right to farm' and 'duty of care'.

Areas of research and issues involved could include:

- separating long-term economic values of RNV from intrinsic and non-economic values and summarising the latter
- identifying gaps between private and social interests and values
- relating sets of intrinsic values to particular stakeholder groups
- providing comparisons with (and/or case studies of) other comparable land management industries such as forestry or fisheries
- estimating willingness of society to pay for non-economic values, and suggesting how this might be done
- developing guidelines for resolving conflict between economics and intrinsic values.

Background papers

What are landholders' attitudes towards maintaining native vegetation on agricultural lands?

Alex Campbell, National Farmers' Federation

This subject is as wide as Australia, so let us start with some definitions to help in concentrating our thought processes.

'Agricultural land' I take to mean the farmed land for more intensive production, necessitating the clearing of vegetation. However, it should also include the areas of potential production, particularly in the higher rainfall areas to the north where both irrigated and non-irrigated farming opportunities are yet to be realised. It should also include the control of regrowth vegetation such as in parts of Queensland. Let us assume it does not include our vast pastoral areas, which have their own particular attitudes, problems and solutions.

'Native vegetation' is taken to mean those areas of natural bush not cleared for intensive farming.

Some common myths

From a landholder perspective, there are some common myths that are being perpetuated that might set a background to some of our attitudes.

'Call it something different and it will be more important'

This can be a mechanism by which someone else will feel they have more knowledge or influence than landholders of many years' experience. Examples would include 'rangeland' instead of 'pastoral', 'remnant vegetation' instead of 'remaining bush', 'biological diversity' instead of 'balance of nature', etc. In other words, the new jargon should not demean long-held terminology and attitudes of generations of well-meaning and knowledgeable landholders.

Oversell

Too often landholders are 'sold' the argument: 'Protect that last piece of bush and you will solve your salinity, water table, erosion, ecological balance (including natural predators to many insects attacking your crops), on-farm biodiversity, off-farm corridors, off-farm eutrophication of streams and rivers, enhanced aesthetics, etc. and it won't cost you anything, you will actually be better off financially.'

Let me give two examples in a West Australian context. Some wheat-belt shires, such as Tammin, Bruce Rock and Merridin, have as little as 3% of their farm land still under natural bush. It would be foolish to pretend its preservation will do much at all to correct the salinity problems of the region, yet its retention is critical from a biological diversity, natural habitat point of view. Equally, farmers in high rainfall shires (800 mm+), such as Manjimup and Denmark with up to 87% of the land as state forest, will take convincing that a small area of their bush is really needed for biological diversity in the area. Furthermore, work by CSIRO and the Department of Agriculture demonstrate that rapidly growing plantation timbers in high rainfall areas are many times more efficient at correcting water table problems than aged natural bush (especially if ravished by 'dieback').

So my point is: tell the truth of the benefits of natural bush on the farm and don't oversell it as the panacea for all problems. We then stand a much better chance of the right bush being preserved for the right reasons.

Guilt syndrome

By overclearing we have cost the nation so many millions of dollars in lost production through salinity and erosion, etc. The logic would seem if we had cleared less there would be no problems and all benefits. The truth is that our natural ecosystems were so finely balanced that *any* clearing was going to influence water tables, salinity and so on. The benefits in productivity have always far outweighed the costs and should be used in a positive way to demonstrate that the challenges of preserving the remaining bush can also be overcome.

Attitudes

Let me address the crux of the issue at hand. Of course landholder attitudes are just as diverse on this subject as, say, urban attitudes to city planning. However, I feel confident in making the following generalisations as representing most landholders' attitudes.

Farmers have a positive and proactive attitude toward conservation issues. This has been demonstrated by the wide take-up of Landcare on a voluntary basis. I believe it can be demonstrated also by the fact that most farms are family-owned and parents wish to leave the land (and all its support systems) in as good stead for the next generation as it was for their own inheritance. 'Farmers drive cars and drink beer as if there is no tomorrow, but farm as if they will live for ever!' is a memorable quote from a Landcare meeting that I attended.

Sadly, it is a common generalisation that agriculture has never been in a more difficult financial position than now. This has been caused by the worst global commodity downturn in 60 years; an increasingly urban and industrialised society that is more influencing economic settings; and severe drought, being the worst ever in many areas. In other words, with all the will in the world, if a farm is not making a dollar, it can't put a dollar back into conservation (including protection of vegetation).

Many farmers feel they are being expected to do something for the public good that would not be expected of urban landholders. (Bear in mind the asset value of most farms equates to that of middle to high income urban homes and land.) Farmers feel that, if urban people can buy land with the expectation of building a house on it, then farmers should be able to buy (inherit) farm land with the expectation of being able to farm it; that if an urban person can landscape and plant any trees, shrubs and lawn that they choose, then a farmer should have similar freedom. The thought process goes on, that should an urban person's expectations not be fulfilled, they are compensated, so why shouldn't landholders be compensated for not being able to farm parts of their farm (by not clearing/grazing bush areas)?

There is a strong resistance to 'cross-compliance'. Cross-compliance is a mechanism by which a benefit is withheld until such time as a certain course of action is demonstrated. An example would be that of taxation benefits only being available for the protection of natural bush if supported by an approved farm plan/ecological audit, or whatever. The farmer attitude is that maximum benefit would be gained by allowing taxation incentives to *all* such work under the normal rules of self-assessment and periodic audit. In other words, it would be more cost-effective to have a few inappropriate areas of bush fenced off and protected than to have that same amount of resource being put into 'approved plans'. (This is not to say farmers don't believe in planning

and taking outside advice, but they detest bureaucratic-type planning and 'big brother' approvals). I have often said that a *used* plan on the back of a Corn Flakes packet is far preferable to a costly, multiple-overlay, high-tech plan that gathers dust in a bottom drawer.

By and large, farmer attitudes are supportive of clearing controls *so long as* backed up by compensations. Those that have been slow to clear should be rewarded and not penalised. If the wider public believe that clearing should stop, they should be prepared to help cover the cost—the farmer should not be the sacrificial lamb for the public conscience!

Now that we are halfway into the decade of Landcare, there is a strong belief that there must be a dramatic shift in resourcing of conservation-related issues. The last five to 10 years have been a victim of their own success. The resources put into awareness, education, demonstration and facilitators, etc. have caused landholders enormous frustration. They want to get started, but don't have the resources. The common cry is 'none of the money is hitting the ground'. I believe it is imperative that taxation rebates (as distinct from deductibility) be implemented immediately to allow work to be undertaken, and that some resources should be diverted from the current 'awareness' areas to help fund it. We need to get the right balance between 'talking about it' and 'doing it'.

Conclusion

This has been a necessarily brief and generalised view of landholder attitudes. I am confident in saying that farmers are ready to join in the fight to protect our natural bush, but we need the resources and incentives to allow us to get started.

The ecological value of remnant vegetation

David C Paton, University of Adelaide

The Australian landscape has changed dramatically over the last 200 years. With the arrival of Europeans, native vegetation was cleared for agriculture, and a variety of domesticated plants and grazing animals introduced and propagated to feed and clothe the growing human population. Various cereals, horticultural crops, sheep and cattle became the backbone of Australia's primary industries, and for short periods of time the country prospered on the world stage. To maintain productivity and viable industries further modifications were required: rivers and creeks were dammed; nutrients and water added to the soil; weedicides and pesticides sprayed over the land; and new crops and better agricultural practices developed through mechanical, chemical, biological, political and genetic means.

As a result of these activities the Australian landscape has been irreversibly changed. Only remnants of the original systems that covered the continent 200 years ago remain. Do these remnants have ecological value? Are endemic ecological processes compromised in remnants? What contributions do remnants make to off-remnant ecological processes? And should remnants be actively conserved and managed to maintain biotic diversity and overall productivity?

Ecological processes occur on, in and under all landscapes. They can be viewed as cycles involving interactions between physical and chemical phenomena and biota. They include the transfer or conversion of energy, nutrients or chemicals from one form to another, from one trophic level to another, or from one system or landscape to another and so on. For example, plants extract water and certain nutrients from the soil, carbon dioxide from the air and energy from the sun to produce plant tissue. Various physical factors like temperature, humidity and light intensity influence the rate of this process. Plant tissue may then be consumed by a herbivore and some nutrients and energy transferred from plant to herbivore, and some dissipated as heat and faecal material. If the herbivore moves to another location then energy and nutrients are transported away. If the herbivore is eaten then some of the energy and nutrients are transferred to a predator, and if the predator subsequently dies, then

scavengers may use the resources. Eventually this organic material, along with faecal material, is broken down by chemical processes and/or by detritivores including various invertebrates and bacteria and this results in some of the raw resources being returned to the soil where they become available for plants to use again. Even when not eaten, plant tissue is being continually recycled, as leaves and branches are dropped and decay. These resources can even be dispersed if dropped leaves and branches are washed or blown away. Ecological systems therefore consist of a series of interconnected cycles and pathways that trace the movement of commodities (water, oxygen, carbon, nitrogen, etc.) through different trophic levels and between different systems. But they are even more complex than this. Rates of movement of commodities from one form or level to another, and interactions between biota, are also integral components. Ecological systems, then, are not only about nutrient cycles, trophic levels, and energy transfer, but also about herbivory, competition, predation, parasitism, symbiosis, death, birth, emigration, immigration, growth, decay, disturbance, chance and so on. Each of these cycles and processes operates at different spatial and temporal scales and what happens in one area and one system can influence ecological performance in adjacent or even distant areas at the same time or in the future.

The ecological processes of remnant native vegetation are inextricably linked with their immediate surroundings, even though those adjacent areas may support markedly different agricultural systems. This is because of the active and passive transport of commodities back and forth between the two. What happens in the remnant can influence performance on the adjacent agricultural land and vice versa. These links are easily illustrated.

First, remnant native vegetation in Australia is usually deep-rooted and structurally more diverse, both above and below the ground, than most agricultural crops. As a result, native vegetation is much more effective at intercepting rainfall, so reducing recharge to groundwater, not just in the underlying area but in adjacent areas and to a lesser extent the region as a whole. Furthermore, native vegetation is also more effective at drawing water from deeper in the soil, thus reducing the risk of saline groundwater rising to the surface. When the water evaporates and the salt concentrates at the surface, agricultural productivity is reduced. This process is known as dryland salinisation, and is a widespread problem in many arable areas throughout Australia. In the south-east of South Australia severe dryland salinisation has taken place because of extensive clearance of deep-rooted native vegetation. Calculations suggest that if just 20% of the landscape had been left with native vegetation then the intervening agricultural areas would have maintained their productivity and dryland salinisation would not have occurred. In these areas remedial action involves revegetating extensive areas, a task made more difficult now by accumulations of salt near the surface. Remnant native vegetation may also provide protection for crops and stock by providing wind-breaks and may help prevent wind and water erosion by simply reducing the intensity of wind and water movement in an area.

Second, these links can operate in the opposite direction and are not necessarily mutually beneficial. For example, agricultural pastures and crops provide a rich food source for a variety of herbivores, not just introduced ungulates. As a result, native macropods that would normally exist in small numbers in native vegetation increase in abundance, commuting nightly between native vegetation where they rest during the day, and adjacent pastures where they forage at night. This not only results in loss of productivity for a grazier but can also lead to increased trampling of native vegetation within the remnant and increased herbivory of native plants at times. Remnants can also harbour various pests like the rabbit, fox and feral cat, each of which can reduce agricultural productivity and erode natural systems by placing new pressures (predation, herbivory) on native biota. There are no simple solutions to these problems—removal of native vegetation may eliminate the pests, but lead to other problems like dryland salinisation. Those same remnants of native vegetation are likely to support beneficial fauna that hunt invertebrate pests of crops and pastures. Removing remnant native vegetation may therefore lead to other pests becoming a problem in agricultural areas. As a general rule, agricultural practices do not provide much benefit to remnant vegetation. Fertilisers, weedicides, pesticides, stock, and introduced plants (weeds) can all intrude onto remnant native vegetation from adjacent agricultural areas and all have a negative effect on the natural values of the remnant. Also due to clearance, remnants experience greater exposure to other physical processes (rising saline groundwater, increased exposure to wind, etc.) that may further erode the natural system.

The key to assessing ecological values is appreciating the links between remnant native vegetation and agricultural productivity. Focusing on a specific process within one of the systems without appreciating the complexity of the links between them would be negligent.

There are other ecological values of remnant vegetation that operate at even larger scales than local interactions between the remnant and adjacent agricultural endeavours. Remnant native vegetation now forms a fragmented network crucial to the conservation and management of Australia's endemic biota and endemic ecological processes. This scale can be easily illustrated by examining the seasonal movements of birds. In the Mt Lofty Ranges near Adelaide, South Australia, more than 95% of the native vegetation has been cleared. This remnant native vegetation is largely found on the tops of hills and in rugged gorges and is now protected in reserves. Native vegetation on the gentler gullies and plains, however, has been disproportionately cleared because those areas were most suitable for agriculture. What little native vegetation is left in these areas now exists as small remnants on farms. As such those remnants provide the only record of what those areas were originally like and have immense conservation value.

Within this system the prominent group of birds are nectar-feeding honeyeaters. Not only do these birds depend on native flora for food, they also provide an important service by pollinating many of our prominent native plants. In fact many of those plants fail to set seeds unless they have been visited by a honeyeater.

During winter and spring, honeyeaters are abundant in reserves in the Mt Lofty Ranges, coinciding with the flowering of appropriate native plants in those areas. But during summer and autumn those areas produce few flowers and most of the honeyeaters leave. Banding studies show that the birds shift to remnant vegetation on the gentler slopes and plains. Remnant vegetation in these areas produce floral nectar during summer and autumn but not winter. These shifts by the birds are not rare events, and now over 200 movements of banded birds have been detected within the Mt Lofty region, with some of the birds regularly travelling distances of up to 100 kilometres. Without remnant native vegetation in the prime agricultural areas, this system would collapse. In fact the system is already perturbed, in that many of the plants that flower during winter and spring are not being adequately pollinated by birds. This inadequacy arises because the summer and autumn habitats have been disproportionately cleared. As a consequence, insufficient birds survive over summer and autumn to enable enough honeyeaters to recruit back to winter habitats to pollinate all of the flowers being produced in those areas. So in this region (and I suspect many other regions) remnant native vegetation on farms plays a crucial role in the maintenance of biotic diversity and ecological processes, like animal movements, pollination and plant reproduction, not just in the immediate area but also in other areas that could be more than 100 kilomtres away. Removing even small patches of remnant, native vegetation in one area not only has ecological consequences for the native biota that permanently inhabit that remnant but can also have ecological consequences for distant areas, not to mention adjacent agricultural land.

Remnants of native vegetation, even isolated trees or shrubs in the middle of a paddock, play important roles in the maintenance of Australia's biotic diversity and should be afforded greater prominence and protection in conservation programs.

In conclusion, remnant native vegetation has ecological and conservation values that extend beyond the boundary of the remnant. Although endemic ecological processes have been compromised by extensive habitat clearance for agriculture, the reverse does not apply and long-term agricultural productivity will depend on maintaining and enhancing remnant native vegetation in all landscapes.

What stops farmers keeping and managing native vegetation on their properties ?

Clive Thomas, Community Grasses Project, New South Wales

My current natural resources management activity is coordinating an interstate Murray–Darling Basin Commission Natural Resources Management Strategy project with the title 'Community development of perennial grasses for multiple ecological uses' (generally abbreviated to 'community grasses project'). The project aims to assist graziers in the steep, low-fertility ridges and hill slopes of the Murray–Darling Basin uplands to develop and manage low-input perennial grasslands. Although not exclusively a native grass project, there is nonetheless a strong emphasis on the understanding, conservation and management of native grasslands.

To commence on a positive note, recognition of the value of native grasses in the temperate region of the Murray–Darling Basin is making excellent growth. Not so long ago someone referred to a 'renaissance' of interest in native grasslands, which may be an

optimistic, but certainly not an invalid, description.

There lies most of the answer to the question, because conservation and utilisation of native grasses satisfies the first law of successful natural resources management—an activity where community interest and private interest coincide. Native perennial grasses provide natural resources benefits on- and off-site, demand little, and yield feed for livestock. Sustaining native grasslands may demand sensitive management but does not require land to be retired from production.

Many farmers are excellent stewards of native vegetation on their land and I trust their motivation and financial sacrifice gets some acknowledgement amongst the participants of the workshop gathering. However, more don't or can't manage native vegetation successfully, and much of what persists after less than 15 decades of European-style intervention does so with the threat of deliberate destruction (in states without land-clearing legislation) or a lingering extinction through failure to regenerate.

The third word in the title question, 'farmers', is no longer a dependable term in contemporary Australia. As an occupational group, the definition of 'farmer' is changing so quickly through ageing, voluntary 'exit strategies' or structural adjustment that, by the time we devise a way to communicate, educate or legislate, the target will look nothing like the profile we devise now.

Fewer of our present farmers will be succeeded by their offspring than any generation since European settlement of Australia.

The average age of the present custodians of the 80% of Australia's land surface that is either privately owned or leased is 'within a grey whisker of 60', which means the demography of rural Australia will be inevitably different within even a single decade. Who will fill those gaps? Who will they be and what sort of managers of native vegetation will they be?

Strategies for protecting remnant native vegetation and spontaneous regeneration must therefore identify the likely land managers of the 21st century and respond to new opportunities and new threats to flora and fauna conservation. There are many contingencies.

Myself and others in natural resources management who have worked with individual land managers and Landcare groups in the states without native vegetation legislation became convinced in 1992 that the way to tip the scales was to encourage farmers to accept 'ownership' of the important nature conservation values on their land through the same process as is successfully employed with community Landcare. That is, the best approach is one which aims at encouraging farmers to manage existing land degradation and to adopt land use systems which make less negative impacts on land and water resources. That process is, of course: issue awareness—issue recognition—community ownership—group education—demonstration—individual action.

It was our belief that a community-based program of nature conservation education for 'land managers and those in a position to influence the decision-making process of land management' could nurture the now perceptible glimmer of interest in integrating nature conservation values with production systems into a powerful tool for sustainable natural resources management. The formula for conserving nature values would be the same as for sustainable land use-oriented Landcare: capitalise on whatever enthusiasm is present amongst land managers and their families and demonstrate that sustainable management can be effectively integrated with production systems.

Integration of nature conservation values into land management systems would lead to a wider understanding of the place of native vegetation in economically and ecologically sustainable land use. Better management of native vegetation would follow.

Judy Lambert and Jane Elix stated present deficiencies most succinctly in their LWRRDC consultancy document 'Remnant vegetation in a rural landscape': 'Many landholders and Landcare groups are embarking on projects without the benefit of scientific, particularly ecological, input, which is probably undermining considerable amounts of well-intentioned work.'

I've left the hard option till last. I will outline a legislative option that may be part of the answer.

Legislate a 'hiatus' so that, for the land manager, there is a process between the decision and the action. There is a process between the decision and the action in every other development activity—we may not like it, but we live with it, whether it's tacking a carport to the side of our house or digging a hole in the backyard for a pool. The land—the irreplaceable, irredeemable land—is the only field of activity where, it's been said, a decision made in the pub on a Friday night can precipitate irreversible alteration of an existing state before the hangover is gone.

Another legislative option would be to legislate land capability/land condition assessment at

ownership changeover time. The softest approach would be to acquaint the new custodian with the conservation values and limitations of the property and cost–benefit analysis of any proposed changes to existing management that might involve alteration to the landscape.

What stops farmers keeping and managing native vegetation on their properties?

In most instances of passive mismanagement? Financial constraints—the capital cost of separating areas of native vegetation from pasture/crop land—the consequence of which is extinction by neglect.

In most instances of deliberate destruction? A pre-emptive element, followed by a lack of critical financial analysis which questions whether the investment in land clearing and development will be profitable; lack of awareness of the complex values of nature conservation; lack of understanding of the interdependence of each component of a native vegetation system; lack of any institutional process that cautions: Pause—Listen—Look—Learn—Change—Conserve.

Marketing and social issues relevant to landholders' management of native vegetation

David Goldney, Charles Sturt University, and Geoff Watson, University of Sydney

Background

The CSU–OAC Remnant Woodland Ecology Program (Goldney, 1995) operates in the central western region of NSW, a 65 000 km^2 area, 75% cleared, containing Australia's oldest inland agricultural lands. In spite of the greening-Landcare phenomenon, we have argued that we are 'winning battles but losing the war' in regard to conservation outcomes for remnant vegetation (Goldney et al, 1995). Furthermore, since there are not, and never can be, enough extension officers on the ground to facilitate remedial action, a paradigm shift is needed, away from top-down autocratic extension approaches to multi-pathway processes based on empowerment strategies. Some critical baseline studies which we are addressing are designed to further understand:

- landscape and ecological processes at work in the region
- the interaction between landscape and farming systems
- the sociological and psychological context in which landowners operate and how this impacts on decision-making
- the economic benefits of integrating remnant vegetation management in farm and total catchment planning
- the marketing-extension strategies needed to more effectively communicate conservation messages to landholders
- the conditions needed to optimise bushland regeneration on farmland.

In this brief overview we address the sociological–psychological context in which landowners operate, the economic benefits of integrating remnant vegetation management in farm planning and the marketing-extension strategies needed to effectively communicate conservation strategies to landholders.

The sociological–psychological context

Studies of the attitudes of farmers towards environmental issues are a relatively recent research phenomenon and the emphases reflect broad contextual differences (MacDonald, 1984; Black and Reeve, 1993; Wilson, 1992; McDowell et al, 1989). These and other studies have demonstrated, amongst the majority of farmers surveyed, predominantly utilitarian attitudes towards environmental concerns. Thus, for example, the economic values of remnant vegetation to farm production was highly valued by the farmer-owner. Wilson (op. cit) also found that the older and less educated farmers were more likely to value the aesthetic qualities of remnants. These utilitarian attitudes towards remnant vegetation are consistent with outcomes of research on farmer attitudes to soil erosion and related on-farm environmental problems. Good land management was, for instance, conceived by farmers in the northern agricultural regions of Victoria in terms of socio-economic beliefs rather than environmental beliefs (Barr and Cary, 1992). They concluded that the major determinants of conservation behaviour are the

attributes of the practice itself, rather than the attributes sympathetic to conservation. These and other studies suggest that farmers may 'think globally' about environmental issues but do not necessarily 'act locally'. The adoption of conservation behaviours appears to be driven by factors such as technical feasibility, economic costs and benefits involved, and the social acceptability of engaging in the practice amongst the farmer 'sub-culture'. Cary (1993) has suggested that many environmental beliefs have the characteristics of 'symbolic' rather than 'substantive' beliefs. These findings support the redevelopment of the traditional 'attitudes lead to behaviour' model to account for the influence of perceptual and contextual factors in adopting behaviour by farmers (Vanclay, 1992). These conclusions are consistent with other studies recently reviewed by Black and Reeve (1993) which suggest that adoption behaviour in relation to conservation practices is only partially explained by recourse to predictors derived from the types of utilitarian attitudes commonly associated with the adoption of commercial innovations.

Our findings (Hodgkins et al, 1995) lend support to the contentions of Barr and Cary (op. cit) about the apparent dysfunction between pro-environmental beliefs and actual conservation action by farmers. Our survey suggests that, while farmers were indeed responding positively to global environmental concerns, including those that bear directly upon the conservation of remnant bushland, they were not translating those beliefs into action to rehabilitate and conserve the bushland on their farms, and furthermore, a significant proportion were open to the possibilities of further clearing of existing bushland, even in the near future should circumstances warrant. In terms of Cary's analysis, beliefs about remnant bushland on their farms are best described as 'symbolic' and seemed largely unrelated to actual or intended management behaviours. These findings also suggest that the establishment of more 'substantive', behaviour-engendering beliefs about remnant bushland may be dependent upon factors such as improved technical information about the characteristics of remnant bushland, management practices for its conservation and rehabilitation, and financial assistance in the form of tax concessions for fencing and so on.

Our survey suggests that, as a minimum, the provision of relevant technical information on the management of remnants for rehabilitation and conservation, together with removal of some of the financial constraints, will stimulate greater conservation action by farmers who have remnants. Furthermore, our results suggest that a more successful extension–education framework will be one which is responsive to both the strong contextual influences upon farmer conservation behaviour, through the use of 'action research' principles (emphasising landholder participation and 'on-farm' relevant research), combined with the strategic use of marketing methods via the mass media, and relevant landholder groups (e.g. Landcare groups).

Economic context

One of our team members is currently reviewing the literature assessing the linkages between remnant vegetation, particularly woodland–forest and sustainable agriculture and derived economic benefits (Windsor, 1995). She has identified significant gaps in our knowledge base which relies on limited empirical data, some anecdotal evidence and a sprinkling of well-entrenched myths. While there is some evidence that establishes the importance of farm remnants (or their surrogate native windbreaks/plantings), in climate amelioration, control of water logging and salination, maintenance of biodiversity, and so on, many critical questions remain unaddressed. For example, what is the optimal area and positioning of bushland on farms, in catchments and across landscapes to maximise agricultural production?

Marketing strategies

The first marketing concept is to devise a contact strategy which involves the client in 'co-producing' the value of the product/service being provided. This will ensure that the client is not viewed by the service provider as a 'passenger' or someone who is merely manipulated by the contact strategy being employed. Involving a client in co-producing the value means that the client can be enabled to take some ownership of the outcome and has the opportunity to be intrinsically rewarded by the learning process that takes place. This concept of co-producing underpins our strategy of developing appropriate extension material.

The second marketing concept which can be drawn upon in a contact strategy is the notion of user testimonial. This simply means spreading an idea to others via word of mouth. The key to enabling this to happen effectively is to ensure that *clients have an extremely positive experience with the service or product, and that they recognise the need to communicate that experience to others with the aim of*

encouraging them to try it for themselves.

These ideas of testimonial/referral underpin the contact strategy of gathering key landholders together to understand and experience the self-assessment kits we are producing and trialling and encouraging them to communicate their outcomes to others in their community once they have validated the value of the kits in their own situation.

Our model will be tested in 1995–96. It incorporates the attributes of both 'hard' and 'soft' systems approaches. The information coming from scientists contains critical data which need to be repackaged into simplified but accurate core messages which are marketed to individual landowners because they want such information. The principles of our marketing strategy are similar to those operating in the marketplace. Marketing is the creation of relationships so that people want to make a voluntary exchange (different from coercion or the pressure of top-down approaches). What relationships must we develop with prospective clients about our product? What are the communication problems which confront the marketing of credible bushland management? Our model incorporates the following points.

- We have a complex product which we need to simplify for landholders; complex issues need to be broken up into simpler ideas.
- We need to have sociological and psychological understanding of our prospective clients.
- To sell the product we must create a need inside the landholder's mind. Clearly at present many landholders behave as though they see no value in their bushland; the values of bushland must be translatable into understandable economic values.
- It may be legitimate to use fear of the consequences of no action to induce behaviour change, and arguably the economic losses that will follow.
- We need to offer realisation and learning so that goals can be achieved by landholders themselves.
- We need to offer knowledge and strategies to individual landholders.
- There needs to be a system of feedback to indicate how the client is progressing and a support system which provides back-up help when the client faces difficulties.
- Landholders need access to material which enables self-evaluation of their properties.
- Evaluation should lead to short and long-term action and/or to seeking help and advice from professional sources.
- The core of this approach is the provision of a series of 'bushland kits' (together with traditional extension materials), simple to use, eye-catching, and highly structured, which can be delivered directly by post at low cost or used in group sessions as appropriate.

