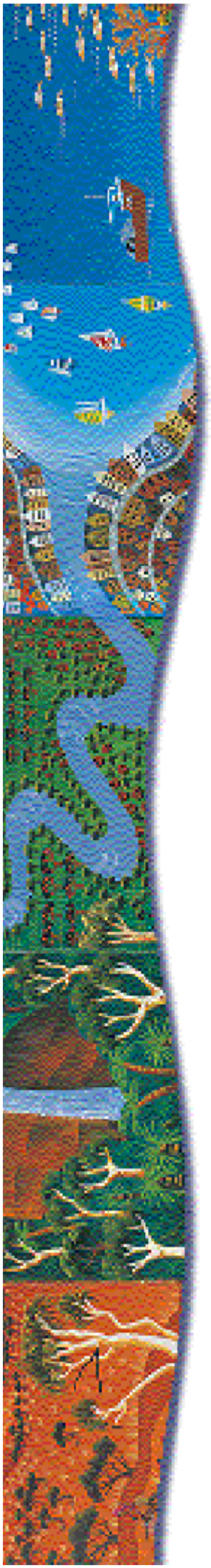

# Natural Resource Management

## *People and Policy*

*Research projects commissioned by the Social and Institutional Research Program of Land & Water Australia.*


## Published by

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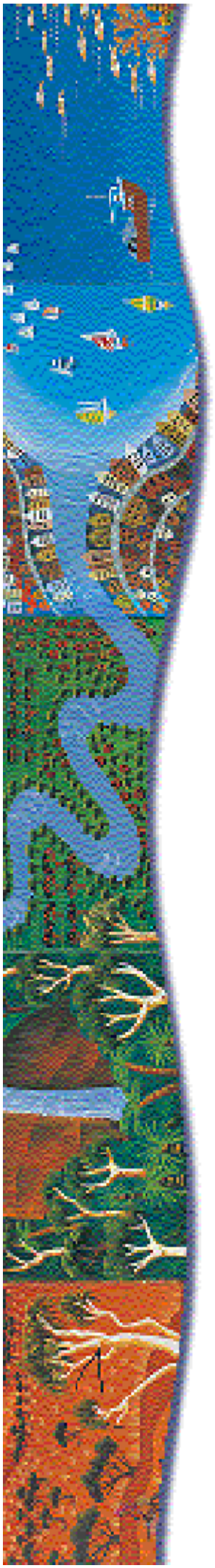
## Disclaimer



# TABLE OF CONTENTS

# DEAR READER

Good policy and the sound advice supporting such policy is the foundation for improved natural resource management (NRM) in Australia.

Land & Water Australia's mission is to provide national leadership in generating knowledge, informing debate, and inspiring innovation and action for sustainable NRM.

In the continuing era of ecologically sustainable development, it remains necessary to perceive and understand our unique Australian landscapes and our use of natural resources in a more complete and integrated way. This means that we must cultivate an improved understanding of the relationship between people and landscapes to be able to manage natural resources in a sustainable way. The relationship between people and landscapes is about communities and their institutions: the law, economy, society, organisations, policies and social values, among others, and how these relationships impact upon and determine our use of resources.

Land & Water Australia has been a leader in recognising this, and established a Social and Institutional Research Program (SIRP) in 1999 to give emphasis to research on people and their institutions and to ensure this is integrated into all NRM research.

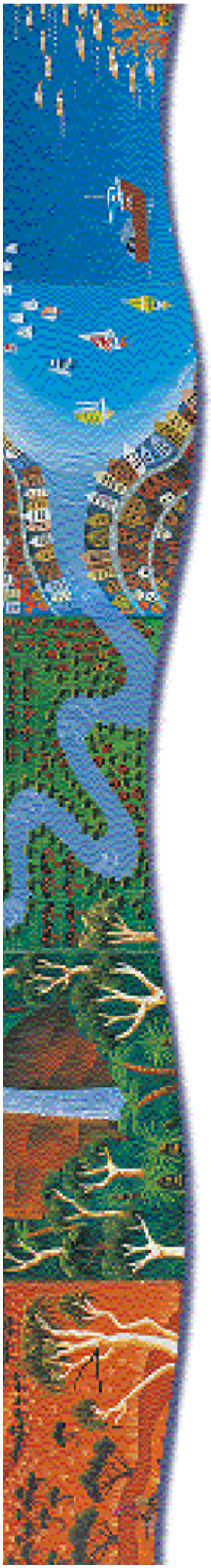
SIRP now has a portfolio of some 35 research and development projects. Funding research in itself contributes to learning, but this is insufficient to generate knowledge, inform debate, and inspire innovation and action. These are largely communication activities and require engagement with the community on the research being conducted and its results.

Land & Water Australia understands that the needs of people who have an interest or responsibilities in NRM vary considerably. Many people are unable to read lengthy reports or to study in detail the findings of research papers. For this reason, SIRP is committed to producing a range of communication products on its research that cater for the wide range of interests of readers.

This first series of research project fact sheets and research overview report is designed to highlight SIRP projects that have been undertaken, the main findings and the implications for everyone involved in natural resource policy. In addition to increasing understanding of issues, the research has produced practical products such as guidelines, tools and techniques, checklists of best practice and case studies. These communication products, also available on-line at www.lwa.gov.au, will allow readers to quickly grasp the key aspects of the research, and then provide pointers to additional and more detailed information as required.

All knowledge is evolutionary. We would like to see these communication products as living documents that contribute to both current policy and action, as well as to future research and knowledge generation. We welcome feedback on all our products as an integral part of enhancing knowledge.

Charles Willcocks
Land & Water Australia
Government Director
Chair, SIRP Program Management Committee



# INTRODUCTION

This document is an overview of the practical results from 11 research projects examining the social and institutional dimensions of NRM, from the Social and Institutional Research Program (SIRP), which is managed by Land & Water Australia.

This information will be of interest to policy makers, resource management agencies at all levels, researchers, community groups and non-government organisations.

The research results have been grouped into the following themes:

- NRM communities;
- NRM institutions;
- NRM decisions/evaluation; and
- NRM research methods.

The research projects provide a series of tools, checklists, principles, case studies and guidelines for advisors and policy makers working in NRM. Organisations and individuals can use them as part of their decision-making processes and to give better advice for effective onground NRM.

A summary of research findings is provided at the beginning of this paper and a summary of the research outputs is provided at the end. For more detailed information, individual fact sheets and complete research project reports are available from Land & Water Australia.

## Summary of research findings

### NRM communities

SIRP identified five principles of good practice, in both design and implementation, for community participatory projects:

- commitment and clarity;
- time and group dynamics;
- catering for cultural differences;
- issues of representation; and
- enhancing skills and personal growth.

For increased community participation in NRM, effective relationships between stakeholders include:

- awareness, vision and commitment;
- cooperative team behaviour;
- sharing resources and outcomes;
- sound consultation and communication;
- good group/meeting practices, governance and power structures;
- recognition of community, strategic approaches and ownership by communities;
- management ability and management for diversity;

- a sound skills base and technical competence; and
- adequate support structures.

*Participatory research has the potential to overcome the separateness between the social and physical sciences ...*

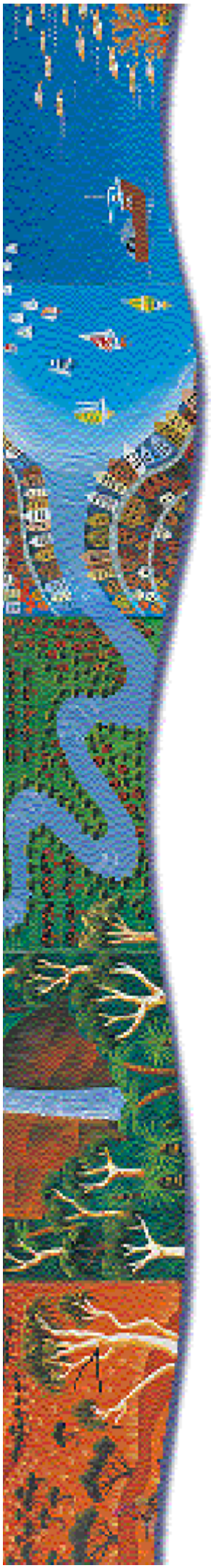
To deal with the advantages and disadvantages of community participation in research and development, SIRP developed a framework (see SYN1 fact sheet) to help potential participants assess the participatory requirements, if any, of a specific research and development situation and the desirability of such participation. Participatory research has the potential to overcome the separateness between the social and physical sciences, as a barrier to effective NRM.

