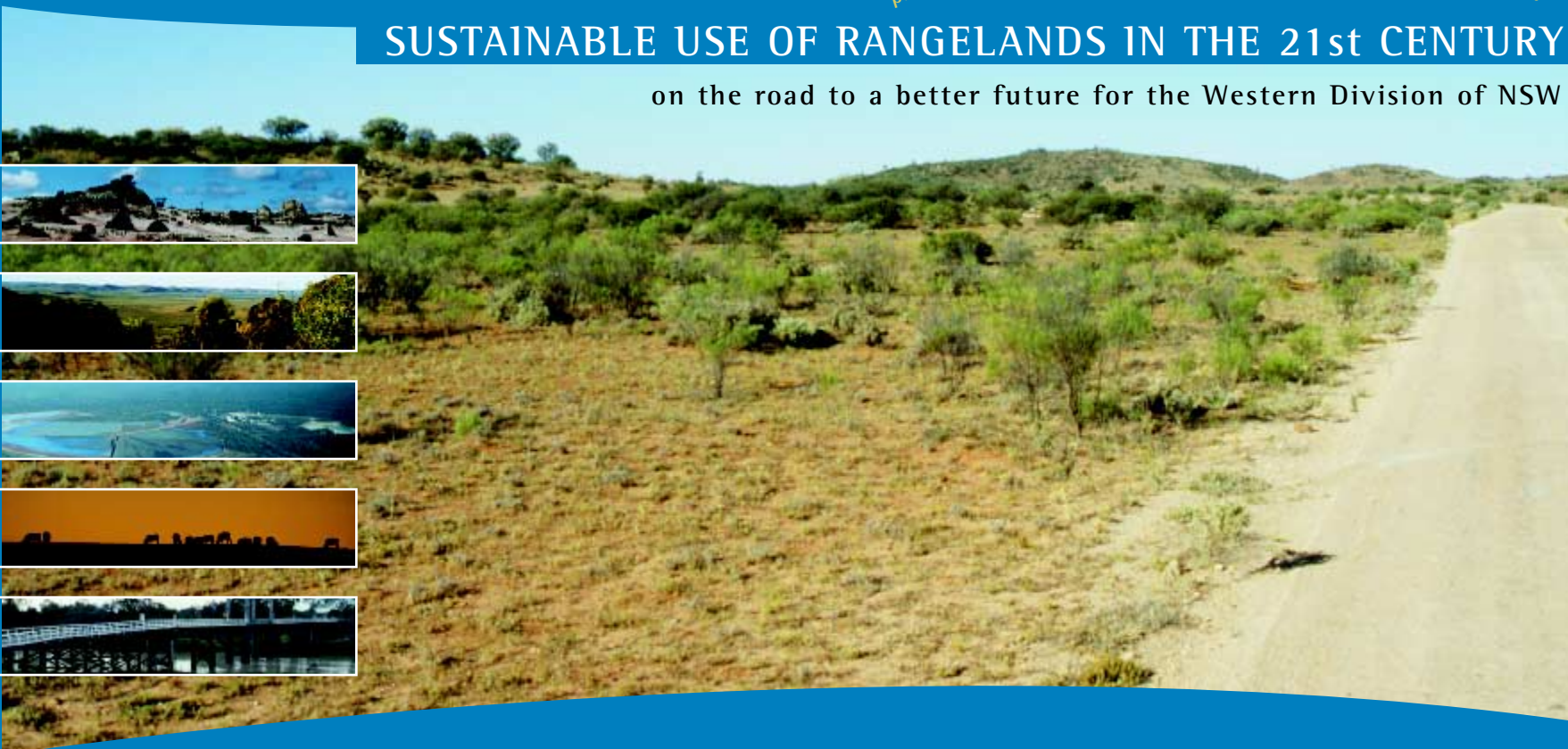


seeking a vision for the future • engaging stakeholders • exploring institutions

proposing institutional change • developing methods and theory

# SUSTAINABLE USE OF RANGELANDS IN THE 21st CENTURY

on the road to a better future for the Western Division of NSW



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## Project participants

**Stakeholders and  
Policy Makers of the  
Western Division**

**CSIRO Sustainable Ecosystems**

**NSW Department of Land and  
Water Conservation**

**Land and Water Australia**

The sole purpose of this booklet is to communicate information obtained and developed during a project entitled 'Sustainable Use of Rangelands in the 21st Century'. The proposals for institutional change detailed therein are the combined recommendations of those persons consulted, all other views and conclusions are those of the authors with reference to existing literature and consultations with project participants. The Commonwealth Scientific and Industrial Research Organisation, the Department of Land and Water Conservation and Land and Water Australia do not accept any risks and responsibility for losses, damages, costs and other consequences resulting directly or indirectly from using any information in this booklet.



A detailed description of this project is available on CDROM from:  
Nick Abel, CSIRO Sustainable Ecosystems, PO Box 284, Canberra ACT 2601.  
Alternatively visit our web site at [www.cse.csiro.au/nsw\\_rangelands](http://www.cse.csiro.au/nsw_rangelands).

### What this booklet is about

The people of the Western Division of New South Wales care what their future will be and how they will get there. They want land use to be sustainable in three tightly linked dimensions: environment, society and economy. Working alongside staff from CSIRO Sustainable Ecosystems and the Department of Land and Water Conservation, representatives of five stakeholder sectors, lobby groups and state agencies have sketched a vision of that future. The vision includes how they could use and share land and how policies and laws need to be changed if their goals are to be achieved.

This booklet describes how that vision was created. “Engaging Stakeholders” documents techniques for allocating and assessing land uses that are both sustainable and coexistent. “Exploring Institutions” describes an analysis of laws and policies that control land use in the Division. It also describes how proposals for changing these institutions were created, with a summary of the proposals provided in “Proposing Institutional Change”. The final section “Developing Methods and Theory” lists the aspects of ecological and social theory that underpin these methods, as well as strategies for adoption of the vision and evaluating the project. Participating organisations are listed on the back cover.