Finally it is important to recognise that landholders are not a homogeneous group in the way that they will perceive and respond to the particular messages being promoted to them. It will be useful to attempt to segment them on the basis of factors such as:

- their state of being (e.g. demographic aspects such as gender, age, education, social networks, enterprise type)
- their state of mind (e.g. attitudes, interests, opinions)
- location (e.g. where and how they can be reached).

This segmentation process can be assisted by surveys including focus groups. The segments can in turn provide direction for education and contact strategies that increase the likelihood of positive impacts for each segment. It is simplistic to assume that the same mix of strategies will be effective across a wide range of segments. Rather it is vital to make decisions on this mix using insights gained from the segmentation information.

Factors promoting or reducing the maintenance of native vegetation on farms

Helen Alexander, National Landcare Facilitator

Focus of this paper

- Broadacre agricultural land—not rangeland, urban fringe or coastal areas.
- Private land and not leasehold—the issue of land tenure is not dealt with.
- Maintenance of remnants—not revegetation.

Why does native vegetation on farms matter?

- Nature conservation/biodiversity/genetic reserves.

- Productive capacity of land (pasture, drought/fire resistant systems, wood products).
- Catchment health—salinity, streambank and broad-acre erosion control water quality.
- Landscape aesthetics.

It is often impossible and always expensive to rehabilitate ecosystems. It is easier to maintain those that exist.

What are the main threats to the maintenance of native vegetation on farms?

- Inappropriate clearing and ploughing for cropping, grazing and urban development.
- Inappropriate management (grazing intensity & timing, pasture improvement).
- Inappropriate drainage and agricultural run-off.
- Pest animals and weeds.
- Rising salinity.
- Inappropriate fire management.

What would best-bet management of native vegetation on farms look like?

Property and catchment management regimes that take full account of the public (off-site) and private (on-site) values of native vegetation and ecological processes.

At a farm scale, key elements would include:

- understanding the values of native vegetation/ maintaining ecological processes in a farm and catchment/regional context
- fencing off remnants and appropriate grazing management (ie understanding what you are managing for with inputs, grazing intensity, duration, etc)
- well planned and managed drainage.

At the strategic level (catchment/regional and state/federal):

- management structure and planning framework to set appropriate community goals
- clear understanding of and resources for public benefits to guide on farm activities through incentives, disincentives and education
- good data on resource condition and trends to guide decision-making.

Factors which promote or reduce the adoption of best bet management practices to maintain native vegetation on farms

Economic incentive/capacity

- Most landholders have to respond above all to the economic imperative.
- Factors which relate to the economic incentive or capacity to manage native vegetation on farm are key.

Reduce

- There is little capacity for landholders, given terms of trade, debt, drought, etc, to take the longer term view, invest in public benefit or take any risks.
- Enormous pressure to overexploit country even on marginal land.
- Managing native vegetation can be expensive (labour, fencing, increased weeds and pests) in terms of revenue foregone (if you chose not to clear), up-front expenses (fencing off, spelling land to allow regeneration) and ongoing costs (lower stocking rates, more intensive management).
- There is little understanding of or information on the short- or long-term economic benefits of this investment.
- There is no comprehensive system to value native vegetation or comprehensive, coordinated government strategy to invest in public benefit aspects.
- Confusion and suspicion over responsibilities for issues of 'public benefit'.

Promote

- Incentives/cost-sharing for public benefit—evidence from overseas (e.g. 'set-aside' and 'environmentally sensitive areas' in Europe) suggests that incentives do work. There are some initiatives, operating at various scales and with various aims, that provide incentives, which need to be better assessed. These include:
  - Save the Bush and One Billion Trees (local grants)—effective for raising awareness and mobilising community investment
  - Murray Corridors of Green, the Murray–

Darling Basin Commission Natural Resources Management Strategy and National Drought Landcare Programs (regional grants) provide resources for more strategic investment
  - 75D provides tax deductibility but not for nature conservation purposes
  - some local councils (e.g. Bendigo) are offering rate rebates for vegetation management.
- Need clearer government strategy to invest in public benefit and to identify which level of government (local, state or federal) is responsible for public benefit aspects. Incentives/cost sharing are being sought in particular for:
  - fencing
  - spelling land to allow habitat recovery/ regeneration
  - controlling weeds and pests
  - taking larger tracts of land out of production
  - environmental payments in areas of particular environmental sensitivity.

  Favoured mechanisms:
  - tax credits
  - resources to implement catchment/regional plans.
- Support and promote private commercial gain. Given that substantial public investment will probably be slow in coming, the commercial benefits of native vegetation management need to be emphasised. Demonstrations of economic value of native vegetation management for production (improved pasture, shade, shelter-belts), tourism, real estate/land values help. Drought has encouraged people to see the value in native vegetation and income/product/species diversification. There is a growing, albeit modest, focus on the development of native species industries, e.g. Farm Forestry Program, Community Rainforest Reafforestation Program.

Disincentives to protect public benefit

- Fair legislative and penalty arrangements are usually necessary to protect public benefit. Australia is, for good reason, (given expense and difficulties in enforcing, and farmer attitudes) reluctant to focus too much on these.

Reduce

- Lack of political will to enforce existing legislation, even on leasehold land, is more of a problem than the absence of appropriate legislation.
- Confrontationist attitude from 'greenies' and farmer groups, fear of 'compliance'/big brother and fierce individualism of landholders makes constructive debate on disincentives (and incentives) very difficult.

Promote

- Good, fairly enforced legislative arrangements clearly help; for example:
  - South Australian Heritage Agreements (have also provided the impetus for management guidelines, agreements and payments); environmental protection policy for wetlands in south-west Western Australia; planning approval requirements for new drainage schemes in most states.
  - Good potential to move towards clearer natural resource management legislative arrangements (à la New Zealand Resources Management Act) where certain 'speed limits' and penalties are set and the need for day-to-day intervention or onerous application procedures and administrative delays are minimised. The evolution of the Victorian Catchment and Land Protection boards will be useful to monitor.

Awareness, understanding and skills for on-farm management

- Even if appropriate incentives and disincentives are available, landholders need appropriate management skills. Awareness, understanding and skills remain a major barrier.

Reduce

- Still widespead apathy about native vegetation management, particularly for nature conservation, among landholders. Degradation has been slow—those that live with it day-in-day-out get used to it. Culturally, unacceptable to talk about nature conservation.
- Lack of knowledge or on-ground expertise about how to manage and value remnant vegetation for multiple benefit. Most extension expertise is production-related. Property Management Planning courses often do not include remnant vegetation management for nature conservation value.
- Limited national publicity on the need to protect and enhance native vegetation; the focus is largely on tree-planting rather than managing remnants in a landscape context.

- Lack of leadership from state agencies and local government in their management of public lands (e.g. stock routes, reserves).
  Suspicion about expertise/hidden agendas in conservation-related state agencies.

Promote

- Strong appreciation of lifestyle/aesthetic values and growing appreciation of multiple benefits of native vegetation among landholders.
- Good potential to build on local PMP, Landcare and best-bet management practice groups to support an integrated approach and to encourage change.
- Good potential in community-based regional consortia and catchment committees to take a more strategic role (e.g. planning corridors, regional resource centres, coordinating and disseminating information, developing and disseminating best-bet management). Need to build on and resource local landholder and community capacity.
- Victorian Land for Wildlife Program seems to be a good model for community-based nature conservation advisers—should be reviewed, lessons learned and model expanded.
- Use of key species (e.g. superb parrot, koalas, barred bandicoot) or habitats (e.g. wetlands) as a publicity tool to achieve broader nature conservation ends.
- Use of industry groups.

Strategic framework to overcome barriers

- The strategic framework operating at the local/regional/state and federal level has a significant impact on the on-farm action.

At the state and federal level

Reduce

- Poorly developed data sets or national priorities and targets. Need to improve national and regional databases on the status of native vegetation (possibly using key indicator species and habitats). Need to include information on native vegetation on-farm in annual ABS/ABARE surveys.
- Lack of long-term policy framework and state-Commonwealth partnership process
  Insufficient funds overall.
- Underlying structural adjustment issues not being dealt with strategically.
- Little investment in long-term, public interest research, given industry-based rural R&D.

Promote

- A framework through the NLP/MDBC to support ESD, particularly at the catchment/regional level.
- Recognition of the need for an Australian vegetation management framework and the need for a regional implementation strategy.
- National Forest Policy Statement and Regional Forest Assessments as a model.
- Growing focus on sustainability indicators, satellite monitoring, ABS green accounting.

Catchment/regional level

Reduce

- Poor definition of how to achieve goals, e.g. is the aim to maximise number of farmers doing some things better or get some farmers to be really good?
- Poor goal-setting and data sets in relation to vegetation management.
- Poor integration of native vegetation for nature conservation purposes in catchment/regional planning.
- Poor skills/guidelines in local government concerning planning approval for subdivision and so on.

Promote

- Regional consortia/catchment committees and 2200 Landcare groups. Greening Australia Local Greening Plans, Integrated Local Area Planning.
- Regional assessment panels/catchment management committees provide a comprehensive national framework for overseeing activities, priorities, targetting incentives and research
- Generally, need better integration of remnant management into property management planning and catchment/regional planning, particularly for nature conservation purposes. Need to resource local community capacity to participate in regional/catchment management.

Factors promoting or reducing the maintenance of native vegetation on farms in South Australia

Neil Collins, Department of the Environment and Natural Resources, South Australia

Background

Parts of South Australia have been extensively cleared. An inquiry was held in 1975–76 which found that up to 75% of the state's original bushland in the agricultural region had been cleared. Some areas, particularly those that were perceived to have high agricultural productivity, had cleared over 90% of the bush.

A voluntary heritage agreement scheme (which puts a caveat on the title) was introduced in 1980. This was only partially successful, for, although about 120 agreements were made in the following three years, most were for small areas of bush (less than 30 hectares apiece) and clearance was continuing at about 40 000 hectares per year.

Controls over the removal of native vegetation were introduced in 1983. By this arrangement, approval to clear in rural areas had to be approved by the State Planning Commission. Difficulties in this system led to the *Native Vegetation Management Act 1985*. Under this Act an independent body, the Native Vegetation Authority, was appointed to decide clearance applications. Those refused permission to clear could seek financial assistance as a result of the drop in land value resulting from the clearance refusal. This payment was dependent on the landholder entering into a legally binding heritage agreement.

In 1991 a new Act, the Native Vegetation Act, was introduced. This Act remains in operation. It encourages landholders to preserve and manage their bushland and to place it under a heritage agreement. By the terms of the Act an independent committee, the Native Vegetation Council, makes decisions about clearance applications and bush conservation matters, and it may also provide assistance to farmers who wish to better care for their native vegetation. The council has a representative from the South Australian Farmers Federation, the Local Government Association, the State Soil Conservation Council, the South Australian Conservation Council, the Commonwealth government, a presiding member and a person with extensive knowledge of the preservation and management of native vegetation. The last two positions are nominated by the minister responsible for the Act, the Minister for the Environment and Natural Resources.

Key issues concerning the council are that its decision-making is independent of the political system, that the South Australian Farmers' Federation and the local government accociation's member must be persons who carry on a business of primary production, and all members of the council must have some knowledge of, and experience in, the preservation and management of native vegetation.

Currently there are over 900 heritage agreements in South Australia covering over 440 000 hectares. Over $72 million has been allocated to the program. Most of this has been spent on financial assistance and the fencing of heritage agreements. The program requires an ongoing maintenance commitment and incentives for active management of native vegetation.

Clearance approvals may require a benefit for the environment through either an area being revegetated with local bush, or areas being allowed to regenerate, or through setting aside native vegetation in heritage agreements. The options are worked out between the land owner and the Native Vegetation Council, taking into account the property managing requirements of the business.

Other conservation systems on privately managed land

The *National Parks and Wildlife Act 1972* enables voluntary sanctuaries to be established on private land. There are over 55 sanctuaries covering over 30 000 hectares with another six sanctuaries being currently assessed.

Incentive schemes

The South Australian Ibis Awards, sponsored by the Commonwealth Development Bank, for private land managers who successfully combine commercial primary production with nature conservation, have been going for seven years and to date more than $70 000 has been given in prize money and trophies.

The South Australian government has allocated funds to an annual 'rural tree grant'. These funds may be applied for by community groups in a similar way to Save the Bush and National Landcare Program (NLP) grants. The government, through the Retree Centre, supports community groups including Greening Australia, Trees for Life, and Australian Trust for Volunteers under one complex.

The South Australian government waives state charges arising from the sale or donation of private land to approved trusts or schemes dedicated for conservation purposes. A private corporation, Wetlands and Wildlife, has established wetland conservation areas in the south-east on private land and receives the waiving of charges as an incentive towards private conservation management of land. The group has also received federal tax deductibility for donations.

Future directions

Currently a draft South Australian revegetation strategy has been formulated (revegetation is defined as replanting and native vegetation management). The draft will be the basis for a representative group of private land managers and those involved in the management of native vegetation (i.e. the Native Vegetation Council, South Australian Farmers' Federation, local government accociations, soil boards, etc) to determine with government representatives the future direction of vegetation management in this state.

Soil conservation boards are including, within their district soil conservation plans, native vegetation issues within their areas of responsibility. The detail and depth of these plans varies but they are a basis for local community groups to express what they see as being important in future directions for native vegetation management.

Regional groups with expertise in native vegetation issues are being established to help in the assessment of local issues and to recommend priorities for native vegetation programs. The emphasis is on the local community to have the say in what is important in their area.

The legislative approach in South Australia has been effective in changing the attitude to broad-area clearance. Emphasis now needs to go onto the management of the areas conserved and the areas linking remnants. This management would be addressed through:

- more coordination of government extension resources
- a commitment to actively revisiting heritage agreement owners and people who have planted and maintained areas as a requirement of approval to clear native vegetation
- simplification of clearance applications and particularly linking this to property management so that the land manager can get on with the business with some certainty over a three-year or longer time frame
- proposed grant systems aimed at the promotion of active management of small areas of remnant vegetation and heritage agreements
- linking of groups of heritage agreement owners with common problems and a number of solutions such as in the Murray Mallee Mantung/ Maggea District
- linking urban and rural groups in conservation activities.

Many landowners are committed to conservation of their native wildlife in South Australia. What appears to be a requirement is provision of information and expertise to support their continued conservation of bush as part of their overall property management. Ways of linking actions across different land managers is also required. All levels of government, along with non-government organisations, need to have a commitment to provision of these services and need to realise that different land managers will have different needs; that is, small landholders in the Adelaide Hills and Murray Plains, family farms, company landholdings and local government will all have different needs.

In summary it appears that to encourage active management of native vegetation through provision of information and support in the field is as critical as provision of any partial funding of activities, particularly for those who are undertaking the activities voluntarily.

Factors promoting or reducing the maintenance of native vegetation on farms in Western Australia

Penny Hussey, Department of Conservation and Land Management, Western Australia

Factors promoting maintenance

Awareness of the value of the remnant vegetation. Value varies between landholders, but may include control of land degradation, stock/crop shelter, aesthetics, historical or nature conservation aspects. (Note: Value in this instance *does not* equate to dollars.)

Financial assistance towards costs of management (initially, fencing). Lack of money is the reason most often given to explain why remnant vegetation areas are not fenced. A grant often provides the starting point from which landholders continue on their own.

In WA there are three main sources of monies.

- National Landcare Program, Save the Bush sub-program—group projects preferred, grant/km low.
- Remnant Vegetation Protection Scheme. State government-funded incentive scheme which provides direct subsidies for fencing remnant vegetation on private land. It provides 50% of the cost of both labour and materials. From its inception in 1988 to the end of 1994, the scheme has protected 34 966 ha of land in 769 parcels. This has involved an expenditure of $2 340 000.
- Gordon Reid Foundation for Conservation. Set up by the Lotteries Commission to disburse money to voluntary groups for conservation projects. Recently moving into the funding of relatively large-scale fencing projects.

Note that some strategic tree-planting schemes/grants may also benefit remnant vegetation management, e.g. buffer, bush corridors, etc.

Regulation of vegetation clearance can be controlled under state government Acts. Remnant vegetation left under such regulations may not be highly regarded or well managed. Also, the threat of clearing bans often leads to pre-emptive, unnecessary clearing.

- Soil and Land Conservation Act, administered by the Department of Agriculture. Clearing can be prevented under this Act where the activity is likely to result in a land degradation hazard. Hazards are assessed on a regional or catchment basis, and farmers may be required to retain areas of vegetation because of others in the catchment. This may raise the matter of equity between landholders. Areas not allowed to be cleared are required to be protected from grazing, i.e. fenced, and compensation is not payable.
- Country Areas Water Supply Act, Part IIA, administered by the Water Authority of Western Australia. Controls exist over the clearing of native vegetation in six catchments in the south-west, to protect the quality of water in existing and potential water supplies. Where clearing is refused, the landholder may claim compensation. Fencing is not required, so grazing still occurs, and recently permission has been given for substantial logging (for sawlogs and woodchips) from these remnants. (Note: The Water Authority of Western Australia is concerned about degradation caused by grazing, and will soon announce large grants for fencing to those landholders who have not already fenced using their own resources (rewarding the disinterested).)
- Wildlife Conservation Act, administered by the Department of Conservation and Land Management (CALM). The Minister for the Environment can forbid the clearing of gazetted Declared Rare Flora. Fencing materials may be provided on a statewide priority basis.
- In addition, proposals to clear native vegetation can be referred to the Department of Environmental Protection who can assess them under the Environmental Protection Act. Recommendations concerning the proposal are submitted by the Environmental Protection Authority to the Minister for the Environment who makes the final decision and sets conditions.

Financial concessions, e.g. rate relief, 150% tax deduction, are often cited as good incentives. No direct evidence that they would increase the level of remnant vegetation retention or management.

Direct economic gain; if this can be demonstrated, the appreciation of remnant vegetation may rise but the biodiversity value of the remnant may suffer.

Activities such as woodchipping, for example, may be unsustainable, whereas promotion of flower/seed harvesting may help retain vegetation as well as conserving biodiversity value in the remnant.

Covenants; a small demand for covenants exists, but WA does not have a convenient covenanting scheme.

Factors reducing maintenance

Cost for no perceived return. This is the most frequent reason cited for clearing and/or not managing remnant vegetation.

Traditional mind set, which results in:

- difficulty with accepting any 'value' for remnant vegetation, particularly when, within current farming experience, lifetimes have been dedicated to removing it
- entrenched belief that 'scrub' harbours 'vermin' and other nasties
- belief in the 'right to farm' unfettered by any 'duty of care' to one's neighbour
- innate conservatism and suspicion of 'advisers', especially government ones
- advisers themselves may be anti-bush and prefer to seek technological fixes rather than ecological ones for land degradation problems, etc.

Scale; the problem is far bigger than one farm. The time taken to fix it may be longer than one lifetime. This can lead to a feeling of impotence. Equity problems may lead to disgruntled persons taking negative actions.

Inability to comprehend the cumulative effects of incremental increases in disturbance; e.g. the effect of wider drain maintenance clearing along linear strips such as roadsides.

Bad experiences; management techniques may have been tried, but have not worked (e.g. burn to promote regeneration, only weeds grow back). This can lead to disillusionment.

Lack of appropriate techniques, e.g. controlling rabbits without destroying remnant vegetation to rip warrens.

Lack of ecological understanding of the spatial distribution of resources and the ability of fauna to move to them. For example, the role that relatively small areas of remnant vegetation may play in the large picture—areas that flower (nectar) during the 'autumn feed gap' may be vital for sustaining nectar-eating fauna from a very wide area. Alternatively, a plant may be flowering well but no viable seed is set, as its pollinator is no longer present, etc.

Land managers often request 'prescriptions' which are impossible to provide—e.g. 'how wide should a corridor be to allow birds to move?' or 'how large should a piece of bush be to be self-sustaining?'...*and the answer's a lemon*...

(Note: A benchmark study in 1987, 'Management of native vegetation on farmland in the wheat-belt of Western Australia' (Report from the Voluntary Native Vegetation Retention Project, Coates 1987, Conservation Council of Western Australia), conducted a detailed survey of farmers' attitudes to remnant vegetation (see tables over). It would be a timely research project to re-survey the same sample and analyse the differences in response. It should give a clear indication of how effective the various educational/financial/motivational incentives have been.

Table 1: Reasons for retaining native vegetation

	Main reasons		Most important	
	Respondents	Percentage	Respondents	Percentage
Shade and shelter	140	94	65	44
Erosion control	115	78	26	18
Soil salinity control	95	64	20	13
Preservation of flora/fauna	74	50	11	7
Scenic reasons	73	49	2	1
Preservation of natural bushland	71	48	19	13
No suitable land left to clear	49	33	5	3
Cost of clearing	13	9		
Environmental	3	2		
Tall timber left as too difficult to clear originally	1			

Note: n = 148. More than one alternative may have been selected.

Table 2: Influence of incentives on management decisions (percentage of respondents)

	A lot	Some	Not at all
Fencing subsidy 50:50	57	30	13
Management advice and loan of machinery	37	42	21
Rate rebate	30	49	22
Demonstration farms	30	47	23
Low-interest loan	28	29	43
Rate exemption (n = 122)	20	46	34
Proportional tax concession	15	40	45
Tax concession for gift	12	19	69

Note: % response (n = 148)

Factors promoting or reducing the maintenance of native vegetation on farms in New South Wales

Christopher Nadolny, Stuart McMahon, Mark Sheahan, New South Wales National Parks and Wildlife Service

The quantity and quality of native vegetation in rural NSW is declining largely as a result of: clearing of remnant vegetation, cumulative (often unintended) impacts of agriculture, and impacts due to feral animals (e.g. rabbits, pigs, goats) and weeds. Symptoms of the declining quality of remnant vegetation include: loss of old-growth trees; eucalypt dieback; lack of (or in some cases too dense) regeneration of trees and associated understorey species; major changes in the composition of understorey vegetation; invasion by exotic plant species; and loss of dead standing trees, fallen logs and other potential habitat for native animals.

Legislation regarding clearing

Legislation concerned with vegetation clearance in NSW is complex but not comprehensive. Trees and shrubs on leasehold land are owned by the Crown and vegetation clearance requires government approval. In the Western Division, applications for clearing licences require a review of environmental factors. On freehold land, local government has the power to introduce zoning provisions or tree preservation orders to protect vegetation but few such provisions are in place. Designated developments (e.g. mining, dam construction, intensive livestock enterprises, but not agriculture in general) require an environmental impact statement that considers impacts on the natural environment. In practice, decisions to clear native vegetation on private agricultural land are mostly at the discretion of the land manager, and involve only economic and life-style considerations. Such decisions usually ignore the value of retaining remnant vegetation for farm biodiversity and productivity benefits as well as for the wider community. Notable exceptions are where:

- the area is mapped as 'protected land' under the Soil Conservation Act. This consists of (a) steep slopes, (b) riparian zones and (c) environmentally sensitive areas. Maps detailing environmentally sensitive areas have only been gazetted for three small geographic areas.
- endangered animal species are known to be affected (Interim Fauna Protection Act)
- local government tree preservation orders, etc. are in place
- state or regional environmental planning policies are in place (e.g. for protection of littoral rainforest, koala habitat, wetlands, etc.).

Other legislation

There is no legislation to prohibit release of feral animals (e.g. recent releases of deer near Molong), or to control the introduction of agricultural plants with a potential to become environmental weeds (e.g. *Phalaris*). Many environmental weeds are notifiable under the Weeds Act.

Factors reducing maintenance

The legacy of colonisation

At the heart of this issue is the notion that the Australian bush is inferior and unproductive. A reversal of this attitude, to value the bush, may be confronting, as it contradicts fundamental values regarding 'improving' the land.

Increasing rural poverty

The capacity of farmers to pay for on-farm nature conservation measures has declined. Consequently, expenditure on long-term commitments (e.g. fencing off remnants) is often postponed, and there is a tendency to over-utilise or overdevelop marginal lands for short-term benefits.

Opportunistic development of farm land

Most remaining native vegetation is on land of marginal agricultural value. The economic return on further agricultural development is highly sensitive to fluctuations in commodity prices, to opening and closing of markets for new products, and to technological breakthroughs. For example, the availability of a market for woodchips improves the economics of clearing remnant vegetation. Conversion of land for cropping has a greater impact

on vegetation than removal of trees for rangeland grazing because much of the original native plant biodiversity survives in natural pastures. Agricultural commodity prices fluctuate greatly from year to year, but there has been a dramatic decline over the last 30 years. Some land was developed during periods of relatively high commodity prices that can no longer be farmed profitably unless farms are amalgamated or technologies changed (e.g. in the Western Division). Such trends are likely to continue.

Lack of visible economic incentives

For example, few farm families earn taxable incomes, reducing the attractiveness of tax deductions. Incentives are currently being reviewed by the CSIRO. Marketing problems are a disincentive for farm forestry.

Lack of understanding of the value of remnant vegetation and how to manage it

Extension is now being tackled through programs such as Farming for the Future, but there are still deficiencies in our understanding of critical issues (e.g. the effects of fertilisers on dieback, or how to manage the weed *Lippia* without clearing vegetation).

Fear of new clearing legislation or other perceived interference

Some farmers fear that clearing legislation will be implemented and so clear their land pre-emptively.

Freeholding of Crown land

Freeholding is often pursued so that land can be more easily developed. Clearing rates often appear to be greater on recently freeholded land, but the reality of such a trend requires confirmation.

Dual management of land

On land leased from the Crown for grazing, where timber is publicly owned and the land manager does not benefit from timber sales, problems arise when management implemented for grazing (e.g. frequent burning) is at odds with that desired for forestry or nature conservation.

Existing financial incentives to retain and manage vegetation include:

- conservation agreements between the landholder and the NSW National Parks & Wildlife Service; the service will assist where possible with fencing and so on.
- miscellaneous grants, which are mostly federal: Save the Bush, One Billion Trees, Murray–Darling Basin, Drought Recovery
- state grants, which include environmental trusts
- tax deductions related to Landcare, which apply throughout Australia.

Positive developments

Farmer awareness of environmental and nature conservation issues is increasing and many farmers recognise the positive benefits of remnant vegetation and wildlife on farms. Landcare is growing in popularity and, with it, a more cooperative attitude to natural resource management. Whole-farm planning is being widely adopted and, at a regional level, land use is being planned from a whole-catchment perspective with community involvement.

These initiatives rely on voluntary participation and their influence on nature conservation is based on the notion that long-term farm productivity can be enhanced by retaining remnant vegetation. Alone the initiatives are, at the present time, insufficient to halt the loss of biodiversity in rural areas. Options to halt this decline could include legislative developments, introduction of economic instruments, and expansion of the funding and scope of community-based programs to further enhance understanding of native vegetation.

Factors promoting or reducing the maintenance of native vegetation on farms in the Northern Territory

Bill Panton, Conservation Commission of the Northern territory

Background

Issues concerning the maintenance and management of native vegetation in the Northern Territory are very different from those of southern Australia. The Northern Territory has not experienced the broad-scale landscape modifications associated with intensive agriculture and farming in southern Australia. This situation has been influenced by both the natural and cultural environment of the Northern Territory.