Effective participation should:

- encompass the local and distant, the direct and indirect, impacts and potential impacts;
- be broad, and not limited to those with direct interests in the outcomes;
- incorporate the values and interests of participants;
- be encouraged across a variety of functions, not just research and development;
- be able to be initiated by any individual or group within the relevant community;
- be negotiated to fit with the purposes and processes of all potential participants, not just at the beginning but throughout the life of the project;
- engender intrinsic motivation and therefore creativity;
- enhance human and social capital; and
- be aligned with the available resources.

In the most comprehensive and integrated study of a catchment ever carried out (see CTC7 fact sheet), SIRP researched the impact of the significant investment to manage natural resources by integrating community involvement, technical knowledge, organisational structure and policy objectives. It recommended that integrated catchment managers and planners should:

- establish local relevance;
- establish supportive institutional arrangements;
- establish legitimacy amongst stakeholders;
- create awareness of issues and the integrated catchment management process;
- influence and precipitate action;
- gain and maintain commitment to the process;
- establish an influential role;
- communicate with the community;
- work with the community; and
- inform the integrated catchment management implementation process.



SIRP found that citizens' juries are a viable public participation method, probably best used to complement other forms of public participation where budgets permit. Jurors, who are randomly chosen from a community, are given detailed and balanced information about an issue, hear a wide range of views from witnesses, and can seek extra information with the aim of making NRM recommendations. The case studies demonstrated an impressive ability of citizens to grapple with complex environmental issues and to deliberate effectively to reach an agreed jury 'verdict'.

## NRM institutions

NRM issues are society-wide issues. Particular attention needs to be paid to building the main mechanism of adaptation, namely, social trust. One way of increasing trust is to begin with a shared vision or a set of shared ideals so that the community groups and government agencies have common goals to pursue.

SIRP researchers identify the characteristics of 'ecologically rational' institutions as:

- incorporating negative feedback mechanisms (providing alert signals);
- achieving coordination across different actors and different collective actions (to ensure cooperation and to deal with problem displacement); and
- having performance capacities of robustness (ability to function well across a variety of conditions), flexibility and resilience which enable them to respond adequately to or correct for changing internal or external conditions.

Governments in Australia have only recently considered the potential contribution of the non-government sector in NRM. To encourage increased private involvement, SIRP research recommends policy reform, including:

- creating competitive equality between private-sector not-for-profit organisations, government and other private sector firms;
- changing taxation incentives laws, including making current taxation incentives more uniform and adding tax-based incentives;
- continuing to reform water property rights;
- ensuring the Common Law principle of 'Use your own property so as not to harm another's property' is applied for natural resources; and
- ensuring community access to development planning processes covering both monetary and non-monetary environmental damage.

In spite of an increase in environmental legislation, there has been little change in improving NRM on the ground. SIRP recommends that new legal regulations should have three key attributes:

- *Synergy*. Laws should act 'synergistically' with culture, market mechanisms and technology to regulate behaviour.
- *Rationality*. Legislation needs to be carefully drafted to avoid unintended impacts, which can be the reverse of the intention of the law.

- *Elegance*. Law makers should avoid establishing unrealistic reporting requirements, assuming the existence of infrastructure and developing laws that require complex monitoring systems, since they are all likely to cause 'failure' of the legislation.

*In spite of an increase in environmental legislation, there has been little change in improving NRM on the ground.*

## NRM decisions/evaluation

SIRP research has developed an overarching model of NRM decision-making that identifies stages where appropriate decision-support techniques, tools and frameworks, aimed at continuous change, adaptation and learning, can be used to evaluate NRM programs and policies. The stages in the model are:

- identifying objectives;
- defining the problem;
- identifying alternatives;
- a filtering process to short-list alternatives;
- in-depth analysis;
- draft recommendation;
- impact assessment;
- final recommendation;
- satisfaction with results; and
- binding decision.

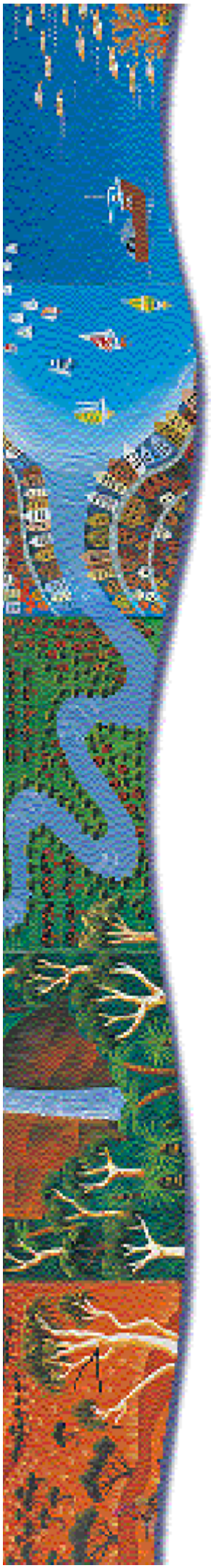
SIRP also developed an outcomes-focused, hierarchical evaluation framework, which:

- clearly defines policy and program objectives, outputs and outcomes;
- recognises that evaluation is a useful learning process as well as a reporting tool;
- recognises that some programs are not worth evaluating; and
- thinks carefully about the 'program logic' of a specific policy or program, and maps its relationships.

The framework offers natural resource managers the opportunity to move away from the current tendency to select relatively arbitrary indicators based on what is available and easy to measure, and to develop consistent, rigorous and integrated evaluation programs that more accurately reflect the effectiveness of NRM.

Based on three Queensland case studies, SIRP research also outlines the key elements of an integrated evaluation framework:

- characterise the issue;
- assess the intent or the objective of NRM initiative;
- assess instrumental assumptions;
- assess the intent or the objective of evaluation;
- assess potential contextual influences;
- identify evaluative criteria;



- select indicators;
- select methods and apply;
- analyse results;
- assess contextual influences;
- synthesise and assess results; and
- inform others of findings.

*The tools and information provided by SIRP research will help policy makers understand the role of participation in NRM projects.*

The guide to evaluation provides useful checklists for developing policy and evaluating or assessing the impacts of policy. It will be most useful when evaluation is being built into policy at the development stage as it links onground outcomes to the objectives of the policy. In this way, the evaluation can inform policy development.

### NRM research methods

Increasingly, NRM research requires the involvement of teams of specialists from many areas. SIRP identify a generally unstated skill base necessary for teams carrying out interdisciplinary work:

- being grounded;
- mindful speaking;
- place holding (keeping a sense of the whole);
- making creative jumps;
- political acumen and discretion (non-adversarial process);
- strategic leadership; and
- emotional creativity.

SIRP has produced a practical series of tools that can be adopted and used by NRM policy makers, decision makers, advisors and participants to improve NRM in Australia.

## Implications for policy makers

Policy makers and natural resource managers now must deal with complexity on a daily basis. They are facing demands for:

- integrating social, environmental and ecological considerations in policy, and coordination of policy across sectors and policy fields;
- integrating the imperatives of inter- and intra-generational equity;
- new and 'efficient' policy instruments and approaches, often simplistically interpreted as economic instruments, but more broadly an invitation to consider different property rights regimes, institutional arrangements, cooperative approaches, covenants, agreements and so on;
- the need to include communities and stakeholders in policy and management, from general consultation through to co-management arrangements;
- acceptance of maintaining ecological integrity and protecting natural life-support systems as high-order policy goals;

- more information-rich and information-sensitive policy and management, implying increasing research, monitoring and communication efforts; and
- adoption of the precautionary principle, stating that scientific uncertainty should not be an excuse to delay action when impacts may be serious or reversible.

The tools and information provided by SIRP research will help policy makers to:

- understand the role of participation in NRM projects, design appropriate participatory processes and ensure that participation is of an appropriate type and level;
- analyse the effectiveness of different relationships between stakeholders and the possible impacts of strong or weak relationships;
- understand which processes need to be resourced when designing projects;
- understand the need to integrate agricultural and environmental policy and for long-term ecological modelling and research to be institutionalised as respected parts of the policy process;
- understand the need for better resourcing of ecological policy, both in degree and in maintaining resource levels over time, to influence the decision-making of government instrumentalities that have an impact on NRM;
- use a range of strategies to increase private sector involvement in NRM;
- develop effective NRM legislation that leads to improved NRM;
- build provision for evaluation into policy at the development stage;
- make complex NRM decisions that can be analysed and discussed in a transparent way;
- evaluate the effectiveness of NRM strategies and activities; and
- develop understandings of NRM not limited by single-discipline approaches.

## Implications for advisors and community groups

Community groups and organisations or individuals that advise on NRM policy face the challenge of informing others with limited time, understanding and even interest in the complexities of the social and institutional dimensions of NRM. In the past they may have had little evidence to draw upon to support their efforts to lobby for greater allocation of resources, new policy directions or innovative programs.