### Why the Division is so special

With just 52,000 people occupying an area that is approximately 40% of the state, the Western Division of New South Wales is a sparsely populated, vast and often dry tract of land.

Its environment is special because the native plants and animals can survive long periods without water and then flourish in response to infrequent but sometimes flooding rains. However, water and wind readily remove soils, nutrients and seeds from over-grazed land. Grazing practices, especially maintaining stock numbers during drought, have caused land degradation in the past and continuing development of

waterpoints threatens the survival of those native species that decline on grazed land. No one wants this to continue and management must be in sympathy with these environmental constraints if land use is to be sustainable.

The society of the Western Division is also unique. Leasehold pastoralism is the dominant land use by area, but the minerals industry, Aboriginal people, conservationists, and tourism operators all have a stake in the land. Land use is governed by the Western Lands Act, which is specific to the Division, as well as a raft of state-wide laws. Legal complexity and contradictions confuse stakeholders and officials alike. Social networks are declining with leaseholders becoming increasingly isolated. Aboriginal culture is weakened by lack of connection to the land that once sustained it. This generates conflict between stakeholders over access to land and existing processes for resolving such issues are ineffective.

The economy of the Division must adapt to rapidly changing technology and markets. It is not well placed to meet these challenges, with complex and outdated laws, and multiple state agencies and community committees each with competing agendas and over-lapping functions. A declining and ageing workforce, reduced community and business services, high unemployment, low profitability and high debt among pastoral enterprises further constrain adaptation.

### Is current land use sustainable

People in the Division hold a range of views about what sustainability means, especially how land use can contribute to it. Resolving these differences is a necessary part of moving toward social cohesion and developing the joint vision of the future that is necessary for regional sustainability. A useful target that combines many of these views is that the development of a region will only be sustainable if environmental, social, and economic systems persist indefinitely without degradation of land and water resources, reduction of options for future generations, or decline in human welfare.