Extensive pastoralism utilising unimproved native pastures is the largest land user in the Northern Territory. The opportunities for more intensive agricultural uses of the land are restricted by climatic conditions. At least 80% of the NT occurs within climatic zones which preclude large-scale agricultural development and, in the remainder, environmental factors such as climatic variability and soil type further limit the agricultural potential. These factors, together with an extreme disturbance regime through fire and cyclone, have reduced both the commercial utility of the native vegetation, preventing large-scale forestry, and the viability of intensive agriculture.

A recent analysis of land clearing revealed that a total 0.12% of the NT had been cleared, representing 0.26% of forest and woodland communities. Much of this clearing is associated with urban development although the majority was carried out to intensify primary production.

Land use and tenure in the Northern Territory

The Northern Territory covers about one-sixth of the Australian continent, with a total population of about 186 000. About 48% of this area (650 000 km^2) is granted as Aboriginal freehold under the NT Land Rights Act (25% of population Aboriginal), around 46% is pastoral lease or perpetual pastoral lease (186 lease holders on 226 leases, 3% Crown leases and 3% parks and conservation areas (96)).

The role of the NT government in controlling land use on each of these tenures is different. The NT Land Rights Act returned land to Aboriginal people on the basis proven of cultural and spiritual affinity to an area of unalienated Crown land. Often, as pastoral leases become available, they are purchased on behalf of Aboriginal traditional owners and a number have been subsequently converted to Aboriginal freehold land once cultural affiliations were proven. The application of NT land management legislation (e.g. Territory Parks and Wildlife Conservation Act, Noxious Weeds Act, Soil Conservation Act) on Aboriginal land is variable. The Territory Parks and Wildlife Conservation Act applies, whereas the application of the Noxious Weeds and Soil Conservation and Land Utilisation Act is subject to the NT Land Rights Act. Issues of vegetation retention on Aboriginal land have not yet arisen and significant areas are managed under joint arrangements with Territory and Commonwealth conservation authorities. Conservation and biodiversity conflicts may potentially occur as Aboriginal communities seek economic independence. More fundamental issues of health, housing and education have, however, gained greater financial support than broad-scale land management on Aboriginal lands.

The Pastoral Lands Act applies on pastoral lands and is administered by the Pastoral Lands Board. Generally, pastoral land may only be used for pastoral purposes, although the landholder may get permission to carry out other activities. Except for when land is cleared for fixed improvements, no clearing can occur without permission of the board.

Applications to clear land for cropping or pasture improvement are approved or rejected primarily on the basis of erosion hazard and soil conservation, although biodiversity issues are also considered. Other legislation can be applied where gazetted, protected or specially protected plant species may be affected.

Crown leases are applied to lands on which a higher order land use may be carried out. The lease is issued with covenants which bind the lessee to certain agreed actions and may be revoked if not complied with. A similar set of land management and clearing controls occur on Crown leases as on pastoral leases, although conservation covenants are placed before the issue of the lease.

Land clearing except for infrastructure and development is not permitted on parks and conservation reserves; however, mineral exploration and mining are permitted.

Current trends in land development

Historically the return to the producer from lands cleared and repastured has not exceeded the gains derived from increased cattle production. The soil nutrient pool is rapidly depleted and introduced pasture species fail to persist. The cost of fertiliser soil dressings further increase the loss. All broadacre agricultural development projects in the NT have failed. Several large-scale agricultural development projects which cleared extensive blocks in the 60s and 70s have rapidly returned to native vegetation.

More recently, live cattle exports to South-east Asian markets have increased the demand for cleared land. The live-store cattle market is particularly suited to NT producers in an environment where grass-fed fattening operations have not been successful. Several large horticulture developments are planned, with potentially 10–20 square kilometres being cleared for tropical fruit and off-season vegetable production In this case, increased land clearing has been encouraged by the development of overseas or interstate markets.

The area immediately surrounding Darwin (approximately 120 km^2) is currently subject to the largest rural subdivision development in Australia. Planning decisions in rural subdivisions have been largely driven by economic rather than environmental considerations. Subdivisions are designed to maximise the number of lots, with natural drainage often altered or water tables lowered. A ban on clearing more than 50% of rural blocks is in place, but determination of what 50% means has not been adequately defined or policed.

The NT is currently on the development pathway. As well as barriers provided by the physical environment, there have been a sufficient number of large-scale agricultural disasters in the past to hope that they will not be repeated in the future. Smaller scale agricultural developments will be undertaken in the future, based principally on demand arising from South-east Asian countries for high-value products or niche markets. The challenge for conservation authorities will be to balance the demand for development upon the limited area of land with an agricultural or housing potential versus the need for conservation across all land types. The implementation of off-reserve conservation programs, with appropriate incentives, may provide a method to balance development and conservation throughout the Northern Territory.

Factors promoting or reducing the maintenance of native vegetation on farms in Victoria

SJ Platt, Department of Conservation and Natural Resources, Victoria

Victoria is fortunate in having about a third of its land in public ownership, but two-thirds are in private hands and many habitats are represented only on private land. It is now widely recognised that to achieve nature conservation on private land, governments must work with private landholders. This is the aim in Victoria and recent initiatives reflect this approach. A cooperative approach recognises the important role landholders can play in nature conservation. In Victoria, various mechanisms—voluntary, voluntary but binding, and regulatory—are available to facilitate nature conservation on private land.

Cooperative agreements

Land for Wildlife is an entirely voluntary scheme which began in 1981 and aims to encourage and assist private landholders to provide habitats for wildlife on their property, even though the property may be managed primarily for other purposes. The scheme caters for landholders who believe that they have a role to play and wish to be kept informed and encouraged. In this case, the registration scheme acts as a sort of club from which participating members can obtain information and continuing support. Land for Wildlife also caters for non-committed landholders, by seeking better solutions to management problems that involve protection and enhancement of wildlife habitat. In this way the scheme attempts to relieve landholders of the problems they face whilst also providing for wildlife. Land for Wildlife seeks to encourage change in attitudes and promotes an ethic of conserving nature on private land.

The scheme is popular with landholders. Over 3100 properties are currently participating, covering 319 000 hectares, of which landholders have identified 69 000 hectares as being managed for wildlife. The annual increase is currently 550 properties.

Voluntary, but binding, nature conservation agreements are available under the *Wildlife Act 1975, Victorian Conservation Trust Act 1978,* and *Conservation, Forests and Lands Act 1987.* Agreements under these Acts include wildlife management cooperative areas, conservation covenants, and land management cooperative agreements, respectively. Schemes based on such agreements provide for a degree of legal responsibility to be incumbent upon both the relevant authority and the landholder and, in the case of a covenant on title, can ensure protection of specific values despite changes of ownership. To be effective, such methods require that professional and technical advisory support be available, if required, to assist landholders to attain their agreed management goals.

Since inception in Victoria, only a handful of wildlife management cooperative areas and land management cooperative agreements have been established and awareness of these provisions is poor. Under the conservation covenanting program of the Victorian Conservation Trust, some 140 properties are registered covering over 5000 ha. This would suggest that legally binding agreements are not popular with Victorian landholders or that other factors, such as the high legal costs associated with covenanting, may preclude widespread participation.

Acts and regulations

Regulatory mechanisms control the clearing of native vegetation on private land (*Planning and Environment Act 1987,* amendment 55) and protect native flora and fauna on private land from take from the wild, and illegal possession, trade and utilisation (*Flora and Fauna Guarantee Act 1988, Wildlife Act 1975*). Under the *Flora and Fauna Guarantee Act 1988* areas of critical habitat can be declared, which may include private land, and interim conservation orders can be issued to protect species or communities whilst longer term arrangements are considered. The planning process *(Planning and Environment Act 1987)* is often used to protect particular habitats, even when no formal agreements are made for their management.

Regulatory mechanisms are a valuable tool that can be used in particular circumstances when voluntary and cooperative arrangements are unable to meet community standards for nature conservation. However, their capacity to effectively control activities on private land is questionable. For example, in spite of clearing controls, there is ongoing clearing of native vegetation in Victoria. The commitment to implementation, the capacity for enforcement and the willingness of landholders to accept these measures are important constraints on their application.

Land purchase is another tool that is used in exceptional circumstances (e.g. to protect high-value native grasslands).

Programs

A plethora of programs deal with private land in Victoria and most of these do, to some extent, deal with nature conservation or related issues. They include Victorian government programs such as Land for Wildlife, Landcare, Tree Victoria, Farm$mart and Botanic Guardians.

Non-government organisations are also active. For example, the Australian Bird Environment Foundation provides financial support to nature conservation projects on private land. The Royal Australasian Ornithologists Union has campaigned to raise funds for habitat retention and enhancement and to undertake research and monitoring activities. The Victorian National Parks Association has organised fencing workshops for volunteers and landholders in rural areas and developed strategies for nature conservation in association with private landholders. The Roadsides Conservation Committee supports the protection and enhancement of flora and fauna on roadsides throughout Victoria and has undertaken roadside assessments with local government in order to identify high-priority sites.

Greening Australia (Victoria) provides guidance and support, including financial support, to projects on private land. For example, the River Murray Corridors of Green Program assists community groups in Victoria's Murray–Darling Basin to undertake habitat enhancement. The Victorian Conservation Trust, in addition to its voluntary covenanting program (see above), actively supports landholders through provision of workshops on habitat management and is establishing a flora and fauna survey group to assist landholders with identification of species on private land. It undertakes fundraising to purchase, and protect through covenant, significant areas for nature conservation. This approach is being supplemented by a revolving fund to purchase, covenant and sell, to sympathetic buyers, land of conservation value. These programs all add to the rich mixture of opportunities for landholders, a factor which is important to success.

Research

Research is an integral part of nature conservation on private land. For example, research adds to our understanding of the needs and management of flora and fauna in fragmented ecosystems; it can assess economic, social and environmental benefits of nature conservation for landholders; and it is an essential part of the policy process, with research data being used for developing options and monitoring program performance.

The Department of Conservation and Natural Resources has undertaken a number of research programs into wildlife conservation in rural regions of Victoria. These studies have documented the status of wildlife in the rural environment and the use of different types of remnant vegetation, and have investigated the processes that influence the conservation of wildlife in such fragmented landscapes. Also, Land for Wildlife has initiated a program to assess landholders' views to nature conservation.

Of particular importance to nature conservation on private land are multidisciplinary regional projects that look at the great variety of issues involved in effecting change in landholder behaviour and conserving wildlife in fragmented landscapes. Also, there is a scarcity of information, backed by research, on the beneficial aspects of conserving nature, particularly with respect to economic benefits. The Land for Wildlife Program has actively sought to assist landholders by providing information that can relieve them of some of the burdens they face. This information has been obtained largely through contact with innovative landholders and from existing literature.

Research is required to monitor progress and the effectiveness of management actions by landholders and to further develop practical methods of habitat protection, enhancement and management.

Information (economics, values)

The Land for Wildlife scheme publishes a quarterly newsletter and a series of technical notes for landholders that include subjects such as the benefits of conserving nature on private land, habitat management and ways to deal with problems caused by wildlife. There are 32 titles in the notes series and 18 newsletters have been published. The Victorian Conservation Trust has initiated a notes series and publishes a newsletter for covenanted properties. There is currently one title in the notes series. The programs listed above, and other institutions such as the National Herbarium of Victoria, offer advice on habitat management. Land for Wildlife, through its team of extension officers, offers on-site management advice to landholders. The scheme also offers information, practical demonstrations and technical advice at field days.

Appropriate and accurate information is a crucial element of conserving nature on private land. In the author's experience, many landholders are enthusiastic about nature conservation but lack the knowledge to implement appropriate management. In fact, some committed landholders actively degrade remnant habitat quality through actions based on inadequate understanding. Information is also crucial in convincing non-committed landholders to adopt a more positive approach to the environment.

Other incentives

Financial incentives are available to Victorian landholders through various sources including state government-funded schemes (e.g. Land Protection Incentive Scheme), federal government schemes (National Landcare Program), and non-government organisations (Australian Bird Environment Foundation, business sponsors). Other forms of incentive are also available locally including taxation benefits (associated with Landcare activities) or local government rate relief (one instance for establishment to combat salinity); goods, such as fencing materials, plants or seed; labour (e.g. prison labour for fencing) and equipment, such as machinery loans. The availability of these forms of assistance is limited and often inconsistent. Recent work with landholders in northern Victoria indicates that they may see financial incentives as of less importance to conserving nature on their land (Morison, 1995 unpublished report) than information, research and education which they regard as more fundamental.

The importance of private land to nature conservation needs to be recognised by all levels of government, particularly in the development and implementation of regional strategies and plans which facilitate a regional perspective and integrated planning. Integration is a key to success. For example, agricultural extension staff must recognise the importance and implications of their advice to nature conservation efforts. Only by working together will conservation be achieved in the large areas of Victoria that are on private land.

Summary

There are two major tasks for nature conservation on private land. They are to provide encouragement, management advice and skills to those landholders who have the desire to manage their land appropriately for nature conservation and, secondly, to convince those landholders who do not have this desire that it is in their economic, social or environmental interest to promote conservation on their properties.

Ultimately, the relative success, in biological terms, of the various approaches to inducing nature conservation on private land needs to be evaluated. Each method may, in fact, have a role to play in conserving nature on private land. However, the role of entirely voluntary nature conservation appears to be becoming an increasingly significant component of private land nature conservation strategies.

The challenge for nature conservation on private land is to identify ways in which people can benefit from a more ecologically sound approach to the management of their land and to convey this vision, along with sufficient technical knowledge and practical skills, to the landholder. Support is also needed at a level sufficient to enable actions to be undertaken where financial or physical constraints would otherwise act as barriers.

Factors promoting or reducing the maintenance of native vegetation on farms in Queensland

Greg Siepen, University of Queensland

- Only legislative mechanism to protect areas of native vegetation occurring on private lands is the *Nature Conservation Act 1992*. Problem in that this is a new piece of legislation and people are still suspicious about new legislation. In other states I understand that any private landholder can put a covenant on their land which can be tied to the land title to protect native plant and animal communities.
- Current draft tree clearing guidelines are colouring landholders' attitudes and behaviours about conservation of remnant communities. That is, they feel they are not in control of the situation. A minority 'green element' is dictating the agenda. There is a general feeling in rural communities and in the state government that legislation is not the way to go, although the results of legislation and financial incentives in South Australia have shown that significant areas of remnants have been protected.
- Lack of an extensive education/extension program by Department of Environment and Heritage to create more awareness and understanding of the values of conserving native remnants.
- General attitude in rural landholders that they need financial compensation to conserve remnants. They believe that they have 'done their bit' by not clearing a patch. They require financial incentives to continue protection and management. General attitude among many landholders that they are still in the pioneering stage of developing the resources and that the problems being faced south of the border will not occur north of the border. Native plant and animal communities need to be 'tamed' or 'developed' to make a living from the land.
- Lack of local information about status of native plants and animal communities and their contribution to overall property management for production.
- Lack of effective communication programs by the Department of Environment and Heritage, Wildlife Preservation Society and Queensland Conservation Council to rural landholders about values and importance of conserving native remnants.
- Emphasis in the Landcare movement on agricultural and pastoral degradation, repair and development of sustainable practices. This has been the case since inception of program in 1989. Lack of understanding of contribution of remnants (including wetlands) to catchment management, prevention of dryland salinity, water quality, quality of life and to production. This is gradually being redressed (e.g. 50% funding arrangement under Drought Landcare packages).
- Agricultural and pastoral production in Queensland is a major component of the state's gross national product. Most of population is in south-east with the other 70% of state under rural production. State government still generally supports rural communities as in the previous 'Joh' government. Agriculture minister is in top five ministers. Environment minister near the bottom in level of importance.

- No adequate financial incentives provided by state or local or federal government.
- Cynical view by members of the public on decision-making processes involving remnants and/or threatened species (e.g. eastern tollway process).

Factors promoting maintenance

- Landcare is assisting in promotion and acceptance of nature conservation as an acceptable activity.
- In older landholders, the attitude that they want to protect a patch of remnant because they 'promised' their father/grandfather. Possible under *Nature Conservation Act 1992.*
- Inaccessibility of remnant making it too costly to develop.
- Activities of the rural/Queensland Conservation Council liaison officer with the Queensland Landcare Council.
- Agreement provisions in the Nature Conservation Act that allow private landholders (including authorities, power stations, local government) to tie land to title for a certain period of time or indefinitely.
- Save the Bush grants under NLP for community groups.

Factors promoting or reducing the maintenance of native vegetation on farms in Tasmania

Penny Wells, Tasmanian National Parks and Wildlife Service

In Tasmania there is no legislation which controls the clearing of native vegetation, other than for forestry purposes. Consequently maintenance of vegetation on private land is largely voluntary and the amount of vegetation any one property retains is generally dependent on the overall economic climate and availability of assistance such as financial incentives and information/advice.

The principal factors which promote or reduce conservation management of native vegetation in Tasmania are outlined below.

Economic climate and financial incentives

Economic climate is one of the greatest influences on the degree of maintenance of native vegetation. During droughts or recession when little cash is available on farms there is great pressure on vegetation remnants to provide resources for fodder/grazing, firewood, forestry activities, the wildflower industry, gravel and soil extraction and, to some extent, mining.

At present the Midlands and parts of southern and eastern Tasmania are severely affected by drought. These regions are the traditional pastoral areas of Tasmania and coincide with the areas of highest conservation priority for native vegetation. The few remnants which do remain on private land, particularly in the Midlands, have suffered from repeated firing and grazing, and problems such as tree decline and weed invasion are prevalent. The present drought has severely exacerbated these problems and is leading to a further decline in native vegetation quality and extent.

Financial incentives are the most likely factor to promote maintenance or restoration of native vegetation during difficult economic times. Apart from Commonwealth funding programs (see below), there are few financial incentives to retain vegetation. More recent tax incentives through the amendment of S75D of the Tax Act have been a positive step, but naturally in difficult economic times farms are not generating income, consequently tax relief has little real incentive value. Other types of financial incentives are required.

In Tasmania the *Public Land (Administration and Forests) Act 1991* provides for compensation to be paid to private foresters if forestry operations are restricted due to the presence of rare or endangered species. No cases have yet been tested since the Act became effective and the government has yet to establish a compensation fund in any case.

There are no other specific financial incentives for retaining vegetation in Tasmania. Rates rebates have been considered in some local government areas, but as yet none have been specifically introduced relating to vegetation.

The lack of specific state-based financial incentives needs to be addressed in order to facilitate protection of remnant vegetation, particularly in poor economic climates.

Legislation and codes of practice

The *Forest Practices Act 1985* and the *Public Land (Administration and Forests) Act 1991* are the only pieces of legislation which can compulsorily regulate vegetation clearance. The Forest Practices Act requires that forest practices on both Crown and private forests are undertaken in an environmentally acceptable manner. The appropriate standards are set out in the Forest Practices Code and these are applied during assessment of timber harvesting plans. For example, the code does not allow vegetation clearance during forest harvesting from banks of certain sized rivers and streams. The Public Land (Administration and Forests) Act only restricts vegetation clearance in so far as it relates to private forestry activities which may have an impact on rare or threatened species. A conservation covenant can be placed on private land in such cases, but can only be compulsorily applied if compensation is paid. The limitations of these pieces of legislation is that they only relate to private land where forest harvesting for wood production is taking place. The legislation does not apply to any other type of vegetation clearance; for example, a landholder can clear stream-side vegetation retained during logging operations after logging has ceased if it is for cropping or grazing purposes!

The *National Parks and Wildlife Act 1970* provides voluntary mechanisms for protecting native vegetation on private land. Such mechanisms include private wildlife sanctuaries, conservation covenants and agreed management plans. All three mechanisms, once agreed by a landholder and implemented, are binding on property titles. Although initially voluntary, such mechanisms will also bind future landholders and are therefore likely to have some positive influence on overall vegetation clearance rates in the future. The major difficulty with such agreements, of course, is enforcement. The majority of management and enforcement resources within the parks and wildlife service are still directed at public land.

Tasmania has recently tabled the Threatened Species Bill in Parliament and it is expected to be enacted by late 1995. If enacted, the Threatened Species Act will require identification and formal listing of rare and threatened species, and will provide a voluntary mechanism for protecting native habitats of such species where they occur on private land.

The lack of planning controls on vegetation clearance on private land for activities other than forest harvesting is a major deficiency in Tasmanian legislation and has enabled an average rate of vegetation clearance of 15 000 ha per annum in the period 1972–88, and 6000 ha per annum between 1980--1988.

A general fear in the farming community with respect to binding agreements such as conservation covenants has also hampered efforts to promote vegetation retention through the voluntary mechanisms described above.

Funding programs and assistance schemes

One of the most successful programs in promoting vegetation conservation in Tasmania is the federally funded Save the Bush Program administered by the Australian Nature Conservation Agency. The program provides funding for a Save the Bush coordinator who promotes and facilitates native vegetation conservation in the state. Since the officer was appointed in November 1994 the level of community interest and support for vegetation conservation has been overwhelming. Save the Bush provides significant levels of funding for community groups to assist in the protection, education and awareness of native vegetation, and to date much of the funding has been concentrated in the Midlands to fence off remnant vegetation from stock grazing.

Off-reserve conservation of native vegetation has benefited greatly in Tasmania from numerous other programs such as the National Landcare Program, One Billion Trees, Grasslands Ecology Program, Endangered Species Program, Whole Farm Planning, Drought Landcare, LEAP, REAP and the networking of locally based community groups and organisations.

The Land for Wildlife Program, based on the Victorian scheme, is likely to generate further interest in private land vegetation conservation, although the scheme has only been investigated in Tasmania and has yet to be formally implemented. At present an informal 'land for wildlife' program is in effect occurring through links between existing off-reserve conservation officers within the parks and wildlife service.

A number of forestry assistance schemes are detrimental to native vegetation retention as these promote native forest harvesting on private land (although most such schemes do require regeneration post-harvesting). These include the Joint Venture

Plantations Scheme, Regeneration Scheme, Extensive Regeneration Scheme, Associated Tree Farmer Scheme, and Farm Forestry Joint Venture Scheme.

Management information

There is considerable information on the management of Tasmanian native vegetation, ranging from handbooks, booklets and education kits, to pamphlets, brochures and note sheets. These are too numerous to list but have been produced by government organisations such as the parks and wildlife service, Department of Education and the Arts and Forestry Tasmania, educational institutions such as the University of Tasmania, environment groups such as the Tasmanian Environment Centre and the Tasmanian Conservation Trust, and community organisations such as the Society for Growing Australian Plants.

Such information, however, is not always easy to access, and there are still major gaps in information relating to specific vegetation types and different species. Another deficiency in this area is a lack of extension officers available to assess vegetation remnants and provide on-ground information directly to landholders. This has improved recently in Tasmania with the employment of the Save the Bush coordinator and the funding of several native vegetation projects through the University of Tasmania, and may improve further if the Threatened Species Bill is enacted and adequately resourced. Coordination of information is another problem, as much of the information is scattered and sometimes inconsistent.

Perceived benefits and values of native vegetation remnants

This is an area which requires more attention in Tasmania. There is insufficient quantitative and user-friendly information relating to the benefits of vegetation retention on farms. A rural biodiversity conference held in Tasmania in 1994 attempted to address this issue and, while consolidating some information, it did, however, highlight the lack of specific data. As farm management is intimately linked to economics, information in this area could have a significant positive influence on remnant vegetation conservation.

Responses

Participants were asked to respond to the following questions before coming to the workshop.

1. What do you think are the main problems in managing remnant native vegetation?
2. What change would you most like to see that would lead to improved management of remnant vegetation?
3. Who or what organisation(s) should do what to achieve your wish?
4. How should this change be brought about?

The responses received are reproduced here.

John Cary

University of Melbourne

Main problems in managing remnant vegetation

- Locality differences for agro-ecological zones and different rural industry zones. It is economically less attractive for cropping zone farmers on the inland margin of the Great Dividing Range to maintain or develop remnant vegetation than it is for landholders in higher rainfall grazing and coastal zones.
- Peri-urban native grasslands present areas with conflicting social demands for development and for creating non-remnant 'European parklands'. As a consequence of development, remnant vegetation is relatively rare and often more frequently encountered in sparsely settled or less developed land. Where government-funded inducements to encourage preservation might be offered, criteria for selection which meet the national interest will need to be determined and agreed.
- Remnants provide landscape and aesthetic values in addition to ecological values. The greatest social benefits in capturing landscape and aesthetic values will occur in areas of greater human use, i.e. within travelling distance of larger centres of population.
- The motivation for most landholders to maintain and protect native vegetation will be utilitarian or instrumental. Relatively few landholders have sufficiently strong ecological values to make

significant impacts on native vegetation retention, where there is no clear, observable, and quickly-realisable private benefit.

- Other motivations for the maintenance of remnants and the development of more aesthetic landscapes may be developed over the longer term, particularly in the more closely settled, higher rainfall areas.

Improving management of remnant vegetation

- Research is required in the area of rural landscape perception, including investigations of differences in rural and urban perceptions of appropriateness of, and preferences for, landscapes including remnants. Some research of this nature is being conducted in New Zealand. In some New Zealand high country, agroforestry is often at odds with conservation of remnant grasslands.
- The management of native remnants needs development, particularly the use of fire, control of exotic and feral pests, etc. While it is not 'politically correct' to say so, much Australian native vegetation does not naturally complement European farming methods and patterns of settlement. There is still much to be learnt about adaptation, management and (re)design of traditional landscapes of native vegetation to provide for harmonious coexistence with modern human settlement.
- The lessons from Europe, and particularly the United Kingdom, where set-asides and other programs provide government support for conserving environmentally sensitive areas, are that such programs are the outcomes of larger structural adjustment policies for rural industries. However, the environmental thrust of these programs arises because of active, and predominantly urban, concern about the state of rural landscapes or the viability of disadvantaged rural communities. Such concerns need to be fostered in Australia, essentially amongst urban people, as a necessary but not sufficient condition for public funding contributions for more active maintenance of native vegetation on private land.

Mike Clark

Greening Australia, Northern Territory

Main problems in managing remnant vegetation

- Lack of awareness of the values of native vegetation.
- Expanding live cattle export industry—cattle-grazing most extensive industry in NT.
- Feral animals, weeds, fire.
- Lack of suitable funds to support integrated approaches to feral animal, weed and fire control.
- Lack of people and resources working in this field.

Improving management of remnant vegetation

- Improved planning processes that consider preserving suitable areas of native vegetation as part of the course.
- More community awareness programs aimed at all sectors of the community, including government, local councils, etc.
- More support by Northern Territory government agencies.
- More support from federal agencies through provision of funds, etc., STB, BRS, ATSIC, OBT, LWRRDC, RIRDC, community land and water grants.

Responsible organisations

a) CCNT/Landcare NT/GANT/CSIRO/DPIF PRIMELINK should conduct workshops/field days to increase community awareness amongst Landcare groups, government extension officers, etc.

- GANT/CCNT/CSIRO should be major players in planning decisions concerning native vegetation.
- Government agencies (and the government in power) such as CCNT, DPIF, DoL, CSIRO, PAWA should change their policies to support initiatives in retaining native vegetation. Community organisations such as GANT to lobby.
- NT Government to look at providing financial incentives to landholders who retain and maintain native vegetation.

- Federal research and other funding bodies such as LWRRDC, STB, provide more funds for research, on-ground activities and so on concerning native vegetation on agricultural land.
- Department of Taxation and Department of Environment, Sport and Territories.