The breadth and depth of evidence gathered in SIRP research will help groups in their own decision-making and management activities. Groups with an advisory role can use this information to strengthen or alter their own policies and decisions, and as supporting evidence when advising others.

*The breadth and depth of evidence gathered in SIRP research will help groups in their own decision-making and management activities.*

Community and advisory groups/organisations can use SIRP research findings to:

- plan and establish group structures and monitor group performance;
- use models that help activate and engage groups, including strategic planning, types of participation and action, agreements and contracts, feedback, consultation and communication;
- structure NRM activities, such as catchment management, according to blueprints that lead to successful NRM outcomes;
- run participatory projects to deliberate on NRM;
- identify how and when to become involved in participatory projects and what the purposes, costs and benefits may be;
- make choices about evaluation and decision-making techniques that are appropriate to the organisations and programs being run; and
- be adaptive to changes, feedback and new information.

In addition, community and advisory groups could use the information within these reports to lobby for:

- incentive support measures to boost commitment, action, accountability, cooperation and longevity;
- legislative change, while understanding the strengths and weaknesses of legislation as a means to ensure better NRM;
- better conditions for private sector involvement in NRM; and
- appropriate participation in NRM research and development.

# THE SOCIAL AND INSTITUTIONAL RESEARCH PROGRAM

Many of the constraints to improved NRM lie in areas other than better understanding environmental processes or developing suitable management practices and decision-support tools. The social, economic, commercial, legal, institutional and policy environments, in particular, need to be conducive to making the best NRM decisions at the right time.

Land & Water Australia established SIRP to invest in social science and interdisciplinary research into these social and institutional dimensions.

SIRP funds innovative research and development that will improve the management of natural resources through enhancing the social and institutional environments. It focuses on:

- building the knowledge base of social and institutional dimensions of NRM;
- producing best practice NRM products and services such as integrated information packages, decision-support systems and assessment tools for measuring the adoption of research and development results and the success of programs;
- building critical mass in the awareness of social and institutional factors so that change occurs and research and development results are adopted; and
- developing the research and development capacities of researchers and their methods, and improving collaboration and coordination across relevant research activities.

## Context

The issue of sustainably managing natural resources is highly complex. The assumptions underlying traditional methods of resource management have been based largely on the 'pristine ecosystem' model, where humans are seen as disruptive interlopers. This model also assumes that ecosystems should be returned to some notional pristine state. The biophysical sciences have dominated research in this area. Correspondingly, attempts during much of the 20th Century to address NRM issues in Australia centred largely on engineering or mechanical solutions.

However, like all the fast-growing knowledge in the 21st Century, society's understanding of the earth's ecology is rapidly becoming more sophisticated. Society has come to recognise that problems once thought to be local and isolated are in fact often interconnected.

In the last decade, the Decade of Landcare in Australia, it has been increasingly recognised that successful NRM in Australia depends on engaging a wider range of stakeholders. NRM problems cannot be considered independently of other social, economic, commercial, legal, policy and institutional dimensions. The development of Landcare and government policies of ecologically sustainable development during the

1990s, which together focus more on the social aspects of sustainability, are examples of the change in philosophy and approach to NRM.

Many institutions are now coming to understand that NRM is, in large part, a human issue and that better relationships among stakeholders can mean the difference between success and failure.

A new model for sustainability that is permeating individual and institutional thought in Australia (and elsewhere) is the capital assets model, where five types of capital comprise the total stock of assets:

- natural;
- social;
- human;
- physical; and
- financial.

The premise of such a model is that sustainable systems accumulate these stocks, while unsustainable systems deplete them. Therefore, the aim is to invest in or accumulate capital across the range of asset types. Sustainability, then, is not solely about NRM but also about improving the human quality of life, on the assumption that the two are highly interdependent.

SIRP projects are at the forefront of NRM visionary thinking. The aim is to help policy makers, advisors and NRM managers to come to terms with the complex issues facing them.

## OVERVIEW OF THE PROJECTS

The 11 projects in this paper have been grouped under four themes - NRM communities, NRM institutions, NRM decisions/evaluation, and NRM research methods.

### NRM communities

*ANU21 - Community Participation in Australian NRM*

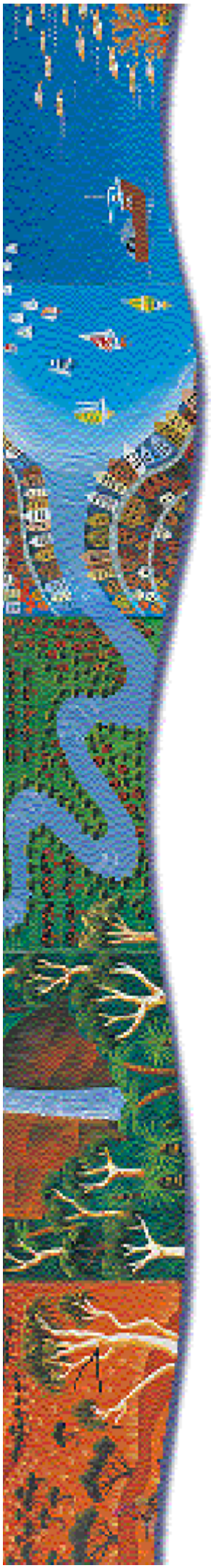
This report identifies a series of good practice principles and critical issues relating to participation, and maps out new dimensions and emerging issues (Dr Marlene Buchy, Department of Forestry, Australian National University).

*CAG2 - 'It Can't Work Without People' - Effective Relationships in NRM*

This report explores the characteristics of effective relationships between the various players in NRM and how they can be improved (Onko Kingma and Noel Beynon, CapitalAg).

*SYN1 - Participation in NRM Research and Development*

This report develops guidelines for participation in research and development, including principles and processes (Tony Gleeson, Synapse Agricultural and Resource Consulting).



### *CTC7 - Evaluating Integrated Catchment Management*

This report develops a systems framework for evaluating NRM programs based on consideration of the changing approaches to NRM programs, practical assessment of on-the-ground projects and guidelines for planning and implementing Integrated Catchment Management (Jenny Bellamy, CSIRO Sustainable Ecosystems).

### *ANU11 - Using Citizens' Juries for Making Decisions in NRM*

This report investigates the potential of the citizens' jury as a means for informing environmental decision-making, and compares it with other forms of public participation (Russell Blamey, Research School of Social Sciences, Australian National University).

## NRM institutions

### *UTA11 - Social and Institutional Knowledge in NRM*

This report identifies knowledge about the social and institutional underpinning of individual and collective action, decision-making and practice (Dr Julie Davidson and Dr Elaine Stratford, Sustainable Communities Research Group, University of Tasmania).

### *TPF1 - Using Environmental Law for Effective Regulation*

This report explores legal mechanisms for increasing sustainable use of natural resources (Paul Martin and Dr Miriam Verbeek, The Profit Foundation).

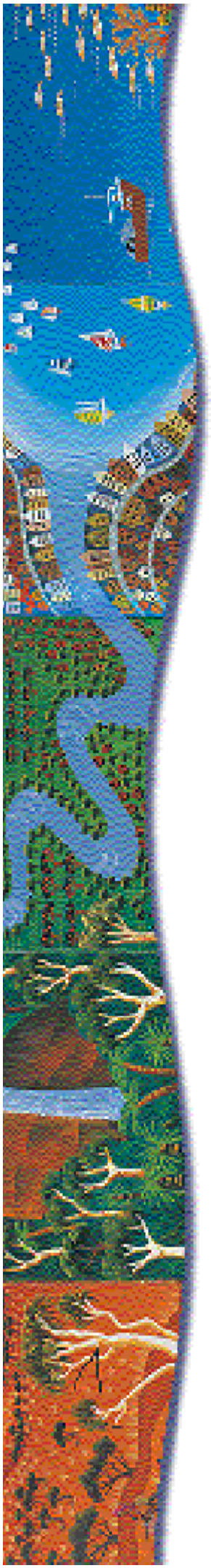
### *ADF5 - The Potential for Private Sector Nature Conservation in Australia*

An investigation of whether greater private sector involvement is desirable for NRM in Australia and how this might be facilitated (Stuart Whitten, Private and Social Value of Wetlands Project, University of NSW).

## NRM decisions/evaluation

### *CLW24 - Supporting Decisions: Understanding NRM Assessment Techniques*

A review of decision-support techniques for NRM decision makers and researchers and development of a generic model of NRM decision-making, identifying stages where various techniques are appropriate (Dr Mike Young and Stefan Hajkowicz, Policy and Economic Research Unit, CSIRO Land and Water).