## ENGAGING STAKEHOLDERS

Participation was invited from five major stakeholder sectors: Aboriginal peoples, agro-pastoral leaseholders, conservation representatives and the minerals and tourism industries. These people brought broad values and knowledge to the project, many of them representing community or business organisations. Organisations included leaseholder associations, catchment committees, Aboriginal elders, land councils, tourism development organisations, shire councils, conservation groups, minerals industry groups, and state agencies. The project provided the opportunity for these people to champion and guide the planning process.

For many participants, working together on this project was their first exposure to the values of others and their first chance to share values directly with them. Early workshops allowed people to interact, build networks, communicate ideas, and teach our researchers about regional land use and society. Plenary sessions, feedback discussions, shared meals and shared accommodation all helped communication along.

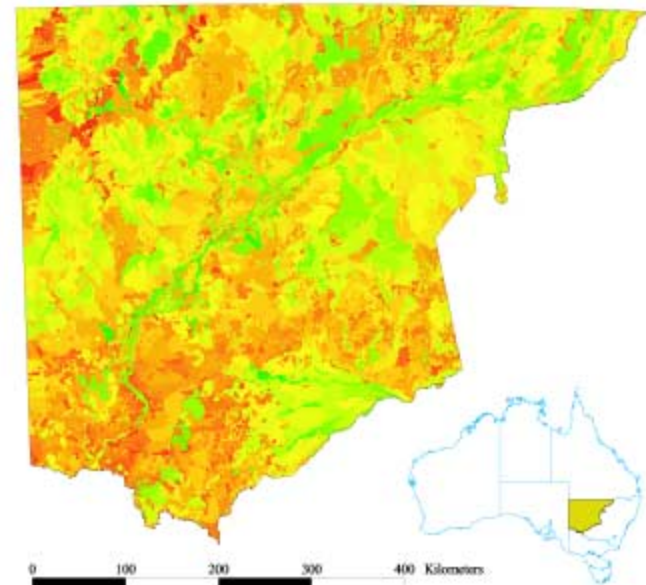
In this atmosphere, land uses of importance to each group were identified. Conflict between the community sectors was anticipated, and land use conflicts were identified. Through discussion better mutual understanding of these conflicts was reached.

### Generating land use value maps

Participants developed guidelines for mapping each land use against a set of attributes of the land. They brought deep understanding and extensive knowledge to this process.

The maps for each sector group expressed land use in different terms: for example the suitability or profitability for agro-pastoral and tourism enterprises; the probability of the presence of sites of importance to Aboriginal people; the suitability for different types of conservation management; and the probability of minerals exploration or mining activity in the future.

The groups developed a wide range of guidelines focussing on a similarly wide range of land attributes, such as: soil texture; erosion risk; distance to services; presence of animal or plant species; topography; past land use; and cultural heritage. The guidelines were designed so that sustainable land use was emphasised. For example soils with low erosion risk were given higher value for cropping land uses and land with attributes that increased the viability of native species was allocated to conservation uses.



An example of a land use value map

## Identifying opportunities for multiple use of land

Participants were able to identify significant opportunities for multiple use of the land by recording a matrix of compatibilities between land uses. They were asked “Which pairs of land uses could co-exist in the same space, at the same time or sequentially, without impacting on their values and performance?”. They listed levels of compatibility: fully compatible land uses from the same sector; fully compatible land uses from different sectors; compatible with negotiated conditions; incompatible; or agreement not reached on compatibility. Eighty percent of land uses were considered compatible – a strong indication that multiple land use is desired by stakeholders.