Bringing about the change

- Continued lobbying and awareness programs by community organisations.
- Increased federal support.
- People such as ourselves getting together.
- Increased federal/territory cooperation in conservation strategies, etc.

Aboriginal land

Food

Utopia example—purchased station—destocked—save native vegetation and bush tucker/medicine.

Now

Health has dramatically improved. Bush medicines used in health service.

Nutrition—more than 50% coming from bush tucker. Has major impact on disposable income available to people. More cash left in the cheque.

Summary

What once supported four or five white fellas on a cattle station now supports several hundred Aboriginals.

The implication is that a huge jump in socio-economic return has come about by converting from cattle-grazing to sustaining native vegetation and utilising it.

Artefacts

Timbers for carving art, didgeridoos, etc. is a major dollar spinner for some people.

Now

With large demand, need sustainable management strategies to avoid resource depletion.

Marketing of bush foods and medicines

Market currently $18 million per year. Soon expected to be $50 million per year. Aboriginal people are and will be more involved. Colin Anderson proposal for Native Food Farm Network and Marketing Board for Aboriginal people nationally is an indication of this.

Industry will rely on sale of wild food as well as intensive selection/horticulture.

Cultural maintenance

Traditional practices/stories often involve native vegetation management or plants as story markers, e.g. ghost gums mark a trail of kangaroo ancestral beings from Dreamtime.

Main problems in managing remnant vegetation

- Economic—not enough dollars to do it, but also pressure to keep at least minimum cattle, even if non-sustainably, for economic survival.
- Awareness of contemporary nature of many of the problems is not good at times. Also *different world view*—feral animals and weeds not seen as always a problem but as a resource at times; so science has to respond more appropriately before people listen.
- Money for programs like ALEP is scarce.

Improving management of remnant vegetation

- Reduce *political* pressure on Aboriginal mobs to run pastoral operations.

Responsible organisations

- Land councils, e.g. Central Land Council.
- Regional service organisations need funding.
- Direct funding for materials to landholders.

Bringing about the change

- Regional funding to community organisations.
- Much reduced *state* government role in determining resource allocation.
- Regional service delivery agreements.

Jim Crosthwaite

Department of Conservation and Natural Resources, Victoria

Main problems in managing remnant vegetation

- There is no provision for information, support, or assistance for landholders with remnant vegetation at 'crunch' times (property purchase, property

hand-over to the next generation, family crisis, crop failure, drought, falling prices, etc). At such times, it is likely that many factors (bank managers, their own instincts, family needs, neighbours) are leading them to handle the immediate crisis with measures which could involve loss of remnant vegetation. Property management planning is a partial solution only, and may be a holding operation at best—given ongoing pressure on many farms to get productivity improvements of 5% to 10% per year simply to keep even (costs up, prices down). The increasing tendency of landholders to invest and work off-farm may be an ameliorating factor.

- Those providing mainstream farming advice to landholders (bank managers, farm consultants, input suppliers, etc.) are largely untouched by the need to conserve remnant vegetation. Hypothesis: they are not informed, do not understand it, and are ill-equipped to integrate it into their advice.
- Agricultural research now being undertaken influences outcomes in 10 to 20 years' time. Understanding, managing and utilising remnant vegetation is largely peripheral to mainstream agricultural research. Changes are occurring but it is largely left to LWRRDC, ANCA and the Murray–Darling Basin Commission, and the odd research project funded by a particular industry research council.

Improving management of remnant vegetation

- Farms robust enough to withstand foreseeable pressures, as well as unanticipated events.
- Information, support, or assistance in specific circumstances.
- New policy focus by agriculture/conservation agencies.
- Advisers to be knowledgeable in a general sense, to be sensitive to conservation issues found on a property, and to alter their usual advice accordingly.
- Integration into mainstream agricultural research.

Responsible organisations

- Joint DPIE/ANCA initiative involving state agencies, rural finance bodies, etc. Possibly through the Australian and New Zealand Environment and Conservation Council and/or SCARM.
- LWRRDC/ANCA coordinating and funding role. State agencies and groups like GAV implementing role. Pressure from landholders and Landcare groups.
- An informal, broadly-based task force at least initially.

Bringing about the change

- Research into the relationship between remnant vegetation loss and key farm decisions compared to day-to-day management. Survey farms for capacity (robustness and flexibility) of farm management system to allow protection of remnant vegetation in face of future negative events. Development of example farm strategies (not models) for different regions and farming types. Trial in one region where property management planning is going well. Extend property management planning into developing long-term strategies for individual properties (and owners).
- Survey advisers (and farmers about advisers). Packages aimed at informing, educating and involving advisers. Develop workshops. Possible pilot approach in one region involving Landcare groups, etc. Give it profile in local press and in various remnant vegetation newsletters.
- Review current situation and guidelines funding bodies use. Then develop initiatives.

Alison Doley

Waddi Forest Land Conservation District Committee, Western Australia

Main problems in managing remnant vegetation

- Landholders' perceptions of remnant vegetation vary from a resource to be exploited to an appreciation of aesthetic and biodiversity values.
- The cost of fencing remnant vegetation in terms of money and scarce labour.
- The control of weeds.
- The control of feral animals, of local species that have increased to pest proportions due to the changed environment, and of species exotic to the area.
- Extraction of gravel and rocks and dumping of bush, soil and weeds on public and private land without permission by local government employees.

(Remnant vegetation includes road verges. Local government attitudes to the preservation of this resource vary widely.)

Improving management of remnant vegetation

- A change in the perception of the value of remnant vegetation.
- The introduction of tax credits to the value of 150% for fencing remnant vegetation would reduce the cost.
- The implementation of covenants that are simple and inexpensive to apply would encourage some landholders to use them.

Responsible organisations

- The Department of Agriculture needs to continue research and extension to provide more evidence of the economic benefits of retaining remnant vegetation on farms.
- CSIRO's wildlife and rangelands research should be funded and encouraged to provide more information on the role of remnant vegetation as a valuable resource.
- The Department of Agriculture should ensure every Landcare group is serviced by a well-qualified Landcare project officer.

Bringing about the change

- Landholders intending to fence need guidance on the relative value of areas of remnant vegetation on their properties.
- Increased monitoring of the water table would provide evidence of the urgent need to act.
- Training programs for local government employees to encourage the retention of remnant vegetation on road verges and gravel reserves needs to be increased.

Marilyn Fox

University of New South Wales

Main problems in managing remnant vegetation

- Problems of tenure, some private, other variety of public administrations.
- Problems of administration, different in different states and territories.
- Differences in legislation.
- Problems associated with pest species which degrade the ecological value of remnants and create additional problems for adjacent agricultural land.
- Many remnants are probably too small for long-term viability, need either augmentation with planted buffers, or to be accepted in a degraded form in the future.

Improving management of remnant vegetation

- The need for both education on the merit of retaining remnant vegetation and on the need to minimise further disturbance.
- The need for guidelines on best practice, including guidelines on revegetation to maximise shapes, to create corridors.
- More research into values of remnants, both scientific and socio-economic.
- More research into management and more extension work to landholders.

Responsible organisations

- A mix of federal and state agencies with involvement of some specialty groups such as ANCA plus CALM (in most states).
- More funding for applied research.

David Goldney

Charles Sturt University

Main problems in managing remnant vegetation

- Lack of awareness by landholders as to what is happening to patches of bush and the isolated trees on their properties.
- See little or no need to value bushland—it looks after itself or maybe is *perceived* as 'rubbish land'.
- Do not understand how bushland fits into landscape–ecosystem processes. Hence do not understand the economic values which can accrue in terms of increased agricultural production or prevention of land degradation processes.
- If landholders accept all or some of the above propositions then:
  - lack of knowledge on which to proceed—after

all, there is little information on optimal conditions required for regeneration to occur
  - lack of knowledge about how to plan optimal placement of surrogate bushland (windbreaks, etc.) in the landscape at farm-scale or catchment level
  - lack of finance to implement programs
  - may not receive critical income level to enable tax deductions for activities engaged in
  - may prefer to plant trees rather than rehabilitate existing bushland because 'fencing out' may appear less of an achievement than tree planting.

Improving management of remnant vegetation

- Training of a range of existing extension people in agriculture and soil conservation, rural land protection areas and local government agents, who at present simply do not understand ecological–landscape processes, particularly the importance of remnant vegetation in the landscape.
- Legislative changes—proclamation of environmentally sensitive lands in NSW, ban (or moratorium) on further clearing; effective tree preservation orders at shire and council level.
- Extensive education materials on *economic* values of bushland on farms, plus management-orientated material.
- Government financial incentives to set aside bushland areas on farms.
- Farmer awareness about processes leading to remnant degradation.
- Research on the 'blockages' to behaviour change and actions on the ground.
- Set up experimental farms to 'model' integration of bushland and sustainable agricultural goals in key locations.

Responsible organisations

- Need to identify segments of farmer population (subcultural groups) that respond to a range of different pathways.
- Need to facilitate a range of options through:
  - individual landowners
  - Landcare groups
  - traditional government extension agencies interacting with landholders
  - non-traditional government agencies, e.g. Farming for the Future
  - critical media outlets (*The Land*, ABC TV, ABC radio, etc.)
  - total catchment management committees, etc.
  - farming organisations.

Bringing about the change

- Need non-traditional approaches since current (traditional) approaches self-evidently are not delivering the goods.
- Need additional pathways opened up beyond traditional extension approaches.
- Need creative marketing strategies to sell core messages with back-up facilities.
- Targeted research to fill knowledge gaps.

Robert Hadler

National Farmers' Federation

Main problems in managing remnant vegetation

- Technical: lack of an accurate national database, limited ecological knowledge and lack of whole ecosystem approach, poor communication/interpretation of ecological data by landowners, agencies and governments (Commonwealth, state and local).
- Economic/market: commercial imperatives on landholders to develop and generate income and lack of knowledge of commercial benefits of retaining remnant vegetation (productivity benefits in higher yields from shade and shelter, protection against woody weeds, etc.).
- Policy/administrative: lack of funding for key programs (e.g. Landcare, One Billion Trees and Save the Bush) and research and development, and cut-backs in state extension programs. Also perverse incentives (e.g. development clauses in leases) and lack of incentives to maintain remnant vegetation for agricultural and biodiversity purposes.
- Cultural: conflict between conservationists/regulators and politicians who resort to command and control approach and the 'frontier' ethos of some landholders. Failure to integrate and promote sustainable development approach of the Ecologically Sustainable Development Strategy (ESD).

Improving management of remnant vegetation

- Technical: improved national database and whole ecosystem approach to land, vegetation and water management.
- Economic/market: targeted education and extension programs to increase landholder knowledge about commercial and biodiversity benefits of maintaining remnant vegetation.
- Policy/administrative: increased funding for key programs, state extension programs (such as property management planning) and R&D, improved incentives for maintaining remnant vegetation and review of perverse incentives and regulation.
- Cultural: renewed commitment to sustainable development approach in the ESD Strategy.

Responsible organisations

- Technical: Australian Bureau of Agricultural and Resource Economics (ABARE), Bureau of Resource Sciences, CSIRO and research agencies/ corporations such as LWRRDC, ANCA and cooporative research centres should cooperate and integrate research programs.
- Economic/market: federal and state agencies improve education and extension services.
- Policy/administrative: federal and state agencies and local government review policies and develop national vegetation management strategy with increased resources to tackle problems.
- Cultural: governments, community and industry groups renew commitment to sustainable development approach in ESD Strategy.

Bringing about the change

- A comprehensive, national and integrated approach could be developed through a National Vegetation Management Strategy (similar to the Rangelands Strategy) that identifies principles, approaches and resources required.
- An alternative (second best) approach is to ensure that each existing and proposed strategy (e.g. rangelands, biodiversity etc.) incorporates vegetation management issues in a whole ecosystem approach.

Ian Hannam

Department of Land and Water Conservation, New South Wales

Main problems in managing remnant vegetation

- The disparate relationship between the *occurrence* of patches of remnants (variability in shape and size, vegetation associations, degree of isolation, etc.) and land *ownership* and tenure. This creates problems for development of management regimes; dealing with variations in condition of remnants.
- The wide variation in perceptions and understanding of the ecological value of remnant patches presents difficulties in organising educational programs and awareness programs, and managing responses.
- Lack of ecological information on particular remnant groups presents difficulties in organising and implementing specific field management programs.

Improving management of remnant vegetation

- Development of a more effective approach (better structure) by the Department of Land and Water Conservation to deal with the management of remnant vegetation as a distinct ecological land management issue. At the moment, responsibility and interest in remnant vegetation is spread amongst three or four different groups (some legal-based, some field advisory), with little coordination and adherence to similar standards or guidelines. This is compounded by the geographic separation of responsibility (e.g. Western Division, tablelands, coast).
- A facility for more research on ecological, land management and cultural aspects of managing remnant vegetation.

Responsible organisations

- See above paragraph on the Department of Land and Water Conservation.
- Given the diversity in land tenure (on which remnant vegetation occurs) and the variability of the ecological condition of the vegetation, it is appropriate that a number of Commonwealth

agencies, state departments, non-government organisations, academic institutions and landholder groups have a formal role in vegetation management.

Bringing about the change

- In the first instance, a substantial amount of *legislative reform* must be undertaken, particularly at the state level, to develop a proper legislative framework for vegetation management (the existing legislative structure is confusing and its effectiveness (application) is highly variable).
- The legislative reform should provide for proper policy development, and a process for development of *land management guidelines.*

Richard Hobbs

CSIRO

Main problems in managing remnant vegetation

- Lack of clear management guidelines/principles.
- Need for region/location specific management prescriptions.
- Lack of knowledge of outcomes of management activities.
- Expense and labour intensity of likely management treatments.
- Need to manage at landscape, not remnant, level.
- Likely irreversibility of some types of degradation.
- Lack of resources to tackle problems adequately.

Improving management of remnant vegetation

- Increased availability of resources to apply to management, and information by which to be guided.

Responsible organisations

- Government: increased incentives for management.
- Landcare groups: incorporation of remnant management into farm/catchment planning.
- Research/extension agencies: collation of existing information and dissemination in usable form. Cooperation between agencies for unified approach.

Bringing about the change

- Increased awareness of remnant vegetation in general population and in politicians.
- Training of LCD advisers, etc. in remnant vegetation management.
- Creation of formal/informal links between agencies to develop integrated approach—could be mediated and facilitated by funding agencies.

Phillip Hone

Deakin University

Main problems in managing remnant vegetation

- There would appear to be two underlying problems in managing remnant vegetation. The first is a lack of understanding of how land management practices affect the level and quality of our natural resources. This information problem relates to all parties involved in the management of native vegetation and not just farmers.
- The second problem is that individual land managers are often unaware of incentives which would help them achieve the best results both for themselves and society.

Improving management of remnant vegetation

- Who knows?

Presumably research and development has a major role to play. I think it is important to ensure that this research and development is funded from appropriate sources, given that budgets are always limited. Where there are predominantly private pay-offs involved, the commodity RIRFS should be encouraged to pick up the tab, while public funding should be targeted at those projects offering limited private benefits. The commodity RIRFS would appear to have a potentially important role to play in any complete research and development strategy in this area. (I don't see any people from this sector listed among the participants?)

Penny Hussey

Department of Conservation and Land Management, Western Australia

Improving management of remnant vegetation

- The change that is needed is an alteration in the traditional mindset of rural landholders.

Responsible organisations

- Educational institutions—especially tertiary—to include ecology (or, better still, James Lovelock's 'geophysiology') in *all* courses which could lead to land management; agriculture, geography, zoology, etc. *Agriculture, especially, is currently mostly treated as a technical manipulation of resources*, almost never as a modification of ecology. Is the mess the land is in a direct result of the 'we can fix it' mentality? It is vital that economists (especially ones in politics!) understand how infinitesimal their time-scales are.
- Agricultural lobby groups of farmers, e.g. Western Australian Farmers Federation, woolgrowers, etc., of agricultural scientists and advisers such as Plant Pathology Society, etc. It is time that such groups took account of the fragility of their resource base. Where are the Hanging Gardens of Babylon now? Turned into salt.
- Local government needs to be the leader, not the follower, towards 'ecologically sustainable development' (for want of a more accurate catchcry). As a start, boundaries should be adjusted to conform to bio- geo- divides.

Greg King

Victorian Farmers Federation

Main problems in managing remnant vegetation

- Lack of knowledge about where it is and how to manage it.
- Lack of finances.
- Lack of interest.
- Suspicion of motive—i.e. Victorian government really mucked up implementation of Amendment S16 to Planning Schemes in Victoria, as there were some farmers who had bought vegetated land to clear, and the amendment prohibits this. Farmers who had borrowed money to purchase the land were caught. They have to pay for land they cannot clear, and it has no resale value (usually).
- Landholders with some areas of native vegetation have been selectively logging areas for their own use for fence posts or firewood. This activity has been prohibited.

Improving management of remnant vegetation

- Financial incentives:
  - abolishment of rates on areas of native bush
  - 'set aside' payouts. This puts an immediate value on such land. (After all, public land has *paid* managers; why hasn't private land?)

Responsible organisations

- Landcare is being regarded more sceptically by landholders because it has become a popular grab-bag for any land issue.
- Many more marginalised entities use Landcare as a means to achieve the entities goal.
- Bureaucracies are, by their nature, unwieldy and regulatory. If an organisation like the Victorian Farmers Federation, which has 68% of Victorian farmers as members, was more involved in encouraging protection of remnant vegetation, perhaps better results would be achieved. The Victorian Farmers Federation is seen to be non-regulatory. Its Landcare section is highly regarded by government agencies, non-government agencies and farmers alike.
- Therefore use the Victorian Farmers Federation Landcare section to help achieve better remnant bush management.

Bringing about the change

- Provide the VFF with an amount of money that is directed to protecting remnant vegetation. The VFF then seeks cooperation by asking farmers to identify areas on their farms containing remnant vegetation or what they think is remnant. A farm inspection can be undertaken by an appropriate person. The farmer either receives finances for protecting this vegetation or is refused finances.
- At least this mechanism will pick up unconvinced landholders, given that many landholders in Victoria voluntarily protect such areas.

James Kirkpatrick

University of Tasmania

Main problems in managing remnant vegetation

- Lack of long-term protection from land clearing.
- Changes in management regimes induced by land sale, inheritance or changes in economic circumstances.
- Lack of financial incentive to maintain appropriate management for nature conservation.

Improving management of remnant vegetation

- Legally-based controls on land clearing.
- Management agreements with performance-based financial incentives of a sufficient magnitude to make legal controls on land clearing palatable to the rural community.

Responsible organisations

- Federal, state and territory governments.

Bringing about the change

- Commonwealth legislation under its foreign affairs powers.
- Funding for incentives through the national tax base, with funds created by a biodiversity levy or by diversion of funds from road-building.

Jill Landsberg

CSIRO

Main problems in managing remnant vegetation

- I'm an ecologist and so I am more aware of ecological problems than of socio-economic ones. However, I think that lack of ecological knowledge is a major impediment to successful management of remnant vegetation. As an example, tree decline (dieback) is a severe, ongoing threat that is probably killing many more trees than are regenerating or being planted. Although we have a general idea of its causes, we know hardly anything about specific mechanisms, except that they are likely to vary in importance between regions. We know even less about how to rehabilitate affected stands of trees or how to 'dieback-proof' currently healthy ones. My impression is that fear of failure is often part of the reason why managers do not do more to protect remnant vegetation. And given our present state of ignorance I think that it is a well-based fear. Of course there are many other problems in managing remnant vegetation and many of them have been addressed in the background papers. So here I've just concentrated on my hobby horse.

Improving management of remnant vegetation

- A greater appreciation of remnant vegetation is the first step toward improved management. Although things are changing, I see relatively little evidence of a general community appreciation of the crisis facing native vegetation across most of our agricultural lands.
- Things needed to achieve this greater appreciation include a better knowledge base (point one) and much better communication about it.

Bringing about the change

Everyone involved should be active in general communication but most already are. There seems to be a perception that the results of research are not getting through to landholders, but an alternative explanation is that there are very few research results to communicate. In any case the urgency of the problem requires a major coordinated and focused publicity campaign rather than a call for more effort from the same few.

- One Billion Trees was a start but it focused almost entirely on revegetation—something similar focusing on saving what we've got would be a real help.

Geoffrey Lawrence

Central Queensland University

Main problems in managing remnant vegetation

- The tendency toward maximum use of the property for productive purposes (driven largely by marketplace considerations). Producers have sought to produce more as a means of overcoming terms of trade declines. Increased tree clearing has been one outcome.

- Attitudes of producers to native vegetation (harbours 'vermin', competes with pastures, etc.).
- Lack of knowledge of producers of benefits of trees.
- Legislative problems. What the federal government might desire, various states or local governments may oppose.
- The general nature of private and leasehold property. On private property, producers believe they have the right to do what they like and are suspicious of those who want to exert external control. On leasehold property, farmers have been required in some areas to show that they are 'managing' the land, and this has often required clearing to be undertaken (or has been interpreted by farmers to mean this).

Improving management of remnant vegetation

- Comprehensive planning on a catchment basis with the input of various groups of stakeholders.
- A notion of what sorts of native vegetation needed to be maintained and for what reasons.
- A national plan to educate farmers about the desirability of maintaining remnant vegetation.

Responsible organisations

- While it could be potentially divisive, the federal government could take a lead by providing incentive money for property owners to maintain certain important stands of vegetation 'in the national interest'. This would be much like the British paying farmers to keep hedgerows as a means of preserving the 'English countryside'.
- State governments could, through their various departments of agriculture and environment, provide information to farmers about better vegetation management.
- State governments could, via new forms of group extension, begin to introduce new ideas about appropriate land and vegetation management.
- LWRRDC and other industry-related bodies could fund research into the best ways of bringing about change in vegetation management among Australian rural producers.

Bringing about the change

- There is evidence that group processes—particularly those involving women in decision-making—might lead to change in attitudes (and perhaps behaviour) among producers. State extension might consider spending more on group extension as it relates to vegetation management.
- Landcare might be an appropriate vehicle for the provision of funds for education of members about the importance of remnant vegetation.
- Where it is deemed essential to save tracts of native vegetation, legislation (including appropriate penalties for non-compliance) should be enacted quickly so that lands will not be cleared out of 'fear' of the government's intentions. (In Queensland at present large areas are being cleared because new legislation, which will limit clearing, is not yet in place).
- Government funds should be available to study social aspects of decision-making on Australian farms, including the nature of 'farming styles' and subcultural norms of modern-day farming.

Ted Lefroy

Department of Agriculture, Western Australia

Main problems in managing remnant vegetation

- The main problem with the management of remnant vegetation is that it cannot be attempted in isolation of the matrix within which the remnants lie, i.e. the surrounding agricultural landscape. Attempts to manage remnants in isolation of this matrix will not be effective as the major threats to the remnants, such as rising water tables, nutrient pollution, weed invasion and predation, are functions of the surroundings. A good parallel is the fate of small island nations faced with the threat of rising sea levels. Nobody would seriously suggest taking action only on the islands to overcome the problem. It is the matrix that is in need of change. In many cases the current diagnosis of the problem is too narrow.

Improving management of remnant vegetation

- The development of agriculture as a structural and partly functional mimic of the native ecosystem.

For example, where the dominant native ecosystem was open woodland and agriculture has effectively resulted in the transformation of this landscape to a synthetic open grassland of crops and pastures, I believe we need to develop farming systems that are structural mimics of the open woodland. Nothing short of such a return to a structurally analogous landscape will see us having any significant impact on the major land and nature conservation issues that are threatening agriculture's resource base and the remnants of native vegetation. Such an approach would reduce the dissimilarity and therefore the tension that currently exists between agriculture and native remnants which is at the heart of the problem. This could be seen as the ecological version of the cultural reconciliation process that Australia is currently going through.

- This idea of developing agriculture as a mimic of native ecosystems has been put forward by several ecologists and agricultural scientists, notably Hart (1980), Ridpath et al (1985) and Ewel (1986) working in the tropics and Jackson (1985) with reference to temperate North America and Lefroy et al (1993) and Lefroy (1994) in southern Australia. It is being actively researched by Jackson in the USA.
- The same principle needs to be examined with respect to woodland, forest heath and mallee ecosystems in Australia.

Responsible organisations

- Existing collaborations of R&D corporations, state government agencies, CSIRO, universities and landholder and other community groups should direct their attention to the following areas.
  - developing tree and shrub crops, as revegetation at this scale needs to be commercially driven
  - developing intercropping and agroforestry systems using mixtures of annual and perennial plants, both woody and herbaceous; the economic opportunities lie not only in the commercial value of woody and herbaceous perennial plants, but also in the synergy that can result from well-designed mixtures of these with conventional agricultural species
  - participatory diagnosis and design to implement experimental treatments that test this hypothesis at a scale large enough, firstly, to have an impact on land and nature conservation issues (i.e. first order catchment or larger) and, secondly, learn about the practicality and acceptability of this approach from a landholder's perspective. Three large issues would need to be addressed when pursuing this approach. The *ecological* questions: can salinity, waterlogging, soil erosion, and the protection of remnants be effectively addressed by an agricultural landscape that mimics the structure of native ecosystems, and how strong does that mimic need to be? The *practical and social* questions: how can the disruption to conventional agriculture and to income be minimised; in other words, to what extent can complementarity between the new landscape and the old be maximised and conflict be minimised? What degree of change is acceptable to existing landholders, and to what degree are we dealing with generational change? The *economic* questions: what are the implementation costs, what are the benefits and how long until they appear, and the corollaries to that: what potential is there for the new vegetative structure to generate income, and what is the time lag before that income is likely to be realised?

Bringing about the change

- Firstly by widening the debate to suggest that current thinking does not go far enough and that fundamental change is necessary in the management of the agricultural landscape.
- Secondly by canvassing this approach of mimicking native ecosystems as an organising principle for the development of sustainable agriculture and thereby reconciling some of the major differences between agricultural land and remnants of native vegetation.

Wayne Marano

University of South Australia

Main problems in managing remnant vegetation

- Lack of current knowledge regarding current landholders' attitudes to and practices of vegetation management.
- Socio-economic impact on landholders.
- Lack of direct economic incentives for landholders to undertake management.

- Lack of vegetation management training.
- Monitoring vegetation management.
- Resolution on how it should be managed.
- Lack of management plans which integrate remnant native vegetation with farm management plans.

Improving management of remnant vegetation

- Identify current landholders' attitudes and management practices of remnant native vegetation.
- Identify past and present socio-economic impact on landholders as a result of vegetation management intervention measures in order to minimise future occurrences.
- Provide greater financial assistance to landholders.
- Educate landholders and the community in vegetation management.
- Shift field responsibility to landholders and community groups.
- Identify best management practices.
- Involve landowners in management plan preparation. Remove centralised decision-making.
- Introduce local government environmental planners.

Responsible organisations

- Researchers.
- Central authority, local government, best practice managers.
- Landholders, community groups, agricultural extension officers.

Bringing about the change

- Conduct survey of landholders' attitudes to remnant vegetation management and current management practices.
- Produce model for identifying socio-economic characteristics of at-risk landholders.
- Federal grants, environmental levy.
- Demonstration farms, on-site training.
- Train landholders and community groups in monitoring procedures.
- Benchmarking.
- Introduce comprehensive regional and local farm management plans.