*USQ3 - Evaluating NRM Policies and Programs*

This report develops a conceptual framework for the complex task of evaluating the outcomes of NRM, encouraging managers to develop consistent, rigorous and integrated evaluation programs that more accurately show the effectiveness of policies and programs (Professor Charlie Zammit and Geoff Cockfield, Land Use Study Centre, University of Southern Queensland).

### NRM research methods

*UMU14 - Interdisciplinary Research in NRM*

This report clarifies the nature of interdisciplinary work on NRM, explores skills to facilitate this process, and traces possibilities for a new conception of interdisciplinary skills (Dr Michael Booth, Steven Rogers, Dr Fionnuala Frost, Institute for Sustainability and Technology Policy, Murdoch University).

## Research findings - NRM communities

The six SIRP projects examined under the theme 'NRM communities' explore participation on a range of levels, from the broad view of the current state of participation as a philosophy and a management approach, through to specific case studies providing valuable lessons in the application of guiding principles for participation. They provide an overview of different participatory approaches, the advantages and disadvantages of participation, key features of positive relationships between players at all levels, and practical applications of ideas and theories about participation.

A feature of NRM in the past decade has been the increasing importance of the community's role in developing strategies and implementing actions. Community participation raises many issues:

- for agencies and institutions running participatory programs;
- for community members involved in such programs; and
- for decision makers allocating resources and designing programs.

Some of the issues raised in SIRP's research into participation include the expectations held by all participants, ways of ensuring effective participation, ways of avoiding 'burnout' by community members, ways of hearing minority voices, and the personal skills needed for participatory projects.

### Participation in NRM

Project ANU21 (Community Participation in Australian NRM) suggests that the current enthusiasm for community participation in NRM activities is based on assumptions that:

- better participation in NRM will lead to better resource management;
- communities are able and willing to engage voluntarily in NRM;
- local communities are seeking increased power in decision-making processes; and

- participation is means to an end OR that participation as an ideology leads to empowerment and greater social practice.

*SIRP identified five principles of good practice that should be adopted by agencies and others working on participatory projects in both the design and implementation stages.*

It is vital that assumptions about participatory processes be examined and that certain principles of good practice be employed in the design and implementation stages to avoid misleading stakeholders and falsely raising expectations.

From a literature review and case studies, the ANU21 researchers developed a typology (a grouping of types that allows for comparison and classification) of 10 participatory approaches, describing the characteristics of each type and providing examples and the benefits and limitations of each. They emphasise that the typology is not prescriptive, that mixed approaches will be successful and that there is no hierarchy of approaches that works best or is recommended.

The 10 approaches are:

1. Individual management (no participation)
   - private ownership, for example farms.
2. Community-based management
   - land or resource is owned collectively, for example Indigenous Protected Areas.
3. Community collective activity
   - for example Landcare.
4. Organised interest groups
   - for example environment and conservation peak bodies.
5. Composite stakeholder bodies
   - for example integrated catchment management bodies.
6. Shared management
   - for example joint management of national parks.
7. Stakeholder-based planning or negotiation
   - for example Regional Forest Agreement process.
8. Consultation
   - for example public participation via meetings.
9. Information
   - for example newsletters informing people about plans or proposals.
10. Agency or corporation management (no participation)
    - power holder does not attempt to involve public.

SIRP identified five principles of good practice that should be adopted by agencies and others working on participatory projects in both the design and implementation stages. The principles relate to:

- commitment and clarity;
- time and group dynamics;
- catering for cultural differences;
- issues of representation; and
- enhancing skills and personal growth.

These issues raise a number of questions that decision makers should consider when planning participatory projects:

- Why do I want to start a participatory process?
- What is available for negotiation, what is not? Have I stated my intention clearly? Have we established a shared understanding?
- Am I committed to listening to the people and acting on their input (or am I just going through the motions)?
- Does the process add value to the community - what's in it for them?
- Given the scale, the process and the issue, have I allocated enough time and resources?
- Have I identified the major stakeholder groups and do I understand how they relate to each other? Do all stakeholders have an equal chance to participate? Do they have the capacity to participate?
- Which useful skills/information will we potentially learn from taking part in this process?
- What are the risks?
- Is the approach we have designed appropriate for the Indigenous, other cultural or organisational group to be involved?
- Have we sought advice from participating Indigenous organisations or key informants (including Indigenous people and women) to ensure that the approach is suitable?

ANU21 provides a framework for policy makers to clarify the level and type of participation they desire. It also recommends that decision makers consider the role of participation in the project and be clear about the issues that must be addressed to enable successful participation.

## Effective relationships

In the context of increasing community participation in NRM, effective relationships between stakeholders become vital. Project CAG2 ('It Can't Work Without People': Effective Relationships in NRM) examines the characteristics of effective relationships between different levels of government, the industry and the community.

Important elements in effective relationships identified by the research are:

- awareness, vision and commitment;
- cooperative team behaviour;
- sharing resources and outcomes;
- sound consultation and communication;
- good group/meeting practices, governance and power structures;

- recognition of community, strategic approaches and ownership by communities;
- management ability and management for diversity;
- a sound skills base and technical competence; and
- adequate support structures.

It is important for community members, whose resources are increasingly being called on to manage natural resources, to be aware of these elements when making NRM decisions. The strategies and indicators developed by the project provide a standardised method for establishing a group, promoting group effectiveness, measuring performance and making comparisons between groups.

## Participation in research and development

Project SYN1 (Participation in NRM Research and Development) explores community participation specifically in the context of NRM research and development. The researchers developed guidelines for participation in research and development after conducting interviews and meetings with community members and representatives of interest groups and government agencies, and carrying out a literature search on related topics.

As in other projects, the researchers start with the assumption that participation in research and development will provide better research outcomes than other approaches to research and development. The advantages of such participation include:

- recognising local ways of knowing;
- tapping into accumulated knowledge and experience of the community;
- supporting local innovation and adaptation and enhancing the capability to generate sustainable processes and practices; and
- encouraging community ownership of both problems and solutions.

Importantly, they also noted disadvantages, including:

- competing perceptions of community needs, depending on interest groups and individuals involved;
- the accumulation of local knowledge being impeded by lack of documentation and dissemination;
- a need to carry out some research and action at a larger than local scale, for example policy making needs to be informed by research on an appropriate scale;
- farmers may not wish to be involved;
- scientists can be distracted from their primary role; and
- research work carried out by untrained personnel may result in data of doubtful quality.

To deal with the advantages and disadvantages of participation in research and development, the researchers developed a framework to help potential participants assess the participatory requirements, if any, of a specific research and development situation and the desirability of such participation.

By applying the framework to a particular project, participants can consider the various:

- principles for participation;
- functions for NRM;
- processes for participation;
- dimensions of research and development; and
- entry points into research and development.

*This five-year study may well be the most comprehensive and integrated study of catchment management ever carried out.*

For example, the principles of participation suggest that, to be effective, participation should:

- encompass the local and distant, the direct and indirect, impacts and potential impacts;
- be broad, and not limited to those with direct interests in the outcomes;
- incorporate the values and interests of participants;
- be encouraged across a variety of functions, not just research and development;
- be able to be initiated by any individual or group within the relevant community;
- be negotiated to fit with the purposes and processes of all potential participants not just at the beginning but throughout the life of the project;
- engender intrinsic motivation and therefore creativity;
- enhance human and social capital; and
- be aligned with the available resources.

This project provides a framework that can be useful for:

- policy makers to check that they have included opportunities for participation in as many functional areas as possible;
- potential participants in research and development to assess the participatory requirements, if any, of a specific research and development situation and the desirable nature of such participation; and
- research leaders to use the framework as a checklist for participation in all aspects of research.

## Participation in community catchment management

Project CTC7 (Evaluating Integrated Catchment Management), looks at issues of participation (among many other issues) in a specific catchment management program in the Herbert River catchment in North Queensland. This five-year study may well be the most comprehensive and integrated study of catchment management ever carried out.

Integrated catchment management, or ICM, is a holistic approach to catchment management, and is also known as Total Catchment Management in some States. It is an example of the significant investments

being made around Australia to manage natural resources by integrating community involvement, technical knowledge, organisational structure and policy objectives.

The project provides information about the social, institutional and economic factors that can influence the success of integrated catchment management projects. These findings have direct relevance not just to integrated catchment management, but also to other integrated resource management initiatives across Australia.

The report identifies guiding principles and success factors for community-based integrated catchment management, and makes recommendation on its planning and implementation.

It identifies the role of community-based integrated catchment management, which is to:

- be a process of influence;
- support community learning;
- be a partnership between government, industry and community;
- ensure legitimate representation;
- provide community forums for coordinating effort, networking and social values;
- build trust and effective interaction amongst stakeholders;
- ensure fairness of process;
- identify and broker project funding opportunities;
- provide an influential voice on NRM at a regional level;
- demand long-term government agency commitment to process; and
- provide a vehicle for integrating information relevant to NRM.