## Informing regional planning policy

The land use value maps resulting from the project are an important tool for participatory land use planning. They present a vision of how each land use might be dispersed over the Western Division in the future and how different interest groups might value that land use pattern. Both the maps and guidelines inform regional policy makers and assist in allocating sustainable land uses based on the suitability of land for those uses. Complex scenarios for land use may be explored. For example, land uses reliant on plant growth (e.g. cropping) may be modelled in response to shifts in rainfall, temperature and carbon dioxide under future climate scenarios. In conjunction with the matrix of compatibilities, the land use value maps can be used to identify areas where greatest conflict is likely because highly valued and incompatible land uses are co-located.

The maps and guidelines need to be updated periodically. Since they were prepared at regional scale they must also be amended to account for local variations if applied to smaller areas.

## Key recommendations from the stakeholder consultation

**Representation** from community groups provides a conduit for knowledge and ideas to and from the project.



**Individual values and knowledge** explored by each group of participants helps identify and rank conflicts between land uses.



**Guidelines for allocating sustainable land uses** should be integral to regional planning.

**Maps of land use values** expressed by stakeholders not only include production values, but also social, cultural and environmental values and future options.



**Options for multiple land uses** can be identified using tools developed by the project.





## EXPLORING INSTITUTIONS

Concurrent with the stakeholder consultation was a series of workshops and meetings involving policy makers and lobbyists experienced in rangelands and Western Division natural resource issues. The objective was to develop recommendations for change in the content and administration of natural resource management policy and legislation. It became apparent that simplification of these institutions was necessary, while at the same time enhancing land use sustainability and increasing the resilience of both the resource base and the community to environmental and economic shocks.

Representation at these workshops and meetings was diverse and included local government, politicians, state resource management agencies and non-governmental organisations with interests in Aboriginal issues, heritage conservation, regional development, infrastructure planning, agricultural production, and biological conservation. Participants were asked to act as knowledgeable people and not necessarily represent the views of the organisation they worked for. For many it was their first chance to exchange ideas with such a wide representation of other policy makers. Representatives from the stakeholder consultation also participated to promote an exchange of ideas between stakeholders and policy makers.

### A history of land use and institutions

Before we could recommend changes in institutional approaches it was necessary to understand the evolution of institutions in the region. A timeline of the Division since colonisation was developed from historical and personal sources. It included information on settlement, provision of water, land use, technology, transportation, laws, biodiversity, weather, fire, markets, agricultural production and social change. The timeline helped participants explore the complex

relationships between institutions and changes in the environment, society and economy. It also helped identify factors which contribute to change in the sustainability and resilience of land use in the Division.

### Analysis of constraints and opportunities

The project team prepared a review of current legislative controls in the Western Division to complement the historical timeline. The review identified over forty Acts of Parliament that influence natural resource use. It advocated changes that would enhance resilience and reduce the cost and complexity of administration. In a parallel exploration of future possibilities, social and economic outcomes were modelled for five different scenarios: business as usual, agricultural enhancement, expansion of conservation, increase in tourism, and growth of the minerals industry. The consequences of each scenario for soil erosion, shrub encroachment, carbon storage and conservation of biodiversity were also estimated.

### Visualising complex institutional relationships

Emerging from these analyses and subsequent workshops was a model of the influence of laws, policy, economy, society and environment on land uses across the Division. The model includes hundreds of factors and interactions. To simplify its interpretation, diagrams called 'causal trees' were used to show the influences that either promote or hinder the land use interests of each stakeholder sector. Causal trees were refined during the workshops and participants began to propose institutional changes that would enhance the interests of each sector whilst minimising conflict and maintaining simplicity, sustainability and resilience. Results from the stakeholder consultation, for example the strong support for multiple land use, were used to seed ideas for institutional change.

## Portfolios for institutional change

Through the workshops and meetings five portfolios were developed by policy participants, one for each stakeholder sector. Additional proposals were developed by the research team to promote unconventional changes that might enhance outcomes for all sectors. Within these portfolios 174 proposals for institutional change were developed. Each proposal details the sector targeted, the intent of the changes proposed, the method of implementation, the impact on other sectors and the perceived importance of the changes taking place. These proposals are summarised on the following pages.