Jim McDonald

Liverpool Plains Land Management Committee

Main problems in managing remnant vegetation

- Economic context that landholders are working in—this has been declining for decades.
- There is a problem with current extension paradigms—this is compounded by the fact that environmental sciences, e.g. hydrogeology, ecology are inexact sciences.
- 'Values' cannot be accounted for, yet are promoted to be paid for by the 'user', e.g. recent challenges between Ehrlich and Simon about the state of the world in ten years' time. Simon argues that things that relate directly to human welfare are the only important indicators that we need worry about, such as life expectancy or the future price of food. We now know, and are struggling to come to terms with (emerging ecological economists), the costs that are associated with the use of natural resources. This problem cannot be isolated from others that face rural communities.
- I don't think we fully understand who exactly is still removing native bush (small/medium/large family farmers, corporate farmers, tax-driven investments, developers) and it follows we do not know what response is appropriate.

Improving management of remnant vegetation

- Why the single focus on agricultural land--there are a lot of public institutions that have an impact on the native vegetation.
- A little bit of the rhetoric sticking and being applied to the current belief in 'integrated environmental management', political will and leadership is needed and not just the historical method of 'command and control'.
- Resource and allow those who use the resource to understand the threats and expand the opportunities that may flow from this understanding. The current call from the Australian Conservation Foundation to withhold resources and funds from the only people who are capable of doing all this work is astounding.
- Use of credits/debits, 'shadow' projects in allowing development to occur in identified areas and

situations. Are there other ways to achieve the same outcome than simply locking it up?

Responsible organisations

- Start at the ground level—all levels need to develop a working relationship. At the moment the process lacks trust.
- Policy-makers need to reinforce community management and action.
- Funding organisations should see a commitment in applications to improving the process and extension methods.

Bringing about the change

- Concept needs to be given legitimacy at all levels of government; as much as possible need to agree on a vision.
- Leadership is needed in promoting integration; need to be committed to an outcome.
- Identify and enhance current examples, e.g. Murray-Darling Basin Commission, a procedure for identifying priorities; need to be committed to joint success not individual claims to that success.
- Promote successful outcomes—trust is the problem. A history of inaction, unsubstantiated claims and conflicting advice from all sides have led to this problem of mistrust. Therefore we all only do what we have to make it look as though integration is happening.

Tein McDonald

University of Western Sydney

Main problems in managing remnant vegetation

- It would make a real difference if the field manager were able to predict when a remnant is undergoing changes that exceed recovery capacity and how to avoid damage or maximise recovery using different interventions. In other words, the field manager needs empowerment with technical information and appropriate degrees of encouragement. I think there is enough technical knowledge to have some reasonable success at remnant vegetation management. But there is a problem with communicating that information, both between practice and theory and theory and practice.

Improving management of remnant vegetation

- I would like to see bushland management principles and techniques brought into all land management training and to be always accessible to land managers. In practice this means bushland management principles (at least) need to be part of all agricultural and other resource management courses. It also means that a two-way technical information facility is needed within the community, into which farming and other management groups can link at a local level.
- Also, I think mechanisms are needed for more accurate assessment of what sites are worth working on and which sites are not worth working on. A lot of this information can only be gained by two-way networks.

Responsible organisations

- I would like to see stronger networking of all existing revegetation groups at every level from local to national to develop a *cooperative information network*. But I think any cooperative program needs to be facilitated at a national level (e.g. ANCA/LWRRDC) with pivotal technical personnel at regional levels dedicated to keeping the flow of technical information going both ways. The Greening Australia (NSW) IGAL model is a good working model, but any truly effective network needs much stronger links with Landcare and with ecologists and managers throughout the spectrum of involvement.
- A technical newsletter is also needed and a rigorous but non-scientific periodical or magazine (along the lines of the US *Restoration & Management Notes*) that can popularise technical information using real-life case studies.

Bringing about the change

- Lifetimes are too short (and management regimes required to effect important change, too long) to set up yet another new organisation or new programs. We need to inject this information facility into existing programs so that it becomes a cultural fixture and can therefore hang around for long enough to work. I think that cultural fixture is the National Landcare Program (with its Coastcare and Bushcare cousins). But it needs a much broadened technical information base and to be backed up with a written resource or electronic database link so that people can refer to and build on a body of knowledge.

- In summary I think a formal (two-way) information network linking theory and practice is needed and that this should be funded nationally, grafted into existing networks, and with strong regional nodes.

Sue McIntyre

CSIRO

Main problems in managing remnant vegetation

- Human population too dense and increasing.
- General indifference to the problem in the population.
- Little awareness of where the real damage is being done.
- Where concern exists, there is a low level of understanding of the problem.
- Where there is some awareness of the problem, there is an emphasis on doing things (planting, engineering-type solutions) rather than *not* doing things, which is often the preferable solution.
- Where there is a high level of awareness of the problem, there is too little known about the vegetation, how it works and what the long-term implications of forms of management are.

Improving management of remnant vegetation

- Recognition of the role of local government and utility providers (telephone, electricity, roads) in destroying remnant vegetation and major changes in their practices—ecological awareness a prerequisite for all bulldozer operators!
- Increased awareness amongst rural and urban landholders, and effective action to manage their properties in a balanced and sensitive manner.

Responsible organisations

- Local government—needs good regional planning, the engineering emphasis needs to be softened, improved guidelines for works, improved public education on harmful environmental practices by urban dwellers.
- Utilities—radical revision of the environmental impact of installing and maintaining services. Reformed practices, equipment that is less damaging.
- Landcare—activities stepped up and with more environmental emphasis.
- Farming organisations—greater recognition of intrinsic value of conserving remnant vegetation.
- Lands department, etc—leasehold conditions need to take management into account.
- Federal government—financial incentives for conservative land management.

Bringing about the change

- Use all avenues. I don't feel any particular target for lobbying; consultation and education will achieve the goals. Nor do I think that it is the entire responsibility of any particular group to bring about the change. Furthermore, it is often quite unpredictable what will bring about a change. However, I do feel that local government and utility providers have somehow been overlooked up until now, probably because the damage they do is minor. However, it is incremental and cumulative—death by a thousand cuts.
- Equally important is the management of pastoral lands in humid/sub-humid regions. These have been overlooked as remnants because ecologists have failed, until recently, to recognise their value as remnants, or as support systems for more highly valued remnants.

Katrina McKay

Tasmanian Farmers & Graziers Association

Main problems in managing remnant vegetation

The majority of farmers recognise the intrinsic value of remnant bush, with many fencing areas off. There are barriers, however, to the widespread adoption of these practices. These include the following.

- Lack of money, time, labour to look after the bush effectively.
- Tree decline—areas fenced off are dying in great swathes.
- Lack of economic and other information about the benefits of bush on farms.
- Lack of real financial and other incentives.
- Invasion of remnant bush by weeds, especially gorse.

- Harbouring of wildlife in remnants, in particular wallabies and possums.
- Lack of readily available expert advice on a one-to-one basis.

Improving management of remnant vegetation

- Tax credits for remnant bush management, including weed control and fencing.
- Land tax and council tax rebates for the people who preserve/manage remnant vegetation.
- Access to low-interest rate loans and direct grants.
- Provision of technical advice through community organisations such as farmer organisation, Greening Australia and the Landcare associations, as well as government agencies.
- Development and provision of information on the economic benefits of remnant vegetation on farms.
- Encourage those who influence farmers (such as agribusiness) to promote the benefits and management of bush on farms.
- Drastic need for increased research into the tree decline problem in Tasmania.
- Development of an 'Advancing Productive Agriculture and Sustainable Environments' Scheme.
- Use of employment programs to assist with the management of remnant bush.
- More effective wildlife control options. This could include the facilitation of commercial use of wildlife.

Responsible organisations

- Community organisations, such as farmer organisations—provision of technical advice, promotion of the practices, farmer-to-farmer communication.
- Local government—development of local incentives such as council rate rebates.
- State government—removal of disincentives such as land tax and development of incentives such as direct grants for on-ground works, land tax rebates.
- Employment of technical and other support staff.
- Development of a strategic framework for improved regional/catchment planning.
- Federal government—tax incentives, direct grants for work, funding for technical support officers through programs such as NLP.

Bringing about the change

- Increased percentage of NLP funds to community organisations.
- State government to show a real commitment to Landcare principles and practices.
- Federal government—financial incentives.

Stuart McMahon

NSW National Parks and Wildlife Service

Main problems in managing remnant vegetation

- Perceptions held by land managers (private and public) that no problems exist. For example, a common initial response is: 'There are plenty of trees in the landscape; what are you worried about?'
- Issues such as remnant vegetation decline and the lack of regeneration are not recognised.
- Lack of understanding by land managers and agricultural advisers (private and state agency staff), of the benefits that retained and managed remnant vegetation offers farm productivity and the environment.

Improving management of remnant vegetation

- Greater integration of extension messages delivered by land management agencies and agribusinesses. Agricultural advisers maintain high contact and rapport with many private land managers. Advisers equipped with the necessary knowledge and conviction can successfully reach a large range of farmers responsible for the retention of remnant vegetation. For example, extension messages providing information on issues such as beef production, pasture production, animal health should also include information on remnant vegetation, its productivity benefits and required management practices.
- Flora and fauna resource information needs to be included in all catchment and land water plans.

Responsible organisations

- Nature conservation agencies need to provide information to other agencies and organisations on the importance of and benefits resulting from the retention and management of remnant vegetation. Those organisations and agencies include departments of agriculture and soil conservation, shire councils, rural land protection boards, agribusiness and banks.
- Departments of agriculture, soil conservation and water resources need to integrate nature conservation principles and measures into their advisory/extension messages.

Bringing about the change

- Providing training to agricultural advisers on the importance of, and benefits gained from, the retention and management of remnant vegetation in the agricultural landscape. A successful training process using facts, statistics and case studies, will result in a large network of advisers providing a more integrated catchment management message.
- The NSW Farming for the Future program is an example of such a training program.

Christopher Nadolny

NSW National Parks and Wildlife Service

Main problems in managing remnant vegetation

The declining area and condition of remnant vegetation is associated with the following.

- A prevalent culture supporting agricultural development (often even when it is not profitable).
- Lack of integrated land use planning.
- Sudden, unplanned development of new agricultural industries, e.g. feedlots, cotton.
- The cost-squeeze (i.e. needing to increase production from a given property as the returns per unit of product fall).
- Rural poverty (less money for the environment).
- (Often) less commitment to the environment than to short-term profits.
- Progressive naturalisation of exotic plants and animals.

These developments are linked to broader trends occurring in rural areas.

- Growth in the size of and scale of production on individual properties (except lifestyle farms).
- Increasing reliance on inputs such as chemicals and machinery (e.g. the ratio of value added on farms to turnover fell from 58% in 1974-75 to 45% in 1992-93).
- Falling commodity prices (usually linked to periodic or chronic over-production).
- Falling rural populations (except on the urban fringes).

These are worldwide trends that are difficult to alter. However, the trends are partly the result of current models of research, development and day-to-day management that do not consider broader implications. The effects of these trends on remnant vegetation management are more easy to alter than the trends themselves. Losses of remnant vegetation are very different in different countries. For example, in the USA government policies curtail agricultural expansion on marginal lands.

Improving management of remnant vegetation

A broad recognition of the following points.

- In most cases the costs of further agricultural expansion (biodiversity, greenhouse) to the community as a whole outweigh the benefits.
- The prevalent model of high-input agriculture using exotic plant species is not appropriate for most of Australia.

Responsible organisations

- Everybody involved in the rural sector.

Bringing about the change

- Such a change needs to be spear-headed by a critical evaluation of the environmental, economic and social consequences of current and alternative models of agricultural development. For example, we need to know more about the marginal cost/benefit (in environmental, social and economic terms) of further expansion of, say, the beef industry in Central Queensland, or cropping in western NSW. Such research (which is the focus of this meeting) needs to be holistic and multidisciplinary. We need integrated projects, perhaps analogous in scope (but not necessarily structure) to, say, the Resource Assessment Commission inquiry into the forest industries.

Bill Panton

Conservation Commission, Northern Territory

Main problems in managing remnant vegetation

- The major disturbance factors in remnant vegetation management are weed invasion, inappropriate fire regime, feral animal disturbance and human destruction ranging in scale from littering to land clearing. The small population of the Northern Territory limits the opportunities for community-based landcare groups to undertake control of disturbance factors. In some cases the problems caused by these disturbance factors are at a scale which prevents effective community action.
- Should be a strong commitment to the principle that beneficiary pays, i.e. the community should pay for the maintenance of biodiversity.
- There is limited appreciation or knowledge of remnant vegetation. Community awareness programs have had difficulty in transferring awareness into action.

Improving management of remnant vegetation

- Remnant vegetation is not sufficiently valued by the community or government. Financial incentives should be available for landholders to manage remnants or not clear their land.

Responsible organisations

- The Commonwealth government should set the agenda and the broad objectives for the maintenance of native vegetation cover (or biodiversity more generally) and provide the funding base, through taxes, to fund the application of incentives.
- This change could be brought about at the next federal budget.

Jamie Pittock

World Wide Fund for Nature Australia

Main problems in managing remnant vegetation

- Need to internalise the environmental costs of bush clearing.
- Lack of adequate regulations, monitoring and enforcement in most states and territories.
- Failure to link rural support funding to conservation of remnant vegetation.
- Lack of adequate performance criteria and monitoring of the National Landcare Program.
- Lack of viability in many agricultural areas.
- Paucity of knowledge of the size and nature of public spending in agricultural regions to enable existing resources to be better directed.

Improving management of remnant vegetation

- Further identification and restructuring of the agriculture industry in regions where many producers are unviable (Commonwealth and states).
- Extensive taxes on bush clearing activities linked to monitoring and enforcement (Commonwealth through the Australian Taxation Office and ERIN); any profit to go to conservation programs.
- Provision of rural support funding from the Commonwealth to states and from governments to landholders, conditional on vegetation retention (Commonwealth and states).
- Vegetation clearing controls (state governments).
- Greater use of Commonwealth powers for environmental assessment of projects and actions that encourage clearing (Commonwealth).
- Restructure Landcare to ensure on-ground performance can be assessed (Commonwealth and states).
- Provide additional incentives for bush protected by regulation to be better managed (Commonwealth).
- Development of pilot programs involving the redirection of existing public resources to land management (e.g. rural support funding in unviable agricultural regions).

- Adoption of regional biodiversity conservation plans with priorities identified for publicly funded conservation works (all to participate, state and Commonwealth initiation).

Liz Raven

Landholder, Victoria

Main problems in managing remnant native vegetation

- Lack of awareness within the wider community of values of remnant native vegetation, from landholders through to politicians, and therefore not seen as worth protecting.
- Not a priority with many agencies, e.g. more emphasis placed on money and time being put towards planting trees, with no mention often of protecting and enhancing what is remnant native vegetation.
- When it comes to protecting remnant native vegetation, landholders see problems in 'locking up' areas, creating pest plant and animal harbours, and taking land out of production, rather than realising the benefits they could enjoy.

Improving management of remnant vegetation

- Encouragement to protect remnants *must* become a priority with all involved agencies.
- A huge community education program is needed to give land managers alternatives, e.g. the Victorian Land for Wildlife Program does this, but needs *many* more resources.
- Incentive funding should be available to initially encourage landholders to fence and protect remnants and thereby learn of the benefits to themselves and their land.

Responsible organisations

- Agencies such as the Victorian Department of Conservation and Natural Resources and Department of Agriculture (obviously many others also) need more motivated, on-ground extension staff to motivate client groups.
- Governments must be made more aware of the value of clearance control legislation, and be prepared to honour regulations.
- All agencies involved in management of remnant native vegetation must do more to inform the general public about values of remnants, give alternative suggestions for land management practices that would ultimately ensure remnants would be protected, and help create a culture whereby remnant vegetation was valued (for many reasons). It is only when land managers and local communities understand the value of something to them that they will then undertake its care and protection.

Bringing about the change

- Given that reliance on legislation can be futile, because of the vagaries of the political world, the only way to bring about real change is by educating and informing the land managers, because if they believe in it, they will do it!

Ian Reeve

University of New England

Main problems in managing remnant vegetation

- At the centre of remnant vegetation issues (and other issues relating to the environmental impact of agriculture) is the mismatch between the capabilities of the institution of private land ownership and the need for broad-scale, long-term management of land resources in the public interest. Land ownership is an excellent way of ensuring land resources are maintained in good condition if:
  - returns to agriculture or other non-destructive uses are sufficiently high
  - the owner is perfectly informed of the outcomes of all possible ways in which the land might be used
  - use of the land by the owner does not have any effect beyond the boundaries of that piece of land.
- The first condition is becoming harder to meet. The second and third conditions have never been met to any significant extent.
- The institutional innovation necessary to arrive at institutions that allow individuals access to land resources for private economic gain while protecting the productivity of those resources for the nation is hindered by:
  - confusion between the rights of land ownership and the rights of civil and political freedom

- reluctance of government to admit that demands for changes in practices amount to a taking of rights of landownership where compensation may be justified
- reluctance of landowners to accept that many agricultural practices have substantial impacts beyond farm boundaries and this leads to a public interest in what happens on private land
- considerations of fairness require that people in the present be treated equally with those in the past, so that the responses of ecosystems tend to outstrip our ability to adapt our institutions.

Improving management of remnant vegetation

- Firstly, an end to the chronic mis-specification of the problem by stakeholders defending particular aspects of the status quo. What is needed is a conceptually valid specification of the nature of the problem as shared understanding by all stakeholders.
- Secondly, a great deal more creative and courageous thought about how institutions might be transformed to better balance private and public interests in remnant vegetation on agricultural land.

Responsible organisations

- Shared understanding and creative institutional reform is achieved through debate, discourse, facilitation and mediation taking place in an information-rich environment. ANCA/LWRRDC should consider having designed what is known in the US as a 'citizen involvement program' and fund professional and independent environmental mediators/facilitators to run the program in localities where remnant vegetation management is contentious. A course for such mediators/facilitators may need to be established.

Bringing about the change

- ANCA/LWRRDC should call for research consultancies to:
  - design a remnant vegetation stakeholder involvement program
  - design a one semester postgraduate certificate level course in remnant vegetation facilitation/mediation and make an assessment of which educational institutions this could be offered from.
- ANCA/LWRRDC might consider funding suitable facilitators/mediators to undertake the course in a similar fashion to Rural Industries Research and Development Corporation's Rural Leadership Program.

Gordon Stone

Gordon Stone & Associates, Toowoomba

Main problems in managing remnant vegetation

- Landholders feel that others in the community don't understand, even don't *want to* or possibly *can't* understand the views of (and issues relevant to) landholders who are the *actual* custodians of significant natural vegetation.
- They feel that on the one hand the community tells them that it's a community resource. On the other, when management costs need to be incurred, rural enterprises end up being asked to incur many of those costs, rather than the whole community. There is limited recognition of this.
- Landholders seek practical management information which is relevant to rural business economic realities. They need to know how to appropriately manage the vegetation in their locality.
- Therefore, acknowledgement of differing viewpoints and financial issues, as well as enhanced communication of information, are key issues.

Improving management of remnant vegetation

- Common community-wide understanding of the complexities of natural vegetation and its management, and support of the differing geographic variations in vegetation communities and farming systems, as well as rural business realities and community needs (biodiversity, a balanced ecosystem, food to eat and a balanced national budget).
- Supply of useful and relevant information which allows landholders to manage vegetation better, within their capability to do so.
- On-ground landholder, conservation group and urban dweller liaison.

Responsible organisations

- Rural producer organisations and conservation groups and landholder groups in particular, as well as the 'conventional groups', especially Landcare and ICM.

Bringing about the change

- Publicise 'good news stories' to urban and rural audiences.
- Involve landholders in collecting and publicising information (existing information is a good start) which will 'make a difference' at the grass roots.
- Government as decision-makers and custodians of the 'community good' to understand/acknowledge business and historic realities of land development and management, so that:
  - practical incentives are given to facilitate an appropriately balanced vegetation management process
  - the individual landholder is not 'lost' in the process
  - there is recognition that like any community sector there are innovators, traditionalists and the 'tail' in rural industry. These groups view natural vegetation differently and should ideally be 'handled' differently.
- Communication of information is a key factor and will need concerted attention by all players. Information must be targeted and communicated appropriately.

Clive Thomas

Community Grasses Project

Main problems in managing remnant vegetation

- The capital cost of retiring areas, the ongoing cost of managing those areas, the loss of income from retiring a part of the farm or not proceeding with the implementation of a land use system requiring the clearing of remnant vegetation.

Improving management of remnant vegetation

- A resolution of those intractable problems by shifting a substantial proportion of those costs from land manager to community.

Responsible organisations

- Research establishments to find more economically feasible, efficient (in terms of the use of precious resources, e.g. steel for fencing) methods to exclude animals; ways in which income can be derived from retired areas.
- Government—Commonwealth and state—(to carry a substantial part of the cost) and local government to remove the property rate impost on retired land.

Bringing about the change

- Determination of the ration of private benefit to community benefit of on-farm remnant vegetation and acceptance by the wider community of 'ownership' of that part of the issue determined to belong to the community.
- Legislation to ensure an end to the active destruction of remnant vegetation where the community benefit of its conservation exceeds the value of the potential productive capacity of the altered landscape.

Bill Watson

Australian Bureau of Agricultural and Resource Economics

Main problems in managing remnant vegetation

- Lack of awareness of the nature of the benefits and costs both public and private.
- Difficulty in valuing the benefits.
- This issue is often perceived to be a 'greenie' issue unrelated to other sustainable farming systems and catchment management issues.
- Cost of fencing.
- Absence of mechanisms to facilitate joint community and private contributions.
- Inefficient research effort (duplication; gaps; lack of focus, integration and collaboration, and critical mass).

Improving management of remnant vegetation

- Development of a national, strategic remnant vegetation management program, including:

  - development of appropriate remnant vegetation plans which identify priority actions, funding mechanisms and responsibilities
  - coordinated national research program.
- An appropriate awareness program.
- Remnant vegetation integrated with other catchment and farm sustainable management programs.

Responsible organisations

- Catchment/regional management authorities should manage the program with coordinated contributions from the three levels of government and private resource users (farmers, foresters, miners, etc.).

Bringing about the change

- The Murray–Darling Basin Commission catchment management plans, the Victorian Landcare and catchment management approach and the National Dryland Salinity Program provide examples of how progress is being made on similar issues.

Charles Willcocks

Department of Primary Industries and Energy

Main problems in managing remnant vegetation

- Allocation and definition of property rights is a key issue in the management of natural resources. However, even where property rights are clearly defined, for example by freehold title, a major constraint on the maintenance of remnant native vegetation is the divergence between the private (landholder) benefits of maintaining such vegetation and the public benefits. This divergence raises the dilemma of who should provide the resources to manage such vegetation for the longer term. Even where the private and public benefits of preserving an area of remnant vegetation do come close to coinciding, financial pressures may constrain the action of landholders.
- Replacement of vegetation, as well as maintenance of remnants, is an important issue.

Improving management of remnant vegetation

- A greater understanding by landholders of the value of remnant vegetation in preventing land degradation and protecting biological diversity (including ecosystem diversity) should lead to improved landholder management of such vegetation.
- There is a role for public provision of incentives to landholders for the maintenance of remnant vegetation where such maintenance would provide public benefits. The presence of such incentives should reduce the divergence between private and public benefits.

Responsible organisations

- The primary responsibility for management of remnant native vegetation lies with individual landholders, whether public or private. Farmer and conservation organisations also have a role to play through providing leadership and coordinating action.
- There is clearly a key role for ministerial councils such as the Australian and New Zealand Environment and Conservation Council and the Agriculture and Resources Management Council of Australia and New Zealand. While land management is a state government responsibility, a coordinated Commonwealth/state approach should deliver substantial efficiency gains compared to a 'go it alone' approach by the various governments.
- There is also a role for research and development agencies in the generation of information on the values of remnant native vegetation so that such vegetation isn't lost through ignorance of its value.

Bringing about the change

- A national vegetation strategy could be considered (involving the Commonwealth and state governments) to parallel the strategies for land and water provided by the Decade of Landcare Plan and the National Water Quality Management Strategy.
- A range of policy instruments is available from regulation to incentives. There is also potential for partnerships between the owners/managers of private or public land to address issues of common concern, with contributions from each party reflecting as far as possible the distribution of benefits.

- Incentives could include government support for raising awareness and development of management skills. Financial incentives, which may include compensation for not clearing, would need to reflect the perceived public benefits to be gained. Tax concessions may be considered but these tend to deliver uneven benefits, both over time and between landholders, depending on the level of farm income and landholders' marginal tax rates. By contrast, while direct payments offer a more visible form of incentive, they can entail substantial administrative costs.
- A cross-compliance approach, for example linking the provision of Landcare funding to clearing controls, would be likely to elicit a strong negative response from the states and landholders. It is unlikely that such negative consequences would be outweighed by the benefits gained, since a cooperative approach is likely to deliver the best long-term outcomes.

Mike Young

CSIRO

Main problems in managing remnant vegetation

- Lack of stakeholder knowledge about real value of remnant vegetation to:
  - landholders
  - society
  - potential industries.
- A political environment that discourages landholders from feeling they are making a positive contribution to Australia's biodiversity objectives.
- Lack of administrative knowledge about the degree to which enlightened self-interest is sufficient to ensure that vegetation is conserved appropriately (a spatial information problem).
- Incomplete understanding about the effectiveness of alternative instruments and their cost-effectiveness in delivering remnant vegetation conservation objectives.
- Lack of knowledge about the effects of different incentives and how they will change management of remnants through time.
- Lack of information about administrative and management costs of strategies.
- Use of narrow conceptual paradigms which, for example, do not acknowledge opportunities to build support through awards, changing community values, etc.

Improving management of remnant vegetation

- For each of the problems listed above, the solutions lie in an astute combination of strategic research designed to give general insights coupled with focused applied program research. The latter should include evaluation of the reasons why existing programs do and don't work and should be conducted in conjunction with implementing agencies.

Résumé of submitted individual comments

Andrew Campbell

This paper summarises the papers submitted by workshop participants before the workshop under the main themes to be explored at the workshop. Not surprisingly there is a large degree of overlap between the various correspondents and many points were made by several people. In general the names of those people contributing particular ideas are mentioned, although on issues raised by many people not all names are acknowledged. To a large extent these points have been noted using the words and terms as submitted, although remnant vegetation was used as a surrogate for 'native bush', 'native vegetation on farmland', 'remnant native vegetation', 'areas of uncleared land', etc. Those papers describing legislative and administrative arrangements in particular states have not been summarised here. Apologies to anyone who feels that their hobby horse has not been given a fair run.

Threats

To remnant native vegetation

- Fertilisers, pesticides, stock, pests and weeds.
- Exposure to wind and rising groundwater.
- Pre-emptive clearing.
- Inappropriate clearing for cropping, grazing and residential development.
- Inappropriate fire management.

- Inappropriate drainage and agricultural run-off.
- Cumulative (often unintended) impacts of agriculture.
- Loss of dead standing trees, fallen logs and other potential habitat.
- Unfenced remnant vegetation is just being cleared in slow motion.
- Repeated firing, drought, firewood harvesting, gravel and soil extraction, mining.
- Shires' roadside management, utilities for telephone, electricity, main roads.
- Sudden unplanned development of new industries such as feedlots, cotton. (composite)

Land clearing is the single greatest threat to biological heritage. (Alexandra)

From remnant native vegetation

- Harbour for pests and vermin.