The report recommends integrated catchment managers and planners should:

- establish local relevance;
- establish supportive institutional arrangements;
- establish legitimacy amongst stakeholders;
- create awareness of issues and the integrated catchment management process;
- influence and precipitate action;
- gain and maintain commitment to the process;
- establish an influential role;
- communicate with the community;
- work with the community; and
- inform the integrated catchment management implementation process.

## Decisive participation

In a worldwide trend, deliberative methods of involving communities in decision-making have been developed. Project ANU11 (Using Citizens' Juries for Making Decisions in NRM) examines the citizens' jury, one particular technique for involving the community in NRM. It investigates two case studies:

- a hypothetical decision about management options in a NSW national park; and
- a real issue to identify the preferred management option for a road development in North Queensland.

*Citizens' juries are a viable public participation method, probably best used to complement other forms of public participation.*

A feature of citizen's juries is that jurors, who are randomly chosen from a community, are given detailed and balanced information about an issue, hear a wide range of views from witnesses, and can seek extra information with the aim of making recommendations.

In this way, the citizen's jury allows for community representatives to become highly informed about an issue before they make recommendations. This has obvious advantages for the community members in that their decision-making has the potential to be based on information from a wide variety of technical and other sources.

The project identified the advantages and disadvantages of citizens' juries. It found that essentially, citizens' juries are a viable public participation method, probably best used to complement other forms of public participation where budgets permit.

A major advantage of citizens' juries is their ability to provide the views of the community under conditions of far greater information and deliberation than any questionnaire could ever hope to achieve. The case studies demonstrated an impressive ability of citizens to grapple with complex environmental issues and to deliberate effectively to reach an agreed jury 'verdict'.

The two major limitations of citizens' juries were identified as being:

- the extent to which the small number of citizens represented can adequately represent the views of the whole community; and
- gaining the cooperation and attendance of people and groups upon which the successful execution of the citizens' jury depends.

# Research findings - NRM institutions

## Institutional arrangements

In the context of NRM, institutions can be seen as the mediators of people-environment relations. Project UTA11 (Social and Institutional Knowledge in NRM) looks closely at the role and functions of institutions that influence NRM. The researchers define institutions as structures and patterns of behaviour, both formal and informal. They include legislation and regulations; policies and guidelines; administrative structures; economic and financial arrangements; political structures and processes; historical and traditional customs and values; and key participants or actors.

Institutional 'actors' that have an influence on NRM include:

- community groups and non-government organisations;
- local, State and Federal government structures, including researchers and agencies;
- business enterprises; and
- international organisations/agreements.

Existing institutions must be responsive to the challenge of natural resource sustainability, and must be able to take account of the complexity of ecosystems. Of particular concern is:

- how to engage institutions whose decision-making has a clear impact on NRM, including government instrumentalities (Departments of Treasury, Finance, Trade, Energy, Transport, Economic Development, Education, and semi-government resource corporations); and similarly
- how to improve the influence of those institutions concerned with sustainable NRM on those which have a negative impact.

Private property is particularly problematic for effective NRM since the problems of resource sustainability (water quality, biological diversity and ecological sustainability) transcend private property boundaries. The issues include:

- how to re-orientate private property and leasehold rights to take account of the public good values of private land, that is, emphasising the responsibility of stewardship; and
- how to re-conceive what is in the private property owner's best interests.

The researchers identify the characteristics of 'ecologically rational' institutions as:

- incorporating negative feedback mechanisms (providing alert signals);
- achieving coordination across different actors and different collective actions (to ensure cooperation and to deal with problem displacement); and
- having performance capacities of robustness (ability to function well across a variety of conditions), flexibility and resilience, which enable them to respond adequately to, or correct for, changing internal or external conditions.

Project UTA11 builds a picture of the institutional arrangements likely to advance the renewal of society's capital assets. Such institutions must necessarily be ecologically rational, cooperative, integrative, and possess a learning culture. The researchers create a series of tables that encapsulate existing knowledge and practice for integrative and collaborative NRM institutions. They operate in different sectors of intellectual and practical endeavour, at different spatial scales, and at and across different jurisdictional levels. This outline of existing approaches indicates that many arrangements are as yet embryonic, that there are numerous obstacles to resolving resource issues, and that governance regimes for sustainable resource management must necessarily be many and varied.

The main points from the tables are as follows.

*Successful collaboration depends on establishing rules of operation and decision-making.*

- Physical sciences have dominated natural resource research and development funding, and non-engagement between the physical and social sciences is a barrier to cross-disciplinary research in NRM. Participatory research has the potential to overcome this deficiency.
- The most important benefit in collaborative planning arrangements between government agencies, land managers and communities, is the trust and relationships that are built between agency personnel and the public. Conversely, the greatest obstacle can be the organisational culture of the agency.
- Successful collaboration depends on establishing rules of operation and decision-making. Coordination can be increased when there are defined mechanisms for information exchange and joint decision-making.
- Ecosystem management, is limited by lack of scientific understanding of ecosystem processes at large scales. However, the most restrictive factors to effective management are social and institutional, such as: fragmentation of scientific effort, agency duplication, insufficient communication of research results, short-term focus of research, and absence of comprehensive syntheses of NRM data.
- Effective integrated catchment institutions must have the authority of legislative sanction, and require a community-based infrastructure supportive of relevant social and bioregional networks and partnerships.
- At the landscape scale, multi-farm management agreements can act as a vehicle for overcoming the problem of integration across individual property boundaries. Landcare groups can serve the same function.
- Effective intergovernmental agreement, at the basin or catchment scale, requires:
  - an autonomous authority or lead agency;
  - formal agreements as the basis of cooperation;
  - a shared vision and joint recognition of common concerns;
  - a sound knowledge base for policy development;
  - a consensus decision-making framework;
  - a landscape-wide planning framework for setting goals and targets;
  - equitable sharing of costs and benefits; and
  - shared information and responsibility.
- Intergovernmental co-management agreements can be undermined by: funding uncertainties; the vagaries of local politics; skewed power relations and the potential enormity of tasks being confronted.

- Strong inter-agency cooperation in addition to adequate resource commitment is essential for effective information/education programs aimed at land use practices changes. There is also a need for clear partition of agency responsibilities. Conversely, inter-agency cooperation can be undermined when objectives are unclear, and agencies act to minimise responsibility and preserve their discretion.

*Particular attention needs to be paid to building the main mechanism of adaptation, namely, social trust.*

- Partnerships are collaborative arrangements that fill the gap left by the failure of regulation and market forces. Successful partnerships are based on trust and mutual understanding between the concerned parties, and a shared sense of purpose and equality of power.
- Effective agency-community partnerships depend on a firm commitment by the agency to developing an effective partnership. Such partnerships have the advantage of being able to place the local perspective in the larger regional context. They can also provide expertise not available locally. Notwithstanding these advantages, they can be undercut by personnel deficiencies, poor communication and under-resourcing of programs and project management.
- Networks are umbrella structures that are assuming increasing importance especially in information gathering, information sharing, building capacity, providing a support environment, and as a strategic focus. They are particularly important in fostering social capital and social trust that can cut across institutional boundaries. They promote coordination and cooperation regionally, foster organisational learning, and have a critical review function.
- Networks are also valuable for influencing attitudes and behaviours of people; for recruiting more and better community leaders aimed at engendering professional management; for being able to garner more resources and so fostering the autonomy of individuals and organisations in dealings with government agencies; and for creating new regional-level communication structures.

NRM issues are society-wide issues. Particular attention needs to be paid to building the main mechanism of adaptation, namely, social trust. One way of increasing trust is to begin with a shared vision or a set of shared ideals so that the community groups and government agencies have common goals to pursue.

## Private sector involvement

Project ADF5 ('The Potential for Private Sector Nature Conservation in Australia) explores the institutional changes that need to be made to encourage greater private sector involvement in NRM.

Although three-quarters of Australia's land is privately managed via ownership or long-term lease, NRM and nature conservation have been dominated by the government sector. Governments have only recently considered the potential contribution to NRM of the non-government sector.

There is much greater involvement of the non-government sector in NRM in the United States (US) and England. Organisations active in the US and English conservation sectors use a range of tools to achieve their goals, including property rights, regulatory and organisational structures, contracting and Common Law.

### *Property rights*

Property right regimes in the US and England are better developed than in Australia, providing private organisations with more avenues and incentives to conserve land, water, flora, fauna and minerals. For example, conservation organisations in the US can hold conservation covenants that restrict (and in some cases specify) management of land, water, flora and fauna. These covenants can be enforced by the conservation organisation and can be written to achieve the management goals desired. In the UK, grazing and fishing rights can be held privately, owned independently of land ownership in some cases.