The sole involvement of policy makers in the analysis and design of policies and legislation introduces the risk of arriving at proposals that maintain the status quo, or minimise disruption to the organisations represented. To encourage participants to think beyond current arrangements research staff proposed an organisational restructure that would promote integration between sectors and significantly streamline planning and decision making.

## Researchers' proposal for organisational restructure

State agency, local government and community committee arrangements are often internally complex, over-redundant and unconnected between organisations in the Western Division. Merging community resource management committees, local governments and existing catchment management boards to form two Regional Councils was proposed to overcome these inefficiencies.

The Councils would coordinate strategic socio-economic and natural resource planning for the region. They would implement development approvals, collect rates and provide traditional local government services. Local representatives would be included in many of the functions currently provided by resource management committees. Relevant state agencies would staff the technical and regulatory sections of the Councils, funded by appropriate transfers from agency budgets to the new Councils.

## Key elements in determining institutional change

**Objectives** for institutional change should be to enhance outcomes for each stakeholder sector, increase sustainability and resilience and reduce conflict between sectors.

**History** provides insights into evolving relationships among institutions, environment, society and economy.

**Social and economic scenarios** and their ecological consequences help exploration of possible regional futures.

**Visualisation tools** facilitate interpretation of complex institutional relationships and assist redesign.

**Extensive options** for restructuring institutions have been identified.





## PROPOSING INSTITUTIONAL CHANGE

Recommendations in the five portfolios of institutional change are summarised below. More detail is included at our website and on the CDROM, which explore conflict and synergy among the portfolios.

### Aboriginal portfolio recommendations

**Provide for greater Aboriginal influence on regional planning and development** through: recognition of customary law; and increased Aboriginal representation on planning and decision-making bodies.

**Resolve conflicts between Aboriginal peoples and landholders** through: changes in Native Title law; Indigenous Land Use Agreements (ILUAs); co-management of pastoral leases; and increased representation by local Aboriginal people with connections to land.

**Resolve conflicts among Aboriginal peoples** through: ILUAs; changes in Land Rights and Native Title law; and recognition of tribal areas.

**Increase Aboriginal ownership or control of land and water** through: lease purchases; co-management of more National Parks and reserves; and allocation of water rights.

**Enhance Aboriginal access to land and water** through: ILUAs; changes to access and liability law; access agreements; and recognition of traditional rights to hunt and fish.

**Improve protection of Aboriginal cultural sites** by: changes to the National Parks and Wildlife Act and the Environmental Planning and Assessment Act; and through Aboriginal heritage management agreements.

### Agro-pastoral portfolio recommendations

**Promote diversification of land uses** by: rebuilding extension services; adding aquaculture extension; easing restrictions where land is capable of more intensive uses; one-stop-shop development approval; establishment of production cooperatives; granting timber rights to leaseholders; and stewardship payments for conservation.

**Increase investment at property level** by: enhancing security of tenure; and freeholding of leases.

**Help eliminate debt** by property amalgamation and other measures.

**Improve roads** by: establishing a legal road network; and resolving trespass and liability issues.

**Promote sustainable management of land** by amending land law so it specifies lessees rights and responsibilities, management outcomes, voluntary nature conservation agreements, incentives, and periodic changes of lease conditions.

### Nature conservation portfolio recommendations

**Promote sustainable use of natural resources across the region** through:

1. legislation that sets strategic social, environmental and economic outcomes; establishes natural resource policies, plans and programs; integrates natural resource and catchment management policies; sets out rights and obligations of resource users, environmental controls and incentives; and establishes participatory planning processes;
2. taxation, grants, user-pays, and incentive measures;
3. linking restructuring policy to land suitability and conservation value;
4. better representation of conservation interests on advisory committees;
5. incentives and levies on uncapped bores; selective removal of water licenses;
6. formal land condition and trend reports required when a lease is sold.