Benefits of remnant native vegetation

- Hydrological balance, shelter, erosion control. Habitat for beneficial fauna.
- At a landscape scale: fragmented network crucial to the conservation and management of endemic biota and endemic ecological process such as animal movements, pollination and plant reproduction. A crucial record of original ecosystems. (Paton)
- Aesthetics, catchment health, drought, fire resistant systems, wood products, biodiversity. (Alexander)
- Historical value (not necessarily in dollar terms) (Hussey)—bush patches retained to keep promises to dad, grandpa. (Queensland)

Positive notes

- A renaissance of interest in native grasslands. (Thomas) Many farmers are excellent stewards of native vegetation. (Thomas, Campbell)
- Strong appreciation of lifestyle and aesthetic values of remnant vegetation among land users. (Alexander)
- Farmer awareness of environmental and nature conservation issues is increasing. (Nadolny, McMahon, Sheahan)
- Community-based regional consortia, Landcare groups and total catchment management committees, etc provide a good platform on which to build. (Alexander)
- Legislative approach in South Australia has been effective in changing attitudes to broad-scale clearance. (Collins)
- Bipartisan support for comprehensive and effective action is possible. (Alexandra)
- Aboriginal management of remnant vegetation for bush tucker, bush medicines, artefacts, didgeridoos, etc. on purchased Northern Territory stations. (Clark)

Constraints to better management

Knowledge gaps

Ecological

- Lack of understanding of interdependence in native ecosystems. (Thomas)
- Lack of awareness of values of remnant vegetation. (Raven, Hannam)
- Degradation (of remnants) has been slow; it is hard to comprehend the cumulative effects of incremental increases in disturbance. (Alexander, Hussey, Goldney)
- Lack of land users' (or advisers') understanding of ecology: nutrient cycles, trophic levels, energy transfer, herbivory, competition, predation, parasitism, symbiosis, death, birth, emigration, immigration, growth, decay, disturbance, pollination, chance and so on. (Paton, Hussey)
- Ignorance of specific dieback mechanisms and how they vary across regions. (Landsberg)
- Don't know the optimal area or positioning of bushland on farms, catchments and landscapes to maximise agricultural production. (Goldney and Watson)
- Lack of local information about status of plant or animal communities and their contribution. (Queensland)
- Little information on optimal conditions for regeneration. (Goldney)

Management

- Extension expertise is largely production-related. Property management planning courses often lacking on conservation aspects of remnant vegetation. (Alexander)
- Few extension staff with skills in remnant vegetation management. (Wells)

- Poor skills guidelines in local government concerning planning approvals, etc. (Alexander)
- Poor understanding of how to manage remnant vegetation. (Nadolny, McMahon, Sheahan, Hobbs)
- Don't know the long-term implications of different forms of management. (McIntyre, Hone, Hobbs, Reeve)
- Don't know how to rehabilitate stands suffering from dieback nor how to 'dieback-proof' healthy stands. (Landsberg)
- Even some committed land users degrade remnant vegetation habitat quality through actions based on inadequate understanding. (Platt)

Economic

- Short and long term benefits of clearing versus retaining (investing in) remnant vegetation (Alexander, Wells)
- Paucity of knowledge of the size and nature of public spending in agricultural regions to enable existing resources to be better directed (Pittock).
- We don't fully understand who (what types of land users) are still clearing and why, and consequently our responses may be poorly founded (MacDonald).

Economic

- Little capacity for most to take a longer term view. (Alexander, Pittock, Reeve, McDonald)
- If farms don't make money they cannot invest in conservation. (Campbell)
- Capital cost of fencing. (Thomas)
- Costs. (Alexander, Thomas)
- Rural poverty leads to over-utilisation of marginal lands. (Nadolny, McMahon, Sheahan)
- Lack of visible economic incentives (Nadolny, McMahon, Sheahan) to manage for nature conservation (Kirkpatrick), particularly in certain agro-ecological zones such as inland cropping zones or peri-urban native grasslands. (Cary)
- Equity problems may lead to disgruntled people taking negative actions. (Hussey)
- Availability of financial incentives is limited, often inconsistent (Platt) and unlikely to align optimal private and social outcomes. (Hone)
- Interstate and overseas markets (beef and horticulture) and rural subdivision are encouraging more clearing. (NT, Panton)

Ecological

- Management of remnant vegetation cannot be attempted in isolation of the matrix within which the remnants lie, as the major threats to remnant vegetation are functions of how the landscape as a whole is managed—just as small Pacific islands facing climate change and rising sea levels cannot overcome the problem by only acting on their island. The current diagnosis of the problem is mostly too narrow. (Lefroy)
- Scale (spatial and temporal); problems usually bigger than one farm and may take longer than a lifetime to fix (Hussey); need to manage at a landscape not a remnant level. (Hobbs, Reeve, Lefroy)
- Much remnant vegetation does not complement European farming systems and patterns of settlement. (Cary)
- Disparate relationship between distribution of remnant vegetation and land tenure patterns. (Hannam)
- Irreversibility of some forms of degradation. (Hobbs)

Institutional

- Lack of appropriate remnant vegetation management legislation. (Wells, Tasmania, Queensland, Northern Territory, Kirkpatrick, Alexandra, Pittock)
- Lack of criteria for determining the national interest if incentives are to be offered. (Cary)
- Taxation still indirectly sponsors clearing. (Alexandra)
- Lack of institutional processes cautioning 'pause-listen-look-change-conserve'. (Thomas)
- No comprehensive system to value native vegetation and no government strategy to invest in public good aspects. (Alexander)
- No legislation to prohibit release of feral animals or to control the introduction of agricultural plants with weed potential. (Nadolny, McMahon, Sheahan)
- Confusion and suspicion over responsibilities for public good issues. (Alexander)
- Lack of political will to enforce existing remnant vegetation management legislation. (Alexander, Platt)
- State and local government agencies set a poor

example in their management of public lands such as stock routes and reserves. (Alexander, McDonald)

- Suspicion concerning expertise—hidden agendas in state land conservation agencies. (Alexander, Wells)
- Poor data sets on national priorities and targets. (Alexander)
- Lack of long-term policy framework and state/Commonwealth partnership process. (Alexander)
- Insufficient funds overall. (Alexander)
- Structural adjustment issues not being dealt with strategically. (Alexander)
- Emphasis on industry-based rural R&D leaves little room and fewer resources for long-term, public interest research. (Alexander)
- Poor integration of remnant vegetation in catchment/regional planning. (Alexander)
- Freeholding of Crown land appears to lead to increased clearing. (Nadolny, McMahon, Sheahan)
- Forestry assistance schemes (Tasmania) promote native forest harvesting on private land. (Wells)
- Priorities geared more to planting trees than protecting bush. (Raven, Goldney)
- Lack of adequate performance criteria and monitoring of NLP. (Pittock)
- Governments unwilling to admit that compensation may be justified. (Reeve)

Cultural

- Lack of awareness of complex values of nature conservation. (Thomas, Goldney)
- Confrontationist attitudes between greenies and farmer groups; fear of 'big brother' and cross-compliance makes constructive debate difficult. (Alexander, Nadolny, McMahon, Sheahan)
- Apathy about remnant vegetation management; culturally unacceptable to talk about land conservation. (Alexander)
- Legacy of colonial era—remnant vegetation is inferior and unproductive, 'rubbish land'. (Goldney) Clearing is improving the land. (Nadolny, McMahon, Sheahan)
- Predominantly utilitarian or instrumental attitudes of land users to remnant vegetation. (Goldney and Watson, Cary)
- Environmental beliefs symbolic rather than substantive. (Goldney and Watson) Relatively few land users have sufficiently strong ecological values to make significant impacts on remnant vegetation protection where there is no clear, observable and quickly realisable private benefit. (Cary)
- A minority 'green element' is dictating the agenda...a general feeling in rural communities that legislation is not the way to go. (Queensland)
- Still in a pioneering phase—native plant communities need to be 'tamed' or developed to make a living from the land. (Queensland)
- Agriculture minister (Queensland) is senior to environment minister who is near the bottom of pecking order.
- The public is cynical about planning and decision-making processes involving remnants and/or threatened species (e.g. eastern tollway, Queensland).
- Human population too dense and increasing. (McIntyre)
- Wide variations in perceptions of the value of remnant vegetation make it difficult to manage responses and develop education programs. (Hannam)
- Pressure on Aboriginal land owners to run pastoral operations on purchased pastoral properties. (Clark)
- Civil and political freedom. (Reeve)
- Land users reluctant to accept the legitimacy of public interest in their management of land. (Reeve)

Suggestions for improvement

Institutional reform

- Further identification and restructuring of agriculture in regions where most are not viable. (Pittock)
- More creative and courageous thought about how institutions might be transformed to better balance private and public interests in remnant vegetation on agricultural land—likely to be achieved through debate, discourse, facilitation and mediation in an information-rich environment. (Reeve)
- Policy-makers need to reinforce community management and action; leadership is needed to promote integration and achieve agreed outcomes; be committed to joint success, not individual

claims to that success; at the moment the process lacks trust. (McDonald)

- ANCA/LWRRDC to commission a 'citizen involvement program' with skilled facilitators/ mediators in regions where remnant vegetation management is contentious. (Reeve)
- Clear understanding of and resources for public benefits to guide land management through incentives, disincentives and education. (Alexander, Hone)
- Learn from and extend: SA heritage agreements (900 agreements, 440 000 ha, $72m); WA wetlands environmental protection policy (look at NZ legislation); Victorian Land for Wildlife scheme; Greening Australia local greening plans; integrated local area planning (Alexander); covenants (Doley) such as Victorian Conservation Trust (Platt); voluntary wildlife sanctuaries. (Collins)
- Regional assessment panels (NLP) and catchment management committees provide a comprehensive national framework for overseeing activities, priorities, targeting incentives and research. (Alexander)
- Develop a framework through National Landcare Program/Murray Darling Basin Commission to support ESD, particularly at the catchment/ regional level. (Alexander)
- Improve local government planning; soften engineering emphasis; improve guidelines for works; revise ways of installing services; develop less destructive equipment. (McIntyre)
- Create a biodiversity levy or divert funds from road building. (Kirkpatrick)
- Rationalise state agencies (NSW) to deal with remnant vegetation as a distinct issue (Hannam); better linkages between agencies facilitated by funding bodies. (Hobbs)
- Accelerate implementation of the national reserve system. (Alexandra)
- Federal government should establish a revolving fund to buy, covenant and resell land à la the Victorian Conservation Trust; provide low-interest loans or deductibility to private funds for reserving land. (Alexandra)

Planning and management

- The development of agriculture as a structural and partly functional mimic of the native ecosystem (e.g. woodland, forest heath and mallee) to reduce the dissimilarity and consequent tension between agriculture and remnants which is at the heart of the problem. (Lefroy)
- Property and catchment management regimes taking full account of public and private values of remnant vegetation and ecological processes. (Alexander, Clark)
- Better integration of remnant vegetation management into property management planning and catchment regional planning (local communities require resources for this). (Alexander, Marano, Hobbs)
- Regional biodiversity conservation plans with priority identifiers for publicly funded works. (Pittock)
- Emphasis needs to shift from just retaining and fencing remnant vegetation to managing remnants and the areas between them. (Collins)
- Develop management agreements with performance-based financial incentives to improve the palatability of legal controls. (Kirkpatrick)
- Legislate a process for the development of land management guidelines. (Hannam)

Research

Ecological

- We need good data on resource condition and trends. (Alexander)
- It is not that results of research are not getting to end users, rather that there are few results to communicate. (Landsberg)
- Can salinity, erosion, waterlogging and remnant vegetation protection be effectively addressed by an agricultural landscape that mimics the structure of native ecosystems, and how strong does that mimic have to be? (Lefroy)

Management

- Develop sustainability indicators, satellite monitoring, ABS green accounting. (Alexander)
- Develop more efficient methods to exclude animals from bush. (Thomas)
- Development of tree and shrub crops as revegetation on the scale required must be commercially driven. (Lefroy)
- Develop intercropping and agroforestry systems using mixtures of annuals and perennials, woody and herbaceous. (Lefroy)

- Participatory diagnosis and design to implement experimental treatments at a scale large enough (first order catchment) to impact on land and nature conservation issues and, secondly, to learn about practicalities and acceptabilities of such systems from land users' perspectives. (Lefroy)
- How can the disruption to conventional agriculture and to income be minimised? What degree of change is acceptable to land users and to what extent are we dealing with generational change? (Lefroy)

Economic

- Demonstrate direct economic gain, especially from non-destructive uses such as flowers/seed harvesting. (Hussey, Thomas)
- What are the implementation costs (of alternative agricultural systems mimicking native ecosystems); what are the benefits and when do they arrive? (Lefroy)
- Integrated large-scale land use evaluation projects examining the costs and benefits of particular agricultural sectors in particular regions, analogous in scope if not structure to the Resource Assessment Commission inquiry into the forest industries. (Nadolny)

Cultural

- Research land users' attitudes and practices concerning remnant vegetation and impact on land users or remnant vegetation management. (Marano)
- Rural landscape perception, including differences in rural and urban perceptions of appropriateness of and preferences for landscapes including remnants. (Cary)

Policy

- Include remnant vegetation status in annual ABS/ ABARE farm surveys. (Alexander)

Incentives

- A substantial proportion of the cost needs to be shifted from land users to the wider community. (Thomas)
- Assess existing incentives and improve them where appropriate e.g. STB, OBT, Murray Corridors of Green, National Resources Management Strategy, Drought Landcare, rate rebates, covenanting. (Alexander, Hussey, Doley, McIntyre, Clark, Pittock)
- We need incentives/cost sharing arrangements (e.g. tax credits and resources for implementing catchment plans) for: fencing, spelling land, weed and pest management, retiring land, and environmental payments in sensitive areas. (Alexander, Doley, Marano, Pittock)
- Tax credits/rebates to encourage works. (Campbell, Doley, McDonald)
- A grant often provides a starting point from which land users continue on their own. (Hussey)
- Rate relief (Hussey, Thomas); subsidise rate rebates where shires introduce effective by-laws protecting remnant vegetation. (Alexandra)
- Provide relevant technical information and remove financial constraints. (Goldney and Watson)

Disincentives

- Legislate to protect remnant vegetation (Kirkpatrick, Hannam, Alexandra, Goldney, Pittock) where community benefit of conservation exceeds potential productive capacity if cleared. (Thomas)
- Strong farmer resistance to cross-compliance. (Campbell)
- Cross-compliance; federal funding for shires and main roads should be conditional on adequate remnant vegetation management (Doley); Landcare, RAS, sugar industry package, 75D deductions and drought relief funding should be conditional on effective clearance controls, e.g. individual covenants. (Alexandra, Pittock)
- Simplify clearance application process (SA) and link it to property management planning. (Collins)
- Need to internalise the environmental costs of bush clearing—taxes on clearing to fund conservation programs. (Pittock)

Extension/education

- Don't 'oversell' the value of remnant bush. Don't be too negative about clearing—its benefits have outweighed the costs. (Campbell)
- Be aware that the (demographic) profile of farmers is changing rapidly—identify and plan for the managers of the 21st century. (Thomas)

- Need sociological and psychological understanding of prospective clients—state of being, state of mind and location—determined by surveys and focus groups. (Goldney and Watson)
- Respond to strong contextual influences on farmer conservation behaviour through action research principles and marketing methods and through relevant media and Landcare groups; farmers as 'co-producers' of the value of the product, in this case remnant vegetation management, ensuring people have a positive experience with the product and that they communicate this to others. (Goldney and Watson)
- Use remnant vegetation self-assessment kits currently under trial to help people evaluate their own properties. (Goldney and Watson)
- Develop education materials on economic values of bush on farm and management aids. (Goldney)
- Adopt the Landcare process: awareness-recognition-ownership-group education-demonstration-individual action. Capitalise on existing enthusiasm. (Thomas)
- Support and promote private commercial gain. (Alexander)
- Use key species (superb parrot, koalas, barred bandicoot) or habitats as publicity tools. (Alexander)
- Use industry groups (Alexander) and demonstration farms (Marano) to 'model' integration of bush on farms in key locations. (Goldney)
- Department of agriculture advice needs to have a longer term focus (Doley); more motivated, better trained remnant vegetation extension staff (Raven, Goldney, Hobbs), including training for facilitators/ mediators in conflict situations. (Reeve)
- Every farm should be monitoring, e.g. piezometers (Doley) and vegetation management. (Marano)
- Identify best management practices and introduce benchmarking. (Marano)
- Needs to be a system of feedback to enable monitoring of clients' progress and follow-up support where necessary. (Goldney and Watson)
- Information and support in the field is just as critical as funding of works. (Collins)
- Training for local government and utilities staff about remnant vegetation management on roadsides and reserves. (Doley, McIntyre)

Cultural shifts

- Widen the debate to encompass consideration of fundamental change in the management of agricultural landscapes. (Lefroy, Nadolny)
- Broad recognition that the days of agricultural expansion are over; the environmental costs (biodiversity, greenhouse) to the wider community outweigh the benefits. (Nadolny)
- Foster a culture where remnant vegetation is valued—if people believe in it they will do it. (Raven, Scott)
- Urban concern about remnant vegetation needs to be fostered as a necessary (although insufficient on its own) condition for increased public funding of remnant vegetation management. (Cary)
- Find a conceptually valid specification of the nature of the problem as shared understanding by all stakeholders. (Reeve)

Comments

Preservation of roadside vegetation

Alison Doley, Waddi Forest Land Conservation District Committee, Western Australia

Much of the land care activity of the Waddi Forest Land Conservation District Committee in the past 18 months has been directed towards endeavouring to persuade the Coorow Shire Council to adopt a positive approach to the preservation of roadside vegetation in the areas under their control. Farmland and roads are part of the total landscape and cannot be treated in isolation.

When shires destroy roadside vegetation they remove not only a valuable record of what once grew in the area but also a source of seed for regeneration purposes. Roadsides are essential corridors that allow for the movement of bird life between patches of remnant vegetation.

The vegetation destroyed along with soil and weeds has to be dumped in areas like recreation reserves, disused gravel pits, or unspoilt areas of bush, as happened on our land in November 1993. The local shire bulldozed bush and removed rocks from the same area of our land without permission, found the rocks were too large, and then asked permission to remove rock heaps from our paddock for the construction of a causeway.

In the Bruce Rock Shire where only 4% of the landscape has not been cleared, the Landcare group and shire council agreed to a ban on clearing in the shire. As this agreement has no legal standing the shire continues to remove gravel from an area of remnant vegetation that a local landholder is endeavouring to preserve. The landholder is investigating whether a covenant will provide protection for the bush.

Recommendations

1) Some work is being done on covenants and in WA they are obligatory for thirty years where remnant vegetation fencing grants are made. However, they need to be simple to implement, last in perpetuity, and there needs to be a mechanism to enforce them. The areas need to be exempt from rates and the covenants need to be promoted.
2) Shire councils and the main roads department receive considerable funding from the federal government. There need to be environmental safeguards attached to the provision of this funding.

3) Farmers need financial inducements to encourage them to fence off remnant vegetation before the livestock complete the clearing process. When farmers do have a good year financially, income and provisional tax remove much of the discretionary cash flow. There is considerable support for a 150% tax deduction in the year of construction for fencing of remnant vegetation undertaken by Landcare group members with farm plans. Those with a negative income are unlikely to fence off remnant vegetation unless eligible for tax credits.

4) It is essential that funding continue for the provision of Landcare advisers so that every Landcare district has access to the services of a regional adviser.

5) Farm management advice provided by the Department of Agriculture is driven by the need to maximise returns in the short term. The advice should be based on a long-term view and should include consideration of the impact of farming systems on the natural environment.

6) In WA we are fortunate to have a network of people who are conducting effective research into the management of remnant flora and fauna, and communicators who transmit this information through publications, seminars and in response to individual enquiries. Finance for this work through CSIRO, CALM, the Department of Agriculture and conservation agencies must continue.

7) It is estimated that 20–30% of WA agricultural land will eventually be affected by the rising water table and consequent water logging and salinisation. Landcare groups have been installing piezometers when a drilling rig is available. Every farm should have two or three piezometers which need to be read regularly.

8) The rocky rises in the landscape are usually uncleared and unfenced. There is too much emphasis on planting trees, usually low in the landscape, and not enough emphasis on preserving the remnant vegetation.

Investing in farm bushland

Andrew Campbell, Australian National University

Introduction

As Australia considers its identity and its relationships—with its indigenous people, with the British monarchy, with the Asia–Pacific region—another relationship is long overdue for an overhaul. That is the relationship between contemporary Australian society and the landscape. It is time for modern Australians to act as if we are here to stay, rather than just passing through. While most Australians probably feel that the colonial era ended last century, much of our land use and management is still deeply embedded in systems which have changed little since their origin in colonial times.

The condition of the mythical Australian 'bush' is a telling indicator of just how far we still have to go in shifting from 'if it moves, shoot it, if it doesn't, cut it down', to a stewardship or sustainability paradigm. Old-fashioned words like honour, cherish, respect or even celebrate, do not characterise how we have treated, and on the whole are still treating, Australian vegetation and biological communities in general. Improving management of the native vegetation which remains outside parks and reserves in Australia to the extent that depletion and degradation are turned around, means overcoming the same potent cocktail which paralyses responses to most environmental issues: cultural values, social norms, technical ignorance, uncertainty and risk, awkward spatial and temporal scales, impractical and unprofitable solutions, economic imperatives, the creaky parochialism of the federal administrative apparatus, and an infatuation with the market as the pre-eminent arbiter of value. The Australian environment movement has to move beyond campaigns based on particular natural treasures, to focus on wider and deeper reforms in the way society relates to natural resources. Recent myopic, blinkered, depressing debates about forests and greenhouse, for example, show that we are far from having the mechanisms to discuss complex issues in constructive ways.

'The bush' is iconically Australian. It could act as a rallying issue, like the Franklin or the Daintree, yet paradoxically in a way which mandates development

of integrated approaches to natural resource management, rather than isolated, ad hoc decisions to lock in green votes in marginal seats. This paper outlines ideas for an integrated policy response to management of farm bushland, based on a value system which sees public expenditure to protect and celebrate natural heritage as investment.

This paper is stimulated by a workshop on socio-economic aspects of managing remnant native vegetation on agricultural land organised by the Land and Water Resources Research and Development Corporation and the Australian Nature Conservation Agency. The views of many workshop participants are built upon in an attempt to develop coherency and to identify research themes, but this is not a résumé of the workshop. The paper also draws on experience in farming, farm planning, revegetation and land conservation extension, research, policy and consultancy.

Remnant native vegetation on agricultural land

The need to improve management of remnant native vegetation on agricultural land is one of the most compelling environmental challenges for Australia in the 1990s. The impact of two centuries of European settlement (an ecological instant) on the native vegetation of the continent has been extraordinary in its scale and severity, with some species of plants and the animals which depend on them already extinct, and many others now rare or threatened. Ecological ramifications of native vegetation depletion and degradation have not been confined to this savage loss of biodiversity, but have included hydrological disturbances, exacerbated soil erosion and salinity, deteriorating water quality and stark impacts on the visual landscape.

Removal of native vegetation and degradation of remnants on agricultural land has historically been the result of need, greed, ignorance and cultural dissonance. Australia has generated much of its wealth from land cleared and/or disturbed for agriculture and mining. There is little to be gained from lamenting past mistakes or chastising former generations who saw the world in different ways with different priorities. The clearing of such vast areas of bush, at least in the early years, should be seen as a magnificent achievement given the tools available, and a testimony to what can be achieved by several generations of hard work buttressed by prevailing attitudes, social norms and a supportive state. But values have changed and knowledge has grown. The crux of this issue is that the native vegetation which remains on agricultural land is still being cleared for agriculture, roads, utility easements and residential subdivisions; grazed, burnt, mined and stripped of gravel and soil; exposed to wind, rising groundwater, agricultural run-off, fertilisers, herbicides and pesticides; and invaded by pests and weeds.

Why? A cynic might answer need, greed, ignorance and cultural dissonance! But the argument that we still need to destroy or degrade the remaining native vegetation on agricultural land seems hollow, given that much of this land is marginal for agriculture and there is no shortage of the products it generates. Greed is harder to refute, and even harder to defend in an age where the ecological and cultural values of relatively undisturbed lands are better appreciated. Ignorance remains a huge barrier, but mainly in the detail—we know enough about the fundamentals for ignorance to be a redundant excuse for inaction. Perhaps the cultural forces which spawned acclimatisation societies last century, in an attempt to 'refine' and 'civilise' the 'alien' and 'hostile' Australian landscape through the introduction of species from Europe, remain more powerful than is generally credited. Seeing native bush as useless scrub, and clearing as development, is a corollary of such a culture. Nevertheless, it should not be beyond the wit nor the will of a technologically advanced, rich nation in the late twentieth century, prepared to confront big issues such as reconciliation with its indigenous people and redefinition of its national identity, to improve the management of the threadbare remnants of its unique flora.

Questions of scale and ingredients for improvement

Management of farm bushland in Australia is an issue which exemplifies why conventional ways of inquiring, learning and making decisions have struggled in the face of environmental problems.

Decisions on the part of a given land user regarding management of remnant vegetation on agricultural land, and on the part of the state regarding investments to influence such management, require the weighing up of diverse values—private and social, market and non-market, utilitarian and intrinsic—which are difficult to quantify and even more difficult to reconcile. Failure to come to grips with how to apportion value to things which cannot be sold lies at the heart of the lamentable state of farm bushland in Australia.

The question of scale, both spatial and temporal, adds further complications. Land management decisions are overwhelmingly made according to criteria determined at the scale of the paddock, farm or individual patch of bush, over time-scales of several seasons or a human generation at most; yet many ecological systems and processes relevant to remnant vegetation must be perceived and managed at a landscape scale, over much longer time-frames. What may seem to be a parameter at one scale may be a variable at a larger scale, and what may seem to be sound management at a farm scale may make no sense in aggregate at a landscape scale, and vice-versa. Processes which are barely perceptible in the everyday lives of humans may be cataclysmic in ecological terms, sealing the fate of other species or communities.

Management of remnant native vegetation is an outcome of the interaction of economic and political forces and ecological processes within a given cultural context. Trying to improve management of remnants for particular reasons means understanding such interactions in all their complexity, drawing from many disciplines and ways of thinking.

For management of farm bushland to be improved, some key ingredients are required: land managers must want to improve management of farm bushland, they must know what to do and how to do it, and they must have the capacity to do it, which includes a process for moving from the existing to the preferred situation. Each of these ingredients is influenced by economic, political, ecological and cultural factors at several scales.

This paper is organised firstly according to spatial scale, starting with the 'big picture', moving 'down' to the individual farm and then back up to the regional or landscape scale; and subsequently according to the ingredients of commitment, knowing what, knowing how, and being able; with the discussion in each section moving from issues (the perceived problems) to responses (how we might deal with them). It should in no circumstances be construed as a hierarchy from the national down to the farm level, neither in terms of priority nor in sequence. No level comes first. Decisions made at each level must be informed by factors operating at other levels. Ideally, knowledge generation, information dissemination, planning, decision-making and implementation should be occurring simultaneously at all levels, recursively and reflexively. There is no assumption here that beliefs lead to attitudes and in turn to behaviour change, nor that research begets policy begets planning begets implementation. The relationships *between* these levels and activities are fundamental. Communication and feedback between actors at various levels and from various disciplines, and mechanisms for reconciling discontinuities between them, must be central to any serious attempt to improve remnant vegetation management, not set aside as something to be sorted out once actors at each level or within each sector/discipline have their act together.