### *Regulatory structure*

Resource-based regulations restrict access to potential development income or other benefits from specified resources. Zone-based regulations restrict access to specified benefits based on the geographic position of the resource. Both types are legitimately used to constrain markets to minimise costs or losses to third parties, but in doing so, may reduce benefits to property right holders.

### *Contracting and organisational structures*

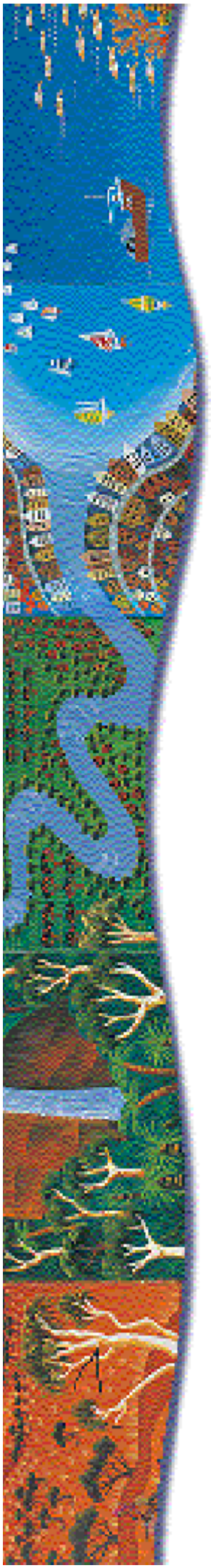
Reducing the transaction costs of NRM via the taxation system does not remove the cost from society as a whole. However, it may avoid government failure and may achieve a more efficient outcome. In the US, almost all forms of donation are tax deductible over a number of years and they are also exempt from capital gains tax. Subsidised development programs and farm income support schemes are a major historical cause of natural resource destruction. The researcher recommends that subsidies be removed, or their impacts on natural resources be made more transparent.

### *Common law tools*

The researcher identified several potential disincentives to private sector conservation. For example, when natural wetlands are managed for conservation purposes, it is not possible for the resource owner to be sued for damages under Common Laws relating to trespass, nuisance or riparian law. The law is much clearer about rehabilitating or restoring natural resources such as wetlands - the rehabilitated resource cannot be allowed to harm others or the owner is liable.

## Suggestions for institutional and incentive reform

The researcher makes a series of suggestions for policy reform to increase private sector involvement in Australian NRM. These policy suggestions have been divided into two groups. Group 1 includes those that create competitive equality between private-sector not-for-profit organisations,



government and other private sector firms, as well as suggested changes to taxation incentives laws that do not extend the incentive. Group 2 comprises additional policy suggestions to increase the level of private-sector nature conservation and avoid government failure. Some opportunities could easily be enacted immediately, while others would require further research.

## GROUP ONE REFORMS

### *Property rights*

- Continue to reform water property rights.
- Check that there are no restrictions that could reduce incentives for conservation, such as property size constraints.
- Investigate and facilitate use of easements for land, water and fauna conservation/management.
- Develop mechanisms to allow producers to access gains from production of natural resource outputs where possible.

### *Incentives*

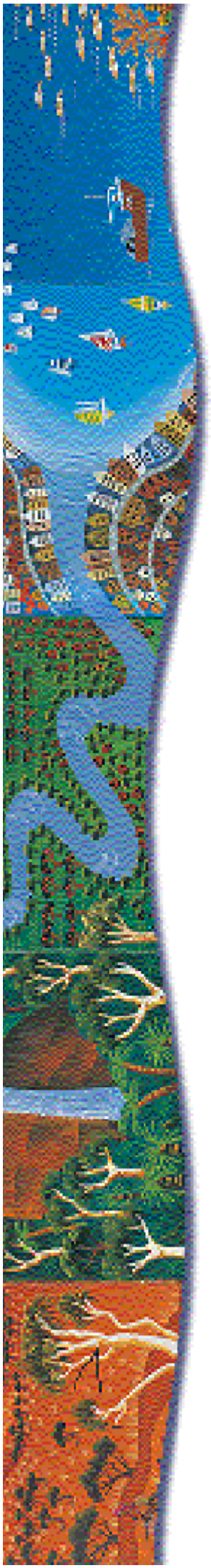
- Treat perpetual and temporary easements equally under not-for-profit organisation laws.
- Eliminate penalties and broaden scope for reinvested funds for not-for-profit organisations from extinguishment of easements.
- Allow a suitable time for this exchange or reinvestment.
- Ensure there is an adequate period over which donations can be deducted from taxable income.
- Remove remaining agricultural development subsidies, such as higher rates of depreciation and irrigation-supply subsidies.
- Increase the use of private-public management partnerships.
- Investigate broader application of alternative management entities, such as trusts, catchment management committees and water management committees.
- Develop mechanisms to establish and mentor not-for-profit organisations.

### *Common Law*

- Investigate Common Law disincentives for natural resource restoration.
- Ensure the principle of 'Use your own property so as not to harm another's property' is applied for natural resources.
- Investigate the degree to which non-government organisations have legal standing to act on behalf of the community.

### *Regulation*

- Ensure community access to development planning processes covering both monetary and non-monetary environmental damage.
- Investigate use of bonds and insurance against environmental damage resulting from development.
- Facilitate conservation group ownership of easements or resources.



- Reduce or remove disincentives from legislation such as endangered species.
- Encourage conservation solutions that include a wider variety of inputs other than just land.
- Facilitate innovation in conservation management.
- Facilitate use of conservation 'banks', which are where a landowner has rehabilitated or recreated a 'bank' of habitat. This bank can then be withdrawn from by other landowners who wish to destroy or otherwise degrade habitat.

## GROUP TWO REFORMS

*Make current taxation incentives more uniform*

- Ensure donations of water rights/licences are tax deductible.
- Remove differential tax treatment of conservation and business inputs.
- Equivalent treatment of perpetual and temporary easements under tax laws.
- Remove capital gains tax from donations.
- Allow bargain land sales to be tax deductible.
- Increase State and local tax concessions.

*Additional tax-based incentives*

- Remove capital gains tax from sales to conservation groups.
- Remove tax deductibility from business inputs that result in wetland destruction.
- Consider treating donations as tax credits rather than deductions.
- Consider allowing deductions at greater than 100%.

Due to the different institutional structures within the US and England, a number of tools are used in those countries that are not available in Australia. Along with the specific policy suggestions summarised above, the case studies within the ADF5 final report provide conservation groups, community groups or individuals with a sense of what is possible by showing them tools that have been successfully applied in other countries.

## Effective natural resource use legislation

The legal system is a key institution that has an impact on NRM. In spite of an increase in environmental legislation, there has been little change in improving NRM on the ground. As a result, legislators have been concerned to find out both why natural resource legislation has been unsuccessful, and what kind of contribution legal regulations can make to better NRM.

Project TPF1 (Using Environmental Law for Effective Regulation) reviews legal institutions and frameworks and the impact of environmental law and regulations on NRM decisions.

The researchers propose a system in which individuals, organisations and society interact more effectively within the environment. Central to this system are three flows: information flows, resource flows and belief systems.

These flows are the key determinants of all behaviour by each of the sub-systems, including NRM behaviour. Successful legislation that modifies behaviour and leads to better NRM outcomes will be based on an understanding of these flows.

*NRM decisions are made by many institutions operating at many different levels.*

In general terms the authors found that the law is a 'blunt' instrument for achieving better NRM. Some of the issues to be considered when proposing environmental legislation are:

- the effects of introducing environmental legislation are difficult to isolate from other effects (such as political and social effects);
- legislation often has the reverse effect to that intended (for example the introduction of land clearing legislation led to an increase in land clearing);
- environmental legislation is often socially inequitable; and
- concepts such as the 'precautionary principle' and 'sustainability' are not easily handled by case law, and as a result, judgements have tended to favour economic rights over environmental rights.