**Establish a comprehensive, adequate and representative (CAR) reserve system** by: formalising a policy under the law; acquiring public reserves and encouraging conservation on private land through taxes, rents and stewardship payments; linking the reserve system to the Conservation Trust; biodiversity accreditation linking consumers, retailers and producers; developing a biodiversity credits scheme; enabling debt-for-conservation swaps;

and establishing conservation on leases purchased by mining companies in return for water rights.

Clarify the priorities of National Park and Public Reserve management and ensure that conservation of native biodiversity is the first priority, conservation of heritage the second, and public enjoyment the third priority.

### Minerals industry portfolio recommendations

**Improve community participation in planning** by increasing inclusion of community representatives on permanent advisory committees.

**Promote regional development** by: favouring approvals for value-adding development projects; simplifying and improving the development approvals process; and providing tax incentives for new mines and for employment of local people.

**Improve rehabilitation practices** by considering the past record of the company in setting the level of the post-mining land rehabilitation bond.

**Promote multiple and sequential land use** through: establishing State Conservation Reserves that contribute to a CAR reserve system, but where exploration and mining are allowed; and through a development approval process that favours multiple and sequential use.

**Promote efficient water use** through: user charges; implementing water trading; developing incentives for water exploration; and reviewing current water licenses.

### Tourist industry portfolio recommendations

**Expand the tourism industry in the region while maintaining product quality** by: developing a tourist carrying capacity strategy and the means of implementation; supporting the establishment of a CAR reserve system; and accreditation of tourism operators.

In addition to these institutional changes the tourism representatives propose improvements to roads, communications, transport and accommodation; and development of eco-tourism and Aboriginal cultural tourism.

## Key institutional change agendas

**Aboriginal sector seeks:** a regional voice; economic development; conflict resolution; control of natural resources; access to land; heritage protection.

**Agro-pastoral sector seeks:** diversification; security of tenure; debt relief; better roads; sustainability.

**Conservation sector seeks:** sustainability; CAR reserve system; management priorities within reserves.

**Minerals sector seeks:** participatory planning; regional economic development; multiple and sequential land uses; water use efficiency.

**Tourism sector seeks:** carrying capacity planning; CAR reserve system; operator accreditation.





## DEVELOPING METHODS AND THEORY

### Mediation and land evaluation

The SIRO-MED process adapted for this project has been developed over the last twenty-five years by CSIRO. The process involves: identifying land use issues; defining and prioritising land uses; describing rules to guide land allocation; collecting data to support those rules; creating maps that display use value or suitability; exploring scenarios of land allocation; and mediating between stakeholders on tradeoffs over competing allocations. The process has been encapsulated in the decision support system WINLUPIS (Land Use Planning and Information System). The project did not attempt to proceed beyond preliminary exploration of land allocation because the extent of the region was too large to allow participants to 'sign off' on negotiated scenarios. Any future sub-regional planning processes would be designed to proceed through all phases.

### Complexity, adaptation and resilience

Human interactions with the environment and our economy are continuously evolving. Complex and adaptive systems such as this tend to go through long phases where the system appears stable. These periods encourage humans to believe that through application of tight control they can maintain stability indefinitely. However, also typical of these systems are periods of rapid change, instability and reorganisation following disturbances. For example, drought and collapse of wool markets have generated significant disturbance of the agro-pastoral sector. Such times present opportunities for system redesign although responses must be appropriate to the type of disturbance and the condition of the system. Attempting to exclude disturbances or trying to fully compensate for their impacts by externally applied means (for example, through drought relief and price support policies), encourages decline in the capacity of regional mechanisms to respond to disturbances. When, inevitably, a disturbance hits a region over-protected in this way, it may be less able or unable to recover. It is better to manage in ways that

allow some disturbance, accommodate fluctuation and facilitate self-reorganisation and recovery, than it is to manage for a false stability. This approach is called 'designing for resilience' and it enables the systems involved to bounce back after disturbances occur. It contrasts with approaches that try to resist change at great expense and with only temporary success.