The structure of this paper is merely an heuristic device for organising information. Any suggestion of hierarchy, linearity or chronological sequence is unintended.

The country

Commitment

There is little doubt that the push to improve the management of remnant native vegetation on agricultural land in Australia is gathering momentum. The commitment of the body politic, while still tepid, at least seems to be bipartisan. However, Australian political will to invest in farm bushland, even as a priority among competing 'green' issues, is still far weaker than it should be.

Several reasons for this suggest themselves. Culturally, remnant native vegetation is still perceived by many people to be 'useless scrub', something to be tamed or removed to make the land productive—it certainly has not gained the status of irreplaceable natural heritage or 'living antiques' to quote Jos Chatfield. It is diverse and dispersed over vast areas, not amenable to focused campaigns; according to Graham Richardson it is not a sexy issue, even compared with revegetation. Its benefits are rarely strikingly obvious, hard to depict on television, and it does not have any clearly identifiable, politically potent advocates in the community. Even at the state level where constitutional responsibility for remnant vegetation rests, there is usually a gaggle of institutions dealing with farm bushland, none with a clear mandate or accountability for the quality of its management.

Changing land management policy in Australia to inhibit clearing of native vegetation and to encourage more thoughtful and ecologically sound management of farm bushland is profoundly difficult. It is a legislatively thorny issue, riven with the cumbersome interplay of state/commonwealth responsibilities and petty parochialism. It also confronts a key doctrine of European settlement in Australia: that clearing equals development, that 'opening up the country' is land

improvement. This ethos has been buttressed by decades of government policy at state and commonwealth level, including tax concessions for clearing, lease conditions which made clearing compulsory, feeble regulatory efforts—rarely enforcing existing land management legislation with vigour—and management of public lands which set a poor example.

Nevertheless, the introduction of native vegetation clearance controls, notably in South Australia and subsequently to a lesser extent in some other states, is an expression of increasing recognition of the need to act and strengthening political resolve to do so. A strong commitment at the national and state level to improve management of farm bushland, reacting to voters' expressed concerns, is a prerequisite for many of the changes recommended in this paper.

A key to galvanising public support and political will is making the problem visible, sensitising the population to the importance of the issue and what can be done about it, identifying the potential gains from investment of energy, and building coalitions of groups prepared to sustain such investments and coordinate their activities.

Making the problem visible means much more than reciting the litany of species extinctions and painting dire scenarios if nothing is done. It means making much greater efforts to get a handle on the extent and status of remnant vegetation and trends in its condition (discussed later), not just among experts and the cognoscenti, but among the punters, the people surveyed by pollsters. Land literacy programs (the various 'watch' projects) have great potential (in urban areas also) if they can be placed on to a more professional footing, adequately resourced, and coordinated so that the data they generate can be aggregated and integrated with data from other sources.

Ted Lefroy's point, that trying to save remnant vegetation by focusing on remnants is akin to Pacific Islands trying to manage threats from climate change within their own islands, is apposite. We need to widen the debate from remnant vegetation to the fundamentals of Australian agriculture—colonial in structure, based on the animals and plants which arrived with the first fleet—profoundly unsustainable in ecological terms and increasingly so in social and economic terms, as aging, stressed farmers are forced from their land by inexorably declining terms of trade, leaving behind them struggling rural communities and withering towns. Lefroy contends that the future of remnant vegetation is most likely to be ensured within a matrix of farming systems structurally and functionally analogous to native ecosystems. Such farming systems would be uniquely Australian.

Now is an apt moment for advocates of a more sustainable land use to focus on the proverbial big picture, and to adopt some appropriate rhetoric for a compelling big picture message, which could include some of the following elements.

Contemporary Australian land use and management still reflects our origins as a group of English colonies, producing and exporting raw materials for the mother country, and not using natural resources as if we were here for good. In line with a general redefinition of Australia and what it means to be Australian at the end of the 20th century, we have a great opportunity to assert that this unique island continent is ours, and we are going to respect and manage it as stewards for future Australians, rather than exploiters for overseas consumers and shareholders. Refining our national priorities to embrace the uniqueness of our landscape and natural and cultural heritage, if it is done sincerely, will have far-reaching influences on international perceptions of Australia, its people and its products. Environmental innovation offers a key direction in which Australia can differentiate its products by focusing on and building upon what it means to be Australian, rather than competing directly with bigger players on their terms. We have an extraordinarily rich, diverse flora and fauna, yet we persist in commercialising introduced species and our research investment remains overwhelmingly biased towards refining the status quo, rather than developing more sustainable and more Australian land use systems.

Valuing farm bushland is critical. It is important to clarify and make explicit the difference between natural resource accounting to quantify economic benefits (and costs of depletion/degradation) in utilitarian terms, assessments of ecological importance and priorities (for example, large versus small remnants, degraded versus pristine, corridors versus patches), and philosophical questions concerning the intrinsic worth of nature and equity between species and between generations. Values which can be expressed in dollars should be. Those which cannot should not be discounted, but should be highlighted and put on the table to be considered in decision-making processes. The green philosopher Warwick Fox has identified several dimensions of the values which nature holds for humans. Nature can represent a laboratory, library, pharmacopoeia, museum, art gallery, cathedral, refuge or a

playground. Australia needs a comprehensive national system for natural resource accounting, for estimating and weighing up different kinds of values, and for making natural resource management decisions.

A thorough analysis of the multiple values of farm bushland would probably support political decisions to allocate substantially greater resources to this issue across a range of policy instruments: a rigorous regulatory framework, meaningful incentives, ecological and socio-economic research, inventory and monitoring, extension and education. There are sound ecological reasons for retaining remnant vegetation—biodiversity, hydrological balance, water quality and carbon sinks among others. We also tend to gloss over the sheer uniqueness of Australia's remnant vegetation and the fact that Australia is one of the few countries left with large tracts of biologically diverse land relatively undisturbed by modern society—an extraordinary feature which we would be mad to squander and which, predominant economic theory notwithstanding, is simply not substitutable. Furthermore, clearing precludes the capture of other possible future benefits from remnant vegetation which may be considerable, regardless of whether they can be defined given present knowledge. Recently cleared land is rarely more productive in the broad sense—the best agricultural lands were cleared long ago. It is not as if Australia has a shortage of cleared marginal land, or that the world is knocking us over in the rush for the products it yields. We should be looking through a macroscope at what is produced on recently cleared land and the land currently being cleared, and just what contribution it makes in comparison to the ecotourism sector, for example, or essential oils, or greenhouse strategies, or Australia's international credibility as an environmentally responsible nation.[1] Justifying retention of remnant vegetation in economic terms may be distasteful, but it can and should be done.

Influencing choices through incentives and disincentives

The assumption that attitude change leads to behaviour change permeates extension theory and much Australian environmental and agricultural policy. We tend to prefer non-coercive policy instruments designed to raise awareness and change attitudes, which are then assumed to lead to desired changes on the ground. However, research by John Cary and others has shown that it is often the other way around—that farmers' attitudes may change in response to behaviour changes induced by, for example, prices, regulation and technology. Seat belts in cars provide an example—people started to use them because they had to, yet most now do not feel comfortable without one. Even farmers unfavourably disposed towards conservation would be more likely to protect farm bushland if that was the most profitable use for the land, and after a few years of doing so, would probably say they think it is a good idea.

Australian governments have been reluctant to express social values through regulatory frameworks establishing incentives and disincentives. However, the depletion of farm bushland is so rapid and degradation of remnants so extensive, that greater regulatory effort is essential. While a substantial proportion of land users might privately admit that further clearing is not smart, their antipathy to governments telling them what they can and cannot do outweighs such concerns. There is a tension between the need for consultation to avoid an irretrievable alienation of the states, and the risk of precipitating a backlash of poorly planned, vindictive clearing during the consultative process. Any legislative changes will need to be backed up by much more comprehensive, sophisticated and effective monitoring procedures and enforcement capacity than are currently in place, which implies more political will at state and national level than we have seen to date. If the Commonwealth is serious about clearance controls, it cannot dodge some involvement in, support for and scrutiny of the enforcement effort. Regulation is essential, but it will be expensive, thankless and ineffective unless complemented by more constructive policy instruments.

It is much easier to design the ideal incentives package than to work out how to justify it and how to fund it. Australia lacks a comprehensive system to value native vegetation, has yet to determine criteria for estimating the national interest and consequently does not have a strategy to invest in public good aspects of remnant vegetation management. Spending money to protect and manage remnant vegetation is not something which *Homo economicus* would be likely to engage in, if such a creature ever existed, as it rarely generates a cash flow for the land user. It is an issue where social benefits nearly always outweigh private benefits, and the social costs of continued degradation are usually more important than the immediate tangible costs to the individual land user. Incentives and cost sharing arrangements are crucial, but there is no basis for constructing such a system.

An integrated incentives package would consist of tax credits, rate rebates and covenanting, for protecting remnant vegetation, and technical support for managing protected areas, for controlling pests and weeds and for inventory and monitoring activities. An extension system for native vegetation management could well take the form of a beefed-up Land for Wildlife scheme, combining a network of committed landholders with public recognition and technical support from appropriately trained, publicly funded people (who could either be full-time civil servants or part-time locals).

Knowledge

At the national level the data sets and analytical frameworks which might underpin priority setting, decision-making and resource allocation are lamentable. This is not unique to native remnant vegetation management, but applies to sustainability issues across the board.

Ted Lefroy raised the thorny question about areas in which the dominant land use is ecologically incompatible with remnant native vegetation, and Jamie Pittock suggests that regions where most land users are simply not viable present a similar problem—radical restructuring of land use is required if even the most basic notion of sustainability is to be entertained.

A fundamental constraint to knowing what to do is the way in which research is funded and research priorities established in Australia. The emphasis on industry-based rural research and development means that long-term, public interest research into alternative land use systems is marginalised in favour of research which refines the status quo. Consequently there are significant resources allocated to controlling worms in sheep, or breeding new wheat and pasture cultivars, but a comparative pittance is being spent on investigating systems based on kangaroos or emus, or perennial native plants.

Steve Dovers and John Handmer (1992) made a useful contribution by proposing a policy development framework for sustainability. They suggest that sustainability can be broken down into constituent issues—such as resource depletion and degradation, pollution and wastes, and society and the human condition—as a precursor to problem scaling. Dovers (1995a) suggests that each issue can be described and evaluated on the basis of some defined problem attributes: for example, problem-framing attributes such as spatial scale of cause and effect, magnitude of impacts, longevity of impacts, reversibility, mensurability and degree of complexity; and response-framing attributes such as nature of causes, relevance to the polity, tractability (availability and acceptability of means), public concern and the existence of goals. Such a framework enables the development of a taxonomy and ranking of topical issues as a basis for policy development, in particular the choice of appropriate policy instruments. It also provides the structure for systematically analysing information needs and research priorities.

Dovers (1995b), reviewing the paucity of Australia's knowledge base relevant to sustainability issues, suggests that four changes are critical: a profound increase in basic ecological research and especially monitoring; strong statutory and institutional bases for gathering and communicating environmental information; coordination of information systems across various scales, between sectors and across political boundaries; and consistent and regular policy monitoring.

Looking at remnant vegetation in particular, it is clear that we need good data on resource condition and trends. Helen Alexander suggests that remnant vegetation status could be included in annual ABS/ABARE farm surveys as a way of getting national snapshots relatively efficiently. Some broad-brush sustainability indicators, monitored in a systematic way on a regular basis, including but not exclusively by satellite, could underpin a greening of the national accounts—for example, so that clearing appears as a debit, rather than a credit as it does at present. Broad quantitative data need to be complemented by some detailed qualitative studies—as Jim McDonald points out, we don't fully understand who (what type of land user) is still clearing and why, and consequently our responses may be poorly founded. More broadly, Helen Alexander asserts that an important first step, if any improvement in the status of native vegetation is to be achieved, is to recognise the need for an Australian vegetation management framework and a regional implementation strategy.

In terms of policy options, there are many existing initiatives which can be learned from, including the South Australian legislation, in particular the heritage agreements, the wetlands protection policy in Western Australia, the Land for Wildlife Scheme and Victorian Conservation Trust in Victoria, and Greening Australia's Local Greening Plans and Murray Corridors Program.

Capacity

One could debate cause and effect endlessly—are resources at a national level for remnant vegetation management insufficient because the issue is seen as unimportant and/or poorly understood, or is it that understanding and commitment are weak because resources are inadequate for the necessary work? Never mind, the fact remains that the overall level of national resources allocated to this issue is miserable. Helen Alexander points out that this stems from the fact that there is a lack of a long-term policy framework and state/Commonwealth partnership process, and that structural adjustment issues are not being dealt with strategically—certainly not in an ecologically informed manner.

The fact that it cost $72 million to prevent the clearing of only 440 000 hectares of bush in South Australia and to enter into heritage agreements for that land may also have inhibited thinking about a national approach to the issue, when areas of that order are still being cleared annually. Governments are unwilling to admit that compensation may be justified, and their fear of huge pay-outs has meant that this issue has languished.

Various forms of assistance have already been mentioned which may cost less in aggregate than full compensation. Besides, $72 million is just one bypass along the Hume or one-quarter of a passenger jet—not much to pay for half a million hectares of bush. Urban populations would be willing to pay biodiversity levies if they knew the money would be spent on managing biodiversity. Ultimately it comes down to a question of priorities.

The individual land user

Commitment

There is already a substantial body of research on the attitudes, beliefs and values of Australian farmers about land conservation issues, including native vegetation, represented in the work of Neil Barr and John Cary in particular, and latterly, David Goldney. Barr and Cary (1992) point out that environmental beliefs tend to be symbolic rather than substantive, and relatively few land users have sufficiently strong ecological values to make significant impacts on remnant vegetation protection where there is no clear, observable and quickly realisable private benefit. Their attitudes towards native vegetation on farms are predominantly utilitarian or instrumental.

My own observations are that (at least on the mainland), as one travels further north and further inland, the cultural devaluing of native bush and the notion that clearing is land improvement becomes predominant. A disdain for native bush is reinforced by the idea that urban greenies share an opposite view. Private property rights are sacrosanct and, as Ian Reeve observes, land users are reluctant to accept the legitimacy of public interest in their management of land, seeming to confuse the rights of land ownership and the rights of civil and political freedom.

All is not lost, however. Substantial changes have taken place over the last decade. I have heard young shearers bragging in the pub about how many trees each had planted recently, and arguing the merits of different establishment techniques. There is now a rural revegetation industry. Knowledge, skills and techniques at the farm level have increased exponentially, in turn reinforcing positive attitudes towards revegetation. When land users are confident about their ability to grow trees successfully, they will do so even in tight times.

Similar changes now need to happen with regard to protecting and managing remnants, which is somehow less glamorous than revegetation, often cheaper in terms of out-of-pocket costs, but more subtle in its impacts. It is more obvious if a farmer has planted ten thousand trees in recent years than if (s)he has fenced off and sensitively managed ten hectares of remnant bush, yet the ecological importance of the latter is probably much greater. This is a potent extension message, but has rarely been the subject of a focused campaign.

A key to an effective farm bushland extension program will be a much more sophisticated understanding, not just of the attitudes, knowledge and behaviour of existing land users, but of trends in who the land users are, and who they might be in ten or twenty years as the profound adjustments in Australian agriculture change the profile of rural communities. Some demographic scenario building based on ABS data at the district level would be very useful to envisage ways of engaging land users who may be quite different from the stereotypical images of today's farmers (which are already outdated in many regions).

It is important that the *management* aspects of farm bushland are emphasised, and to remember that in the main we are dealing with farms in extensively modified landscapes. Ecological fundamentalism, urging land users to protect farm bushland for its intrinsic value, to 'fence it and forget it', treating it as precious, delicate islands of wilderness to be admired from afar but not touched, is misguided. A much

more effective message for the majority of land users would be based on active management of farm bushland, controlling pests and weeds, using fire appropriately, and even occasional micro-scale harvesting of products such as posts and poles, flowers, seeds and essential oils. Private commercial gain from farm bushland should be supported and appropriate examples celebrated, albeit with a constant emphasis on management which respects ecological values. On properties which are not commercial farms, (such as the increasing number of non-professional farms, which turn over frequently) enshrinement of ecological values through professional ecological inventory, mapping, monitoring and management plans, registered on covenants, may be a form of value-adding. Where farm bushland is being thoughtfully managed, whether from a purist ecological perspective or a more utilitarian (yet non-destructive) perspective, such examples should be highlighted.

Commitment to farm bushland management on individual farms is influenced by more than just extension messages. The incentives and disincentives discussed above, and the participatory research, inventory and monitoring programs suggested below, will also have a major influence on land users' willingness to get serious about farm bushland management.

Knowledge

Improved management of farm bushland requires an improved knowledge base.

As the most respected agricultural science courses in the country include only rudimentary units of ecology (rarely Australian) and rarely any nature conservation whatsoever, it would be safe to assume that the vast majority of agricultural advisers, farm consultants (and approved farm plan assessors?) are incapable of disabusing farmers' perceptions that remnant bush is awkward to manage and not of much value. It does not help that degradation of remnants is slow and insidious, making it hard to comprehend the cumulative effects of incremental increases in disturbance. Ecological concepts and processes such as nutrient cycling, trophic levels, energy transfer, herbivory, competition, predation, parasitism, symbiosis, emigration, immigration, growth, decay, disturbance, pollination, chance and so on, should be second nature to natural resource managers and those who advise them. This is not the case. The number of mainstream farm management advisers capable of helping people to modify farm layout and management to enhance the ecological integrity of remnant bush is risible.

Criticising the knowledge base of advisers is wholly valid only if technically sound answers to the problems they are tackling exist. Yet, as Jill Landsberg and Jos Chatfield point out, we still suffer from ignorance of specific dieback mechanisms and how they vary across regions, we simply do not know how to 'dieback-proof' a farm, and experts have yet to develop answers to farmers' questions about relative priorities, for example, between protecting pristine versus degraded bush, or large patches versus small clumps, or blocks versus strips.

One reason why our knowledge base is so poor and human resources so scarce, apart from the sheer size of Australia and the diversity and uniqueness of its ecosystems, is that the research investment in this area is lamentable. The few researchers examining the ecology of vegetation remnants, the impact of clearing and habitat fragmentation, the extent and rate of species extinctions and so on, are flat out doing research and/or chasing money to do research. It is unrealistic in this climate to expect teaching materials or advice given to farmers to be state-of-the-art. It is becoming a mantra, but the clever country needs to invest in research.

Some good basic work has been done, but there is a need for better interaction between this research and land management practice and practitioners. There is great potential here not only to do more research, but to involve more people in this research and monitoring (farm advisers, facilitators, farmers, greenies, ecotourists, students), so that knowledge of the parlous state and ecological value of remnant vegetation is much more widely shared. This issue is ideally suited to the principles of participatory inquiry (Campbell 1994b) and the 'post-normal' science of the Argentine mathematician Silvio Funtowicz and the British philosopher of science Jerome Ravetz (1994, 1991).

Two examples of this more participatory inquiry spring to mind.

- The West Hume Landcare Group near Albury organised a roadside vegetation survey of their shire last year. Volunteers walked every road easement in the shire, learning from botanists as they identified, recorded and mapped roadside remnants. In areas like West Hume which have been overcleared for agriculture, roadside remnants are often the last examples of particular plant communities. They are thus ecologically critical, as habitat for birds, marsupials, reptiles and invertebrates, and as repositories of local genotypes which can be used for revegetation and improving the habitat value of

other nearby remnants. They are also priceless from a land literacy perspective, as they enable current generations of land users to observe, seek to understand and to ponder upon the difference between the ecology of the roadside vegetation, and that of the adjacent monocultural pasture or crop. Changes in biological diversity, in soil fertility and structure, and occasionally (near larger remnants) in water quality and hydrology, can be appreciated to advantage in the contrast between farmland and the islands of bush remaining. The group used $7600 from Save the Bush to involve 38 people—generating an outstanding level of participation and awareness of both the parlous state and critical importance of remnant roadside vegetation, and a dawning recognition by the shire of the importance of roadside management. It was a seminal experience for those involved.

- Dr Dennis Saunders and Dr Richard Hobbs of the CSIRO Division of Wildlife and Ecology in WA provide opportunities for farmers, naturalists or anyone else who is keen to participate in their wildlife surveying and monitoring programs in patches of remnant bush in the wheatbelt. People set up insect pits, nets for trapping and banding birds and marsupials, they learn to identify critical species, day and night, they learn about population levels and the impact of management practices on habitat quality and subsequent species survival prospects. Dennis and Richard are senior scientists, paid to do research, not extension or community education, yet the experience and insights they provide for people are priceless. It would be great if they had the resources and people to expand such programs and replicate them elsewhere without compromising their capacity to do the research on which their insights are based.

These are signposts, rather than recipes, of many possible ways of improving the knowledge base in such a way that direct influence on land management practices is more likely. The point is that farm bushland management in Australia will never improve unless there is a widespread understanding among land users and voters of the importance of remnant vegetation and how to manage it, based upon vastly improved knowledge of the extent and status of remnant vegetation, continually updated by participatory monitoring programs.

Land literacy programs (Saltwatch, Waterwatch, Frogwatch, Wormwatch and so on) are described in more depth elsewhere (Campbell 1994, 1995). These programs have enormous potential, but are in danger of being pigeon-holed as environmental education in schools, a good way of getting kids out of the classroom and getting their hands dirty. They are that, but could be much more.

The major value of land literacy programs is the speed and effectiveness with which they transmit local environmental knowledge and teach people to observe and monitor the health of the land around them, subtly changing powerful social norms about what is 'good management.' Social norms must be overturned if clearance controls are to be widely accepted in rural Australia. Community groups and schools can gather more data from more sampling points than is conceivable for government agencies paying professional staff, in a way which is ultimately more effective than scientists interpreting satellite imagery from their Canberra offices. People involved in gathering information are more interested in learning what it means and taking it seriously. They develop ownership of this information, commitment to dealing with its implications, and are less overawed by the language and the aura of science and bureaucracy. Incorporating such programs as an integral component of natural resource assessment and monitoring programs and catchment management planning processes would make better use of the learning potential of land literacy.

What about a 'Bushwatch' program working through schools, Landcare groups and field naturalists clubs, linked in with national assessment and monitoring programs and the remnant vegetation teams? This could involve, for example: the development of local remnant vegetation assessment guides designed to complement an expansion of CSIRO's Treedat database; mapping projects based on nationally agreed standards and criteria, anticipating ever-cheaper and friendlier technology such as geographic information systems, GPS and the much-heralded Infobahn; curriculum material for schools, building on the existing Landcare, Save the Bush and Corridors of Green stuff and using the project officers in each state already funded by NLP; an annual 'State of the Bush' report which would gradually become a rough index of progress as well as a powerful communication and motivational tool; and competitions for schools and community groups' assessment and mapping projects, linked in to the Landcare awards. Much of the administrative and technical support could be delivered through the existing Greening Australia and Save the Bush networks.

Involving as many people as possible in such programs is an effective way to generate and sustain

political momentum, defraying and deflecting criticism of clearance controls. Policy must be seen to be even-handed and consistent. The tragedy/farce of the current situation—government funding revegetation and vegetation retention schemes while half a million hectares of bush per year are going up in smoke—has yet to be effectively politically exploited. This must be done in a constructive way.

Capacity

Farm input costs have been rising and world commodity prices declining for several centuries—a situation referred to by economists as declining terms of trade. The long-run trend lines for Australian farm input costs and farm gate prices crossed over around 1990, which means that the average Australian broadacre farmer now makes a farm business loss in an average year.[2] This means that few farmers are in a position to outlay cash for measures which will not yield a financial return. Rural poverty is acute, chronic, and neither understood nor serviced compared with urban poverty. This has profound ecological implications.

Perhaps Hanrahan was right. Things are so crook at the farm level that the rest of this paper is academic. But there are counterpoints. Firstly, beware of averages. Many farmers are still making money, and could invest in land care activities including remnant bush protection. It would be interesting to know what proportion of the farm landscape is managed by profitable farmers, or people with an off-farm income, and what proportion of farm bushland is on this land. Australian agriculture is in a period of such rapid adjustment that the composition of the farming community is changing rapidly, so the question of what happens to the land of the thousands of farmers forced to leave over the next decade is ecologically significant. Are these farms bought by larger more profitable farmers who can afford to invest in the land, or by hobby-farmers/alternative lifestylers who value patches of bush, or by desperate neighbours also trapped on the terms of trade treadmill?

Secondly, managing farm bushland need not involve significant cash outlays, once it is fenced. The cost of fencing remains the biggest constraint, and should be the focus of a targeted incentives program. Tax deductions are as handy as an ashtray on a motorbike for farmers who haven't paid tax for years, for whom direct grants or tax credits would be more persuasive. However, an increasing number of farmers have an off-farm income, are better able to afford cash outlays, and more likely to be influenced by tax deductions, although they may not manage a large proportion of the landscape.

The point is that existing financial incentives are limited, often inconsistent, inequitable given the diversity of farmers' situations, and thus unlikely to work for both the public and private good. There is an urgent need to overhaul the incentives system to provide meaningful assistance commensurate with the public good. This would make the necessary regulatory sharpening much more palatable. Expenditure on incentives should be seen as a public investment in natural heritage, not a subsidy to farmers.

The landscape—where the pixels in the big picture take shape

The measures discussed at the national level and the farm level would together go a long way towards generating commitment to and knowledge for better management of farm bushland at the landscape scale, and they would also enhance the capacity to act at this scale. Nevertheless, it is at the landscape scale that management of farm bushland must make sense ecologically, and this gives rise to particular considerations, discussed here.

Commitment

A key challenge at the landscape scale is not merely to get land users to value native bush, but to encourage them to manage farm bushland and the land around it in a way which makes ecological sense at a landscape scale. Extension messages need to highlight interactions and interdependencies, research needs to generate landscape level priorities and guidelines, and planning needs to consider how to 'scale up' from the farm scale to the catchment/landscape scale. A catchment full of nice farm plans does not a catchment plan make.

A powerful motivating issue which can be used here is the link between particular native species and appropriate habitat. Key species such as the superb parrot, koala, eastern barred bandicoot, platypus and regent honeyeater are already being used by Landcare groups and catchment management committees to focus catchment-scale efforts to integrate farmers' planning and works. Regional dryland salinity plans and regional forest agreements also reinforce the need for an integrated approach.

The Commonwealth can encourage stakeholders, and has started to in some areas, to work together at

a regional level by making funding conditional on compliance with principles flowing from integrated regional planning processes. This may be a necessary kick-start for landscape level cooperation and integration, especially where there are no immediately obvious unifying elements such as a rising saline watertable or threatened koala habitat.

Knowledge

It is when we focus on the landscape scale that our practical ecological ineptitude becomes most apparent. We have spent so long trying to refine European farming systems, based on annual species of crops and pastures, soil cultivation, cloven-hoofed animals, flood irrigation and so on, in a colonial context of producing large volumes of undifferentiated, unprocessed products for export markets, that we are in poor shape to start with a clean sheet of paper and think about what an Australian farming system might look like. Land tenure systems, land management regulations, research and development infrastructure and funding, the education system, incentives, the tax system, trade policies—all conspire to prop up the status quo.