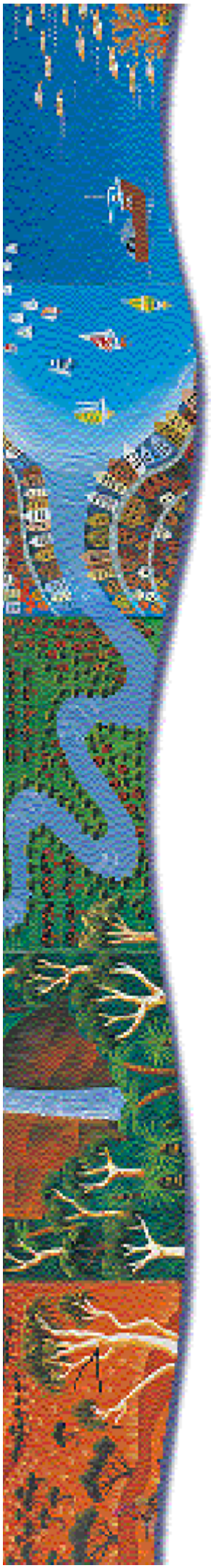
SIRP recommends that new legal regulations should have three key attributes:

- *Synergy*. Laws should act 'synergistically' with culture, market mechanisms and technology to regulate behaviour.
- *Rationality*. Legislation needs to be carefully drafted to avoid unintended impacts, which can be the reverse of the intention of the law.
- *Elegance*. The proliferation of environmental regulation is a reflection of a lack of elegance of design. Law makers should avoid establishing unrealistic reporting requirements, assuming the existence of infrastructure and developing laws that require complex monitoring systems, since they are all likely to cause 'failure' of the legislation.

The three projects examined under the theme 'NRM institutions' move from a broad view of institutional principles that will facilitate effective NRM, through to examining two specific institutions - private property, and the law. Each includes a series of recommendations with particular relevance for policy and decision makers. They go towards addressing the complex issues of institutional success and failure in achieving NRM goals.

## Research findings - NRM decisions/evaluation

NRM decisions have far-reaching effects and are very complex. Those involved in such decisions have to plan for and evaluate outcomes on a long-term basis, taking into account a wide range of issues.



At the same time there are increasing demands for better scrutiny of the use of public funds, greater accountability for environmental protection and equity in resource use. New approaches to evaluation are needed that can deal with continuous change, adaptation and learning.

Within the literature relating to evaluation for public policies and programs, there is very little rigorous material relating directly to NRM evaluation, even though most government policies and programs require evaluation.

SIRP research projects have focused on providing decision-support techniques, tools and frameworks for evaluating NRM programs and policies.

## NRM assessment techniques

An increasing number of decision-support techniques have been used to help NRM decision-making. However, many decision makers are unsure of which particular method to use, how to apply the different techniques and how a certain method might bias the results.

Project CLW24 (Supporting Decisions - Understanding NRM Assessment Techniques) examines the strengths and weaknesses of various decision-support techniques and develops an overarching model of NRM decision-making, identifying stages where the techniques analysed may be most useful. The researchers found that NRM decisions are made by many institutions operating at many different levels. In making these decisions they often face uncertainty, potential for irreversible outcomes, multiple objectives, multiple stakeholders and intangible outcomes. The researchers believe that no single decision-making technique will be the best tool in a particular NRM decision, but that combinations of appropriate techniques at different stages will help decision makers.

Decisions are classified into four types:

- Prioritisation - for example choosing between two or more projects for investment;
- Allocative - for example determining the most appropriate investment contributions;
- Threshold - for example determining particular quality standards; and
- Binary - for example deciding whether to proceed with a development or not.

Since all NRM decisions require an estimate of the value of various environmental assets, the researchers review a range of approaches to valuing the environment, from standard economic approaches to indigenous valuations. They analyse the policy frameworks operating in Australia within which NRM decisions are made, categorise the major types of NRM decision problems and describe the strengths and weaknesses of each decision tool. The range of analytical decision-support techniques analysed include benefit:cost analysis, multiple-criteria analysis, energy analysis, ultimate environmental-threshold analysis, planning balance sheets and the environmental evaluation system.

For each tool the following questions are addressed:

- What are the major stages involved in applying the technique?
- How does the technique work?
- How does the technique influence a NRM decision?
- How can the technique bias a NRM decision?
- What are the technique's major strengths and weaknesses?
- What is the frontier of research for the technique?

*In the context of a community-based resource management framework, both quantitative and qualitative aspects need to be investigated.*

The researchers develop an overarching generic model of NRM decision-making based on a rational decision-making model of: identifying objectives, identifying alternatives, measuring the performance of the alternatives against the objectives, evaluating the alternatives and making a final decision. Recognising that a uni-directional, rigid and highly structured model is not applicable in NRM decisions, their model follows the same general steps as the rational decision-making model but introduces iteration and feedback loops between the stages in the decision. The model also recognises that additional information becomes available during the decision-making process leading to more iterations.

The stages in the model are:

- identifying objectives;
- defining the problem;
- identifying alternatives;
- a filtering process to short-list alternatives;
- in-depth analysis;
- draft recommendation;
- impact assessment;
- final recommendation;
- satisfaction with results; and
- binding decision.

The authors identify stages within this framework where the various techniques that have been analysed might be most useful. In the context of a community-based resource management framework, both quantitative and qualitative aspects need to be investigated. When policy frameworks are set, within which more detailed decisions will be made, processes that involve community participation will be more useful. However, when more detailed decisions must be made and NRM managers need to decide on the allocation of resources, quantitative techniques such as benefit:cost analysis and multiple-criteria analysis are more useful.

## Analysing effective policies and programs

Project USQ3 (Evaluating NRM Policies and Programs) recognises the complexity of the political, institutional, social and biophysical factors involved in NRM. This is partly because NRM works within the framework of ecologically sustainable development and also because NRM policies and

programs are embedded in multi-government and multi-actor processes, and are therefore subject to external influences which shape the pace and direction of management.

The researchers have developed an outcomes-focused, hierarchical evaluation framework. They found that for effective evaluation practitioners need to:

*The framework offers natural resource managers the opportunity to move away from the current tendency to select relatively arbitrary indicators based on what is available and easy to measure, and to develop consistent, rigorous and integrated evaluation programs that more accurately reflect the effectiveness of NRM.*

- clearly define policy and program objectives;
- recognise that evaluation is a useful learning process as well as a reporting tool;
- clearly define outputs and outcomes;
- recognise that some programs are not worth evaluating (the role of careful questioning early in the evaluation process will reveal this);
- think carefully about the 'program logic' of a specific policy or program and map its relationships; and
- be careful about developing inappropriate indicators.

### *Effectiveness principles*

The framework developed by the project provides the following set of general principles for NRM and its evaluation.

- NRM policies and programs will be more effective if they optimise environmental, social and economic benefits, as anticipated in Ecologically Sustainable Development.
- The overall effectiveness of NRM strategies should be regularly assessed to ensure that when they are being implemented some values are not consistently favoured over others - in particular that environmental values are not marginalised.
- The genuine and orderly participation of the community and a wide range of stakeholders and interested parties in policy development, implementation and evaluation, will contribute to more effective NRM. This means that prospective participants need the capacity to meaningfully engage in policy processes.
- NRM policies and programs will be more effective if different kinds of knowledge are better understood and more fully taken into account when policies are developed, implemented and evaluated.
- The optimal reconciliation of strategic management and wider participation in policy development, implementation and evaluation will make NRM policies and programs more effective.
- In multiple tier and/or multiple group systems of governance, clear and transparent agreement on the allocation of roles and responsibilities and regular review of these will contribute to increased NRM policy effectiveness.

- Development of an outcomes-based hierarchy of goals, objectives and plans, linked in a logical way, will contribute to more effective NRM policies and programs.
- NRM policies and programs will be more effective if there is a clear commitment to, and demonstrable effort to apply, the precautionary principle.
- NRM policies and programs that operate at a bioregional scale will contribute to more effective NRM outcomes.
- Openly acknowledging and discussing the inherent complexity of NRM systems with stakeholders and other policy actors will contribute to more effective policy development and evaluation.
- Development and use of systems and techniques that contribute to enhanced adaptive management will lead to more effective policies and programs.
- Demonstrable and orderly efforts to develop and use systems that enhance 'policy learning' by individuals and within organisations will contribute to more effective NRM policies and programs.

*The guide to evaluation provides useful checklists for developing policy and evaluating or assessing the impacts of policy.*

The conceptual framework for evaluating NRM provides a robust and effective tool for resource managers in government agencies to evaluate the effectiveness of NRM strategies and activities. The framework allows for the development of 'program logic', where outcomes at one stage of a program or strategy are linked into the next level of the program, or into another related program or activity.

The framework offers natural resource managers the opportunity to move away from the current tendency to select relatively arbitrary indicators based on what is available and easy to measure, and to develop consistent, rigorous and integrated evaluation programs that more accurately reflect the effectiveness of NRM. The framework notes that appropriate indicators need to be clearly established through a process of careful questioning that clearly defines the evaluation goals.

The framework also confirms that practitioners must be receptive to changes, or feedback, anticipated or not, during the course of their management. This allows new information to be incorporated as necessary into the management program.

The report provides practitioners with detailed advice and a generic structure for questions in support of the various ways in which the framework can be used. The framework is flexible in terms of when it can be used. Practitioners planning a new project can use it to incorporate an evaluation system into their program designs; while those who are part-way through or at the end of a program can use the framework to design a retrospective evaluation.