### Designing institutions that promote resilience

- Design institutions to give just enough external support to prevent a system crash, but without discouraging internal adaptation.
- Maintain institutional memory to guide regions through recovery following disturbance.
- Build and maintain capacity for learning from past disturbance and thus enhance the ability to anticipate and adapt to future ones.
- Foster innovation and diversity within societies and land use to provide a wide range of options if the environment changes.
- Accept a level of redundancy in infrastructure, technology and institutions so that if a part fails there are backups.



## Adoption of project output

It is not enough to come up with proposals for institutional change in this project – they must be implemented by the relevant organisations. The study of social psychology predicts that community and agency participation and their consequent ownership of outputs are necessary for implementation of proposals. Psychology also tells us that individuals tend to accept information that confirms pre-existing perceptions and shed that which contradicts. People tend to construct ideas about controversial issues that are simple and comfortable.

Recognising these tendencies, this project tried several ways of improving implementation and adoption. Working together in a shared learning process helped overcome the resistance to change. Being exposed to the views of other sectors, learning about their values, hearing their social history all contributed to shared understanding. We used participants as champions within their own organisations to help overcome such tendencies and to stimulate a reaction beyond 'business as usual'. Regular communication proved vital in maintaining the understanding of participants and our newsletters maintained contact during long periods of data collection and analysis by researchers. We also visited people at home or in a nearby town rather than always expecting them to travel long distances to workshops.

## Evaluating changed perceptions

The project involved a two way exchange of information where community participants and researchers would learn from each other. Participants were surveyed at intervals to detect changes in their understanding – of the meaning of 'sustainability' and of relationships among institutions, land use and sustainability. Non-participants from similar social and professional circumstances were also surveyed on these issues to provide a benchmark of change in values and understanding in the broader community against which any change in the participants could be measured. This evaluation will contribute to the future development of the participatory method used in the project.

## Key methods and theory

**WINLUPIS and SIRO-MED** are a means of mediating land use conflicts, provided participants have the authority to represent the conflicting sectors.

**System models** of the rangelands aid the design of institutions that enhance regional resilience.

**Designing for resilience** in variable systems is cheaper and more effective than trying to impose stability.

**Participation** of stakeholders and policy makers is essential for shared understanding and implementation.

**Evaluation** of impact on participants and their changing values can enhance participatory methods.



Aboriginal and Torres Strait Islander Commission  
 Arid Lands Environment Centre  
 Australian Conservation Foundation  
 Australian Labor Party  
 Australian Local Government Association  
 Bureau of Rural Sciences  
 Cobar Shire Council  
 Commonwealth Scientific and Industrial Research Organisation  
 Darling River Environment Group  
 Earth Resources Foundation  
 Ecotourism Association of Australia  
 Environment Australia  
 Greening Australia  
 Land and Water Australia  
 Landcare  
 Lower Murray Darling Catchment Management Committee  
 National Australia Bank  
 National Parks Association  
 Nature Conservation Council  
 Northern Floodplain Regional Planning Committee  
 NSW Aboriginal Affairs  
 NSW Aboriginal Land Council  
 NSW Agriculture  
 NSW Environment Protection Authority  
 NSW Farmers' Association  
 NSW Land and Water Conservation  
 NSW Mineral Resources  
 NSW National Parks and Wildlife Service  
 NSW Premier's Department  
 NSW Roads and Traffic Authority  
 NSW Tourism  
 NSW Urban Affairs and Planning  
 Orana Development Board  
 Outback Regional Development Organisation  
 Pasminco Mines  
 Pastoralists' Association of the West Darling  
 Primary Industry Bank Australia  
 Resource and Conservation Assessment Council  
 Rural Industry Research and Development Corporation  
 Wentworth Shire Council  
 West 2000  
 West Farmers Dalgety  
 Western Catchment Management Committee  
 Western Lands Advisory Board  
 Western Lands Review  
 Westpac  
 World Wide Fund for Nature

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