John Cary makes the point that much remnant native vegetation simply does not complement European farming systems and patterns of settlement. So in trying to protect or preserve the fragments of bush which remain on agricultural land we are really trying to push back the ocean with a broom.

As Dean Melvin, an innovative young farmer in the WA wheat-belt puts it: '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.' Ted Lefroy has been working with Dean Melvin on his farm near Dowerin for some years, rapidly evolving alley farming systems which are described in detail in Campbell (1994). Ted makes several points with regard to the development of farming systems more in tune with the ecology of the Australian landscape.

- Management of remnant vegetation cannot be attempted in isolation of the matrix within which the remnants lie, as the major threats to remnant vegetation are functions of how the landscape as a whole is managed. The current diagnosis of the problem is mostly too narrow. A more appropriate long-term goal might be to develop agriculture as a structural and partly functional mimic of the native ecosystem (for example woodland, forest heath and mallee), to reduce the dissimilarity and consequent tension between agriculture and vegetation remnants which is at the heart of the problem. But can salinity, erosion, waterlogging and remnant vegetation protection be effectively addressed by an agricultural landscape that mimics the structure of native ecosystems, and how strong does that mimic have to be?
- We need to develop intercropping and agroforestry systems using mixtures of annuals and perennials, woody and herbaceous species, in different configurations according to soil type, slope, drainage, climate, the farm enterprise and the relationship to remnant vegetation. Revegetation on the scale required must be commercially driven.
- Given the profound nature of changes such as moving from a farming system based on annuals to one based on perennials, and given the extent to which the existing R&D infrastructure and funding is embedded in the status quo, it will be necessary to take a participatory diagnosis and design approach to implement experimental treatments at a scale large enough (first order catchment) to affect land and nature conservation issues, and secondly to learn about the practicalities and acceptability of such systems from land users' perspectives. Key questions include: what are the implementation costs (of alternative agricultural systems mimicking native ecosystems); what are the benefits, and when do they arrive?

At the landscape scale, the activities of local governments and authorities managing water, electricity, transport and communications become germane. Roadsides, streams and rail reserves, stock routes, local nature reserves, tips and gravel pits are all critical threads in the fabric of remnant vegetation, forming a matrix of patch and corridor which straddles agricultural land.

A new clientele for remnant vegetation management knowledge and skills suddenly emerges when such areas are considered. Dozer and grader drivers, chainsaw operators, railway maintenance crews, stock inspectors, shire engineers, fire brigade captains, Telstra ditch diggers and electricity authority tree loppers often see trees, their roots and branches as the enemy, something to be uprooted, sprayed, hacked or burnt—and they are generally even less aware of the value of remnant native grasses, herbs and shrubs. Sue McIntyre stresses the need for local government planning to soften its engineering emphasis, improve

guidelines for works crews, revise ways of installing services and to develop less destructive equipment. I well remember persuading a shire engineer over a couple of years to schedule roadside tree lopping operations to coincide with good eucalypt, acacia and casuarina seed yields, so that lopping could become a seed collection operation, providing local farmers with local genotypes and generating some revenue for the shire. It worked for a while, as the engineer and his crew became aware that they had been lopping and burning branches laden with seed worth at least $100/kg, that native species are valued and local genotypes are unique, and that it makes more sense to remove as little of the tree as possible than to bowl over the whole tree. Alas, the engineer retired and his replacement was of the old 'a bare roadside is a good roadside' school.

We are dealing with entrenched institutional cultures here. Carefully designed and targeted training programs are needed to improve the management of many of the linear reserves which are so critical in agricultural landscapes. These will be even more effective if they are combined with activities such as the West Hume Landcare Group's roadside vegetation survey, mixing up shire councillors, officials and workers with local ratepayers and students in collective learning about the status and importance of fragments of the original vegetative cover of their landscape.

Ecological illiteracy is not only a problem with works crews; it permeates planning guidelines and the way in which development applications are assessed at local and regional levels. Exercises like the West Hume survey would also enhance the chances of property, catchment and local government planning processes taking full account of the social and private values of remnant vegetation and ecological processes. Jamie Pittock proposes regional biodiversity conservation plans identifying priorities identified for publicly funded works, but such plans are most likely to be implemented as components of broader catchment and local area plans, prepared with the involvement of local stakeholders, not by outside experts in isolation.

Capacity

Australia does have many of the ingredients necessary to develop a more integrated and ecologically informed approach to land management at a landscape scale. Across the states there is a plethora of new and emerging institutions with a natural resource management brief, including regional assessment panels, catchment management committees, soil and land protection boards, and integrated local area planning boards. With additional resources flowing from a focused strategic direction at the national level providing the leverage, it should be possible to build a comprehensive national framework for overseeing activities, setting priorities, and targeting incentives and research at the landscape scale.

Research needs

The workshop papers develop research priorities in more detail, but some clear directions emerge from the argument developed in this paper.

From a political perspective, it is imperative to establish as soon as possible a system for assessing, monitoring and presenting the extent and status of native vegetation, with at least key indicators gathered consistently across Australia, so that an annual 'state of the bush' report could be produced and promulgated. We need a much better handle on the clearing which is still occurring—for coastal subdivisions, for suburban development, roads and power lines, agricultural land of various types (for example, what proportion is regrowth or woody weeds). We need to develop farm bushland assessment kits which can be used at a local level to estimate the ecological integrity of remnant stands and trends in their condition, in such a way that understanding of the processes influencing such trends is enhanced. The pressure-state-impact-response model used to develop local sustainability indicators for European cities provides a good starting point.

Ecological research is essential at several levels. Basic research is still required to understand the ecology of farm bushland, the impacts of fragmentation and the dynamics of decline. More applied and participatory research is required to develop guidelines for farm bushland management (to develop the kits mentioned above), to help improve land users' decisions. Some decent qualitative case studies (not merely journalistic descriptions) of people who are successfully managing farm bushland would be helpful, also in the development of extension strategies. Finally, research is needed at the landscape scale to consider different farming systems which would complement farm bushland remnants. Keith Bradby has described current broadacre farming systems as 'ecological apartheid', with heavily modified monocultures on one side of the fence and complex ecosystems on the other.

Policy development for farm bushland needs to be informed by a knowledge of who the land users are,

and who they are likely to be in five, ten and twenty years, given various rural development trajectories for Australia, from laissez faire (i.e. laissez degrade) through various levels of public intervention. We need to know what types of land are changing hands for what reasons, and what are the implications of these changes for the management of farm bushland in terms of land users' knowledge, inclination and resources.

Finally but crucially, we need to invest considerable effort in developing ways of evaluating and reconciling the social and private benefits and costs of farm bushland—its continued depletion and degradation and various options for arresting and reversing the decline. This job is too important to be left to the economists—which would in any case be like asking the French to develop procedures for evaluating the impact of nuclear tests in Polynesia. Rather, we need to combine the skills and perspectives of economists, ecologists, land users and social scientists including philosophers, to sort out where and how to draw the line between public and private interests, and how to determine an appropriate level of public investment.

Conclusion

Improving management of farm bushland in Australia is not straightforward, but is very achievable given sufficient energy and nous on the part of its advocates. Research of various kinds at various levels has a crucial role to play, but only in the context of a more rounded policy integrating incentives and disincentives, inventory and monitoring, land management planning, and education and training. The political impetus and subsequent resources for the necessary upgrading of this issue are more likely to be generated if the justification and the language is changed from a rearguard action to preserve ecologically important remnants of pre-European settlement vegetation, to a long-term investment in Australian natural resources—in line with a more fundamental transition of Australian natural resource management from the colonial to the sustainable development era.

1. *The Independent*, Wednesday 22 February, 1995, page 2, headline 'Australia abandons clean-air target' and a five-column horror photo of a desolate Western Australian salt pan and skeletal dead trees:

   'Australia is cutting down forests at a rate second only to Brazil and, in spite of being one of the biggest producers of greenhouse gases, has abandoned targets to reduce gases by 2000.'

   It won't take many such articles in Britain's most respected broadsheet to demolish any pretensions Australia has to environmental respectability, let alone leadership. Memorable lines such as 'second only to Brazil' will quickly undermine years of spadework by Penny Wensley and others involved in Australia's contributions to international conventions such as Agenda 21 at the Rio Earth Summit and the UN conventions on biodiversity, desertification and climate change. For a country trying to position its products internationally, promoting images like 'clean, green and responsible', continuing to clear 664 000 hectares per year of native bush in 1995 is myopic—scarcely credible to outsiders.

2. 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 savings. Broadacre farms include cereals and other dryland cropping, sheep for meat and sheep for wool, and beef, which together account for more than 70% of the gross value of Australian agricultural production and which occupy the vast majority of the land in agricultural and pastoral use.

Vegetation clearing and climate change

National Farmers' Federation

The National Farmers' Federation is disappointed that undue attention was given to the impacts of vegetation clearing on greenhouse gas emissions at the launch of the Greenhouse Gas Inventory.

The inventory overestimates the impact of vegetation clearing because:

- the data on which the inventory is based is partial and out of date
- not all land clearing has been for agricultural purposes; much has been for urban expansion
- the inventory does not distinguish between remnant vegetation and clearing of woody weeds and regrowth
- the inventory does not acknowledge that land clearing was actively supported by government policies and tax concessions until the 80s
- there have been substantial improvements in management of remnant vegetation by the states and the rural sector since the late 1980s
- the inventory methodology does not include the so-called CO_2 fertilisation effect which would substantially reduce emissions from the rural sector.

The focus on land clearing diverts attention from other key greenhouse issues such as the impacts of climate change on the rural sector and the need for adaptation strategies.

It has also provided another platform for green groups to pursue unrelated agendas such as biodiversity and desertification.

Despite these reservations the National Farmers' Federation supports sustainable land management practices, including the conservation of remnant vegetation and revegetation programs:

- the National Farmers' Federation has adopted resolutions supporting tax incentives and funding initiatives to conserve remnant vegetation and promote revegetation programs such as Landcare, Greening Australia, One Billion Trees and Save the Bush
- the National Farmers' Federation has also adopted resolutions supporting state regulations to ensure compliance with conservation programs
- the United Graziers Association of Queensland (a member of the National Farmers' Federation) has issued a handbook on timber management and is developing a code of practice on vegetation clearing.

The Australian Conservation Foundation recognises that individual farmers and pastoralists are making concerted efforts to conserve remnant vegetation and revegetate cleared areas.

Some states, notably Victoria and South Australia, have implemented tough regulations restricting land clearing and few permits have been issued since the early 1990s. This has seen a dramatic fall in clearing.

Land clearing is still continuing at relatively high rates in some states, notably Queensland and NSW. However, substantial changes are under way to introduce sustainable land management practices. The Queensland government has a range of regulations covering conservation of remnant vegetation and has also developed local development and approval guidelines for broad-scale tree clearing on leasehold land. The NSW state government also has a number of legislative controls over land clearing and is developing regional environmental plans that will provide additional management in sensitive areas.

Key future actions to improve the conservation of remnant vegetation and revegetation could include:

- improving the database on land clearing through more robust state systems and more widespread remote sensing programs by the Commonwealth—Bureau of Resource Sciences is holding a workshop on this issue on 24–25 October
- improved coordination of Commonwealth and state programs through appropriate ministerial councils (Australian and New Zealand Environment Conservation Council, Agriculture and Resources Management Council of Australia and New Zealand and SCARM)
- improved education and awareness programs and extension services to rural communities through relevant Commonwealth and state departments
- increased federal and state funding to conserve remnant vegetation and revegetation programs through Landcare and other programs
- initiatives such as tax rebates and cash allowances to conserve remnant vegetation and promote revegetation.

Other possible actions to promote rural sector awareness of climate change issues and encourage

improved greenhouse response strategies could include:

- improved regional models of climate change
- increased research on the linkages between El Niño–Southern Oscillation and greenhouse
- increased research on the impacts of climate change on agriculture
- increased analysis on adaptation strategies within the rural sector
- improved monitoring and measuring of climate change impacts and response measures
- increased involvement of key stakeholders in developing wider greenhouse response strategies such as:
  - research and development on improved land management and feeding practices to reduce methane emissions
  - extension programs aimed at extending improved land tillage and fertiliser practices to reduce nitrous oxide emissions
  - extension programs aimed at improving energy efficiency and reducing carbon dioxide emissions.

The National Farmers' Federation wrote to the Department of the Environment, Sport and Territories seeking membership of the National Greenhouse Advisory Panel. The federation has not been admitted as a member of the panel yet.

A proposal for advancing productive agriculture and sustainable environments

Biz and Lindsay Nicolson, Farmers; Katrina McKay, Tasmanian Farmers and Graziers Association; Colin Bastick and Mike Temple-Smith, Department of Primary Industry and Fisheries, Tasmania

Background

The following issues were the basis for the development of this proposal which we believe could significantly advance sustainable agriculture in Australia..

Improved agricultural resource management depends upon changes being made at farm level. Currently there are few tangible incentives and rewards to encourage the leading practitioners in sustainable agriculture. Only about 15% of Australian farmers have completed property management plans and very few of those have partially or completely implemented them. There is an urgent need for more incentives and rewards for those prepared to lead in this direction. A Land Management Task Force has been set up by the Prime Minister to investigate how the involvement of farmers and graziers in property management planning can be accelerated. The strategies outlined below could help to achieve that.

The achievements of the Decade of Landcare are currently under review and the focus of the program is moving away from 'awareness and demonstrations' towards strategies that will translate to broader action at farm and catchment and regional level.

The innovators with the greatest impact in Landcare, property management planning and sustainable systems development are leading farmer practitioners in sustainable agriculture. As pioneers of sustainable management, these farmers often fail to receive funding and recognition for their projects. After an idea is proven by these innovators, other farmers are able to receive funding more easily for identical on-ground works. An associated problem is the isolation from similar-thinking people that innovators often experience and the outright initial rejection of their novel ideas and practices by the majority. Australia would benefit from a mechanism which would better support innovators and provide a network and infrastructure for their activities.

Many of the benefits of sustainable agriculture do not accrue solely to the farming community but are public benefits that accrue to other sectors of the Australian community; for example, improved water quality and reduced erosion result in cost savings for local and state government. As such, support and funding for improved natural resource management must be sourced, at least partially, from these sectors and be borne by the whole Australian community. The incentives and rewards suggested below fall into this category.

Financial institutions are keen to identify and reward land managers who carry lower risks because of their use of more sustainable management practices. Currently there is no national accreditation process which would allow these farmers to be identified. The proposal below would provide such accreditation.

Vision

- A self-help group of networking farmers recognised as being at the forefront of Australian sustainable agriculture who would provide:
  - support and impetus for further innovation in developing sustainable agricultural systems, natural resource management and Landcare
  - guidance, demonstration and incentive for followers to advance.
- Real tangible incentives and financial rewards available for leading (accredited) practitioners of sustainable agricultural practices.

(Note that this vision includes retention of the current level of support for non-innovators and non-accredited farmers.)

Objectives

To advance the long-term productivity and profitability of Australian agriculture by providing recognition, incentives and financial rewards for those farmers implementing sustainable management practices.

Anticipated outcomes

The primary outcomes will be smarter, more profitable agricultural production, improved biodiversity and reduced land and water degradation leading to cost savings in rehabilitation, treatment and degradation control by land managers, industry and local, state and Commonwealth governments.

Other outcomes include the following.

- A more committed, more active group of leading practitioners in sustainable agriculture. Advancing the top land managers forward gives incentive for followers to advance.
- A greater number of farmers, leaseholders, managers and overseas owners practising sustainable land management due to the presence of financial incentives—incentives for *implementation* of whole-farm plans should be targeted.
- More emphasis by financiers on recognition and evaluation of land and water management as well as production and financial management when assessing financial packages.
- More self-reliant operators in agriculture—reverse the present situation where those not self-reliant receive 'rewards' such as drought relief and so on.
- Stronger and more supportive leading practitioner groups/networks removing the isolation of innovators—both geographic and mental. Improved channels for innovators to network, interact and get access to information and personnel—Australian and international.
- Greater recognition and acknowledgement given to proven innovators (by Commonwealth, state and local governments, Landcare, agribusiness, industry (farmers' organisations), advisers).
- Greater opportunities for innovators within extension (e.g. departments of primary industry, Landcare, advisers, forestry).

Strategies for achievement

Establish a two-stage assessment and accreditation process for land managers to recognise leading practitioners in sustainable agriculture.

Based on self-assessment procedure

A voluntary, detailed, questionnaire-type self-assessment procedure is envisaged which farmers could purchase for about $30 to $40. This could be completed every one to three years and would provide an audit of sustainability and prompt land managers to consider changes to their management practices. The system—Linking Environment and Farming—developed in England could provide the model for a process suitable for Australia.

The Australian system should include questions in the following broad areas:

- enterprise management, including total quality management
- risk management
- financial management
- management of soil
- management of water
- landscape and biodiversity, including vegetation management
- pollution control
- feral animal and weed management
- disease and pest management
- animal welfare
- conservation of energy
- marketing
- human resources planning and management.

Based on an accreditation procedure

Farmers who consider they perform well in their self-assessment audit could seek formal accreditation by requesting an external assessment. This would be based on a set of criteria developed and endorsed on an industry/bio-regional basis. Such criteria would need to be developed by the key stakeholders. Broad support and sponsorship for the accreditation process would need to be obtained from industry, agribusiness, government, Landcare and environmental groups.

The actual assessment would need to be conducted on a fee-for-service basis using nationally accredited private consultants, industry personnel and Landcare experts.

Develop an incentive system to reward accredited land managers

This is the cornerstone of the entire proposal. Some of the possible incentives and rewards that could be considered for development for accredited land managers are:

- reduction in interest rates (financial institutions)
- taxation relief (Commonwealth and state governments)
- rate relief (local government)
- communication incentives (Landcare Aust Ltd; e.g. travel grants to interact with peers, networking technology).

In most cases these should be developed nationally by governments and industry.

Different levels of incentives could be provided for 'self-assessment level' and 'accreditation level' managers.

Initiate networks/self-help groups of accredited leading practitioners in sustainable agriculture to generate and implement innovations in land management

This would require the development of linkages and groups of accredited farmers, at state and national level, via newsletter, computers and even workshops and meetings. It is envisaged this would largely be organised by the accredited members but with sponsorship/funding from industry, agribusiness, financial institutions and governments.

One role of this strategy is to pursue market advantage through accreditation labelling of products from accredited producers. This could work in the same way that 'organic' produce is marketed.

Promote the self-assessment/accreditation/ incentives system for sustainable agriculture and the on-ground practices of the leading practitioners

This would be an important component of the Landcare program both nationally and in each state and would require the involvement of industry, agribusiness, financial institutions and governments to implement. Responsibility for coordination of this strategy could be devolved to Landcare Australia Ltd (nationally) and state Landcare coordinators.

Proposals for Commonwealth policy options on halting native vegetation clearing

Australian Conservation Foundation

Greater Commonwealth involvement in policies which bring about an end to broadacre land clearing and support native vegetation retention on leasehold and freehold lands is urgently required. Ending further inappropriate broad-scale clearing of native vegetation for agricultural development and other purposes is now an urgent national priority to which concerted government efforts need to be directed. The Commonwealth could use a range of policy instruments more forcibly and effectively. This paper outlines a few opportunities which the Australian Conservation Foundation (ACF) believes are worthy of much greater consideration.

Political context

Land clearing is now squarely on the national agenda with the release of the National Greenhouse Inventory in late 1994 highlighting the contribution of land clearing to Australia's greenhouse emissions (approximately 25% of total emissions are due to land use and forestry). This has added to the concern of the impact on biodiversity, water and land. Most ecologists believe land clearing is the single greatest threat to Australia's biological heritage.

The coalition's recent Environment Statement promised to bring an end to further clearing. The fact that Ian McLachlan, an ex-National Farmers' Federation president and the coalition's environment spokesperson, is prepared to take this step demonstrates that Commonwealth action on this

issue would have widespread support. There has only been limited opposition to the coalition's statement. This was predictably from the Queensland Cattlemen's Union and sections of the Queensland National Party. While the coalition's statement was uncosted and has failed to clearly explain how it would deal with states' rights and individual property rights, it is nonetheless a significant turning point. From now on we have the potential to gain bipartisan support for comprehensive and effective action on this urgent issue.

The Commonwealth government must now become more active in this policy arena, to both match the coalition and in order to meet its commitments to greenhouse gas reduction, biodiversity and land conservation, and the protection of threatened species. Furthermore it is inconsistent for governments to sponsor land protection initiatives such as Landcare programs while sanctioning further broadacre land clearing.

Vegetation clearing is not simply a historical problem. Contemporary rates of clearing are excessive and are proceeding at horrifying rates into many areas unsuitable for agriculture. Numerous studies indicate that current rates of land clearing equal or exceed historical averages. Official estimates (Department of the Environment, Sport and Territories 1994) put the national rate of clearing at 660 000 hectares per annum (as at 1990). However, one unofficial government estimate from Queensland puts current clearing in that state alone at over 1 000 000 hectares per annum.

While better documentation of clearing rates is important and something which the Commonwealth could do, it is secondary to the need for effective policies which minimise further clearing. The Commonwealth needs to use a wide range of policy instruments in order to do this. The rest of this paper considers a range of Commonwealth policy options for the control of clearing.

This paper is in no way comprehensive but simply attempts to identify those areas where the Commonwealth could move swiftly and effectively.

Taxation

Current taxation arrangements indirectly sponsor clearing. Many clearing expenses—fuel, machinery hire and/or depreciation, chemicals and labour—can be deducted against income as ordinary operating expenses. This therefore encourages expenditure on clearing as one option for minimising income (and therefore income tax) whilst improving capital values of farming properties. Clearing expense should not be deductible against income or at least should be treated as a capital expense, similar to the construction of farm buildings and therefore depreciated over a long period, for example 1% or 2% per annum. Reinterpretation of current tax legislation may be sufficient to bring this into force or an amendment may be required.

ACF recommends that the Commonwealth urgently review taxation in relation to land clearing.

Cross-compliance: state–Commonwealth partnerships

The state–Commonwealth partnerships approach to Landcare funding adopted under the *Natural Resource Management (Finance Assistance) Act 1992* provides a clear opportunity for the Commonwealth to introduce cross-compliance measures as a condition of financial assistance. The Commonwealth should seek commitments from the states to introduce legislative controls to clearing (similar to South Australia's controls) as a condition of future funding of Landcare programs. Failure to implement such controls should be regarded as a signal from the states that they are unwilling to genuinely implement Landcare policies and a sufficient basis to withdraw funding. Commonwealth funding could then be offered to regions willing to adhere to reasonable land management standards.

ACF recommends that the Commonwealth use its powers under the Natural Resource Management (Financial Assistance) Act 1992 *to ensure that the states introduce strict controls on broadacre clearing.*

Cross-compliance: Commonwealth–regional partnerships/contracts

Through the National Landcare Program and other programs such as regional development initiatives, Rural Adjustment Scheme and Drought Relief, the Commonwealth is increasingly involved in funding regional initiatives. For example, a recent joint proposal from Queensland and NSW called on the Commonwealth to fund the South-West Strategy (Mulga lands) for about $90 million over 10 years. It would be possible to introduce cross-compliance amendments to local government planning schemes. Similar logic applies to support for local government, total catchment management, or integrated catchment management.

ACF recommends that the Commonwealth investigate the potential to develop regional cross-compliance measures.

Commonwealth funding of some initiatives, such as the Sugar Industry Package ($20 million promised before the last election) could be leading to accelerated clearing. In the case of the Sugar Industry Package, the emphasis on expansion of the industry is stimulating clearing on coastal plains and riverine floodplains in Queensland, despite assurances that the funding must be consistent with sustainability and best land management principles.

ACF recommends that the Commonwealth review the effects of its funding programs to identify where these contravene its policy goals of sustainable land and water management, particularly where Commonwealth funding leads to further clearing.

Cross-compliance: Commonwealth to individual property

The Commonwealth, via the states, makes considerable funds available for land and water management and structural adjustment programs. In dollar terms, rural and structural adjustment programs often exceed Landcare funding, being used as a channel for special drought or industry restructuring funds. For example, in 1992–93 the Commonwealth made $166 million available for the Rural Adjustment Scheme plus an additional $50.6 million was made available for drought and wool industry funding, bringing the total delivered via the Rural Adjustment Scheme to $320 million. In 1994–95 an additional $164 million was made available for drought funding. Landholders who benefit directly should be compelled to enter contracts to protect the public good in the future by signing away rights to clear. To be effective such an arrangement would require covenanting the title.

The Commonwealth also forgoes taxation income in order to encourage land conservation activities, through provisions under the Tax Act, sections 75B and 75D. This could be tied to covenanting of clearing rights and vegetation maintenance.

ACF recommends that the Commonwealth make much greater use of covenanting of property titles where public funds are used to support private property initiatives.

Financial support

Direct financial support could be provided to landholders, for example, fencing/management grants via programs such as Save the Bush. Rate rebates could be provided via local governments willing to pioneer local government by-laws prohibiting or restricting clearing. However, these measures are likely to be of limited effectiveness compared with the introduction of state-wide systems of controls similar to the South Australian model.

ACF recommends that the Commonwealth investigate the means of supporting local government initiatives, for example, application of by-laws and planning controls.

Reserve systems

The Commonwealth needs to accelerate its implementation of the comprehensive and representative national reserve system, purchasing private property with significant native vegetation. While this would only protect a small percentage of privately owned native vegetation, it would be a significant step, indicating that the Commonwealth takes the reservation and protection of native vegetation seriously.

Revolving fund and low-interest loans

Low-interest loans and/or tax deductibility should be made available to private funds for reserving land, such as the Australian Bush Heritage Fund, to stimulate private investment in nature conservation. Access to tax deductibility would also require covenanting.

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ABARE:	Australian Bureau of Agricultural and Resource Economics
ABS:	Australian Bureau of Statistics
ALEP:	Australian Land Evaluation Program
ANCA:	Australian Nature Conservation Agency
ANZECC:	Australian and New Zealand Environment and Conservation Council
ATSIC:	Aboriginal and Torres Strait Islander Commission
BRS:	Bureau of Resource Sciences
CALM:	Department of Conservation and Land Management (WA)
CCNT:	Conservation Commission of the Northern Territory
CSU:	Charles Sturt University
DoL:	Department of Lands
DPIF:	Department of Primary Industries and Fisheries
ERIN:	Environmental Resource Information Network
ESD:	ecologically sustainable development
GANT:	Greening Australia—Northern Territory
GAV:	Greening Australia—Victoria
GPS:	Global Positioning System
ICM:	Integrated Catchment Management
LCD:	Land Conservation District (WA)
LEAP:	Local Employment Action Program
LWRRDC:	Land and Water Resources Research and Development Corporation
MDBC:	Murray–Darling Basin Commission
NLP:	National Landcare Program
OAC:	Orange Agricultural College
OBT:	One Billion Trees (program)
PAWA:	Power and Water Authority (NT)
RAS:	Rural Adjustment Scheme
REAP:	Rural Employment Action Program
RIRFS:	rural industry research funds
RNV:	remnant native vegetation

SCARM: Standing Committee on Agriculture and Resource Management

STB: Save the Bush (program)

VFF: Victorian Farmers Federation