## Evaluation of a NRM program

*SIRP identified a generally unstated skill base necessary for teams carrying out interdisciplinary work*

Project CTC7 (Evaluation of Integrated Catchment Management) devotes one section to an examination of evaluating NRM policy initiatives within a specific context. This sub-report is a guide to implementing the integrated systems approach to evaluation, developed by the research group and successfully tested on a number of case studies. It stresses the importance of environmental, policy, economic and social/cultural context and provides examples of the context of implementation of NRM using three Queensland case studies.

The report outlines key elements of the integrated evaluation framework and then discusses each in turn, again supported with examples from the case studies. The steps are:

- characterise the issue;
- assess the intent or the objective of NRM initiative;
- assess instrumental assumptions;
- assess the intent or the objective of evaluation;
- assess potential contextual influences;
- identify evaluative criteria;
- select indicators;
- select methods and apply;
- analyse results;
- assess contextual influences;
- synthesise and assess results; and
- inform others of findings.

Benefits of this approach include:

- improving program management;
- improving transparency and costs;
- reducing risk and uncertainty;
- fostering learning; and
- improving process.

The guide to evaluation provides useful checklists for developing policy and evaluating or assessing the impacts of policy. It will be most useful when evaluation is being built into policy at the development stage as it links onground outcomes to the objectives of the policy. In this way, the evaluation can inform policy development.

## Research findings - NRM research methods

Increasingly, NRM research requires the involvement of teams of specialists from many areas. Implementing different scientists' models in this area is an elaborate exercise. It brings together the skills of biophysical scientists with those of managers, policy makers, those with a special concern for public

understanding of science and the many social science practitioners who study communities. All who play a role in bringing community concerns to this process need skills cutting across those of the usual disciplines.

*The 11 SIRP projects have produced a practical series of tools that can be adopted and used by NRM policy makers, decision makers, advisors and participants.*

The 11 SIRP projects have drawn on various methodologies and research tools. Many of them are multidisciplinary and moving towards true interdisciplinary approaches. Reflection on the research process is an important component of understanding the social and institutional dimensions of NRM.

## Interdisciplinary research

One of the SIRP research projects has focused specifically on research methodology in its investigations. Project UMU14 (Interdisciplinary Research in NRM) explores the nature of interdisciplinary work on NRM and identifies skills for building interdisciplinarity. The researchers have developed a user-friendly summary of interdisciplinary research and guidelines for users.

The project explores the skills that facilitate interdisciplinary work. By using six case studies of Australian NRM research, two focus groups of users and producers of NRM research, and a process of self-reflection using dialogues, metaphors and diaries, they provide a number of recommendations to encourage a movement to interdisciplinary research.

The international review of the subject found that although interdisciplinarity is widely acclaimed, there has been little effort to truly bring it about because of a lack of clarity about what it is. The researchers argue that it is not simply filling the gaps between disciplines (i.e. multi-disciplinarity) but a way of transcending the limitations of compartmentalised knowledge.

Disciplines are about skills and the researchers draw out those skills showing what is common between disciplines and at a non-disciplinary level. SIRP identified a generally unstated skill base necessary for teams carrying out interdisciplinary work:

- being grounded;
- mindful speaking;
- place holding (keeping a sense of the whole);
- making creative jumps;
- political acumen and discretion (non-adversarial process);
- strategic leadership; and
- emotional creativity.

The six case studies give practical examples of interdisciplinary research efforts in NRM and how teams manage complexity.

The communication strategy aims to help other teams develop interdisciplinary expertise. It helps teams overcome resistance, clarify what

social science can contribute in NRM research contexts and show outcomes. Within this context, communication moves between Land & Water Australia (as the funding management agency for this project) and the research teams, improving researchers' grasp of the process at each stage. The elements in the strategy include video, 'metalogues', diaries, forums, and a journal for studies of the process of interdisciplinary NRM research.

Traditional disciplinary approaches have failed to identify the blocks to adopting sustainable NRM activities. The development of interdisciplinary research into NRM has the potential to deepen understanding about the social and institutional dimensions of NRM and shed light on new approaches.

### Participation in research

Project SYN1 (Participation in NRM Research and Development), outlined under the theme 'NRM Communities', has developed guidelines for participation in research and development within a conceptual framework that addresses the nature of NRM and the purpose of participation in research and development. The principles of participation in NRM research are listed under that theme.

## Research products

### Research findings and tools

The 11 SIRP projects have produced a practical series of tools that can be adopted and used by NRM policy makers, decision makers, advisors and participants.

*NRM communities*

- A database of key references on participation in NRM (ANU21).
- A typology of 10 participatory approaches with characteristics, examples and advice (ANU21).
- A typology of relationships for NRM identifying essential success factors and the possible impacts of good or poor relationships (CAG2).
- A framework for participation in NRM research that looks at principles, functions, processes, dimensions and entry points (SYN1).
- Checklists of principles for participation in NRM (SYN1 and ANU21).
- A series of questions for those initiating participatory processes (ANU21).
- Strategies for developing effective groups and relationships, with performance indicators (CAG2).
- Recommendations for planning and implementing integrated catchment management programs (CTC7).
- Recommendations for managing and running citizens' juries for environmental management (ANU11).

*NRM institutions*

- A database of NRM references and materials, with a keyword thesaurus for ease of searching. The materials address the question of why, after years of scientific research, Australians still maintain land use practices that contradict best practice in NRM (UTA11).
- Models of institutional arrangements likely to advance the renewal of society's capital assets (UTA11).
- A list of institutional principles that will lead to improved NRM (UTA11).
- A list of all current natural resource legislation at State and Federal level (TPF1).
- A summary of the ways in which environmental laws and statutes have been interpreted by the courts, illustrated with judgements (TPF1).
- Recommendations and guidelines for the attributes of more effective environmental legislation (TPF1).
- An analysis of the institutional tools that can be used to increase private sector involvement in nature conservation (ADF5).
- Suggested policy reforms to increase the level of private sector nature conservation and avoid government failure in this area (ADF5).

*NRM decisions/evaluation*

- An analysis of NRM decision-support tools, identifying their strengths and weaknesses (CLW24).
- A generic model of NRM decision-making that shows appropriate stages for the use of decision-support tools and recognises the processes of change and the introduction of new information into decision-making processes (CLW24).
- Frameworks for evaluating the effectiveness of NRM policies and programs, which provide a rigorous basis for drawing on the best available professional knowledge (USQ3 and CTC7).
- General principles, practices and steps for evaluating NRM policies and programs (USQ3 and CTC7).

*NRM research methodologies*

- A framework for participation in NRM research that looks at principles, functions, processes, dimensions and entry points (SYN1).
- Skills for teams carrying out interdisciplinary work (UMU14).
- Checklist of questions for interdisciplinary work on NRM (UMU14).
- Steps that can be integrated into future research projects to enhance and support other teams carrying out interdisciplinary work (UMU14).

## How these outputs can be used

SIRP aims to achieve the following outputs:

- new ideas and options for policy makers in government and industry, land managers and community groups;
- better ways for biophysical information to be integrated with social and institutional information so that decision makers and land managers have the necessary information and in useable packages to deal with NRM issues;

- improved processes whereby research and development results are adopted into practice at different levels in the community, particularly by land managers and catchment groups; and
- new methodologies and arrangements in research design which strengthen interdisciplinary research and development, encourage the participation of users of research and development results in the research process, and which widen the source of research providers to undertake NRM research and development.

The 11 SIRP projects presented provide an impressive array of tools to help policy makers, decision makers, researchers and resource managers move towards improved NRM.

# CONCLUSIONS

## Overall outcomes

SIRP research makes a substantial contribution to the knowledge base of the social and institutional dimensions of NRM. Many SIRP research projects identify areas that need further research and development. Together they provide an insightful examination and a wealth of material for engaging and activating stakeholders at all levels to ensure successful NRM outcomes.

## Fact sheets available

The following project fact sheets are available from Land & Water Australia:

- ANU21 Community Participation in Australian NRM
- CAG2 'It Can't Work Without People' - Effective Relationships in Natural Resource Management
- SYN1 Participation in NRM Research and Development
- CTC7 Evaluating Integrated Catchment Management
- ANU11 Using Citizens' Juries for Making Decisions in Natural Resource Management
- UTA11 Social and Institutional Knowledge in NRM
- TPF1 Using Environmental Law for Effective Regulation
- ADF5 The Potential for Private Sector Nature Conservation in Australia
- CLW24 Supporting Decisions: Understanding NRM Assessment Techniques
- USQ3 Evaluating NRM Policies and Programs
- UMU14 Interdisciplinary Research in NRM

## For more information

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