State of the catchments 2010

Capacity to manage natural resources

Murray region

State Plan target

There is an increase in the capacity of natural resource managers to contribute to regionally relevant natural resource management (NRM).

Background

The capacity to manage natural resources depends on a number of factors, such as the accessibility of resources, capability and expertise of natural resource managers and the institutional and policy environment in which the managers operate. Such factors are important when assessing capacity and identifying what enables and constrains effective NRM.

A livelihood framework of five capitals (Ellis 2000) provides a framework for understanding these factors. National indicators of adaptive capacity (Nelson et al. 2010a, b) lack relevance at a community level; as such, they cannot effectively aid in triggering a change in local management practices or livelihood activities.

To ensure regional relevance, a participatory workshop approach was taken with participants drawn from pre-existing networks of natural resource managers, where available.

A detailed technical report describes the methods used to derive the information contained in this report. At the time of publication of the *State of the catchments (SOC) 2010* reports, the technical reports were being prepared for public release. When complete, they will be available on the DECCW website: www.environment.nsw.gov.au/publications/reporting.htm.

Note: All data on natural resource condition, pressures and management activity included in this SOC report, as well as the technical report, was collected up to January 2009.

In consultation with the Murray Catchment Management Authority (CMA), two workshops were held in the Murray region to assess the capacity of land managers to contribute to regionally relevant NRM (Figure 1). The area north of Jerilderie was represented by two farmers who owned mixed agricultural enterprises and a Murray CMA staff member. The Culcairn area was represented by four large-scale farmers who owned mixed agricultural enterprises and a Murray CMA staff member. Low attendance at these workshops was due to them overlapping with the dryland farmers' harvest period. Irrigators from the Murray region were not represented.

Map of the catchment

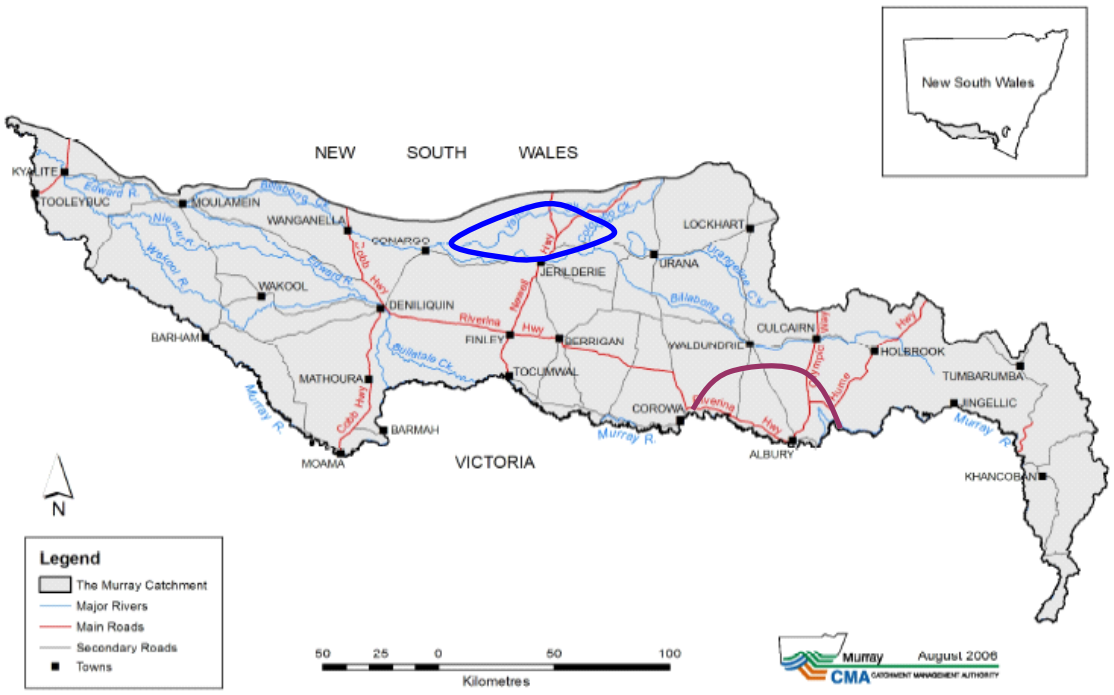


Figure 1 Jerilderie and Culcairn areas represented by the workshops

Assessment

Each participant was asked to identify important indicators of *human*, *social*, *natural*, *physical* and *financial* capitals that either enabled or constrained NRM in their respective area. Examples of each of these indicators are provided in Table 1.

Table 1 Definitions of the capitals

Capital	Examples
Human	skills, health and education
Social	family, community and other social networks and services
Natural	productivity of land, water and biological resources
Physical	infrastructure, equipment and breeding resources
Financial	access to income, savings and credit

Participants then rated each indicator on a scale of 0 to 5, according to the degree to which it supported NRM action in their area. A score of 0 indicated the support of the NRM was 'very low' and action was a high priority; a score of 3 indicated support of NRM could be improved and monitoring was required; and a score of 5 indicated that NRM support was 'very high' and no immediate action was necessary. Scores for each indicator were then combined to find an average for each capital (Figure 2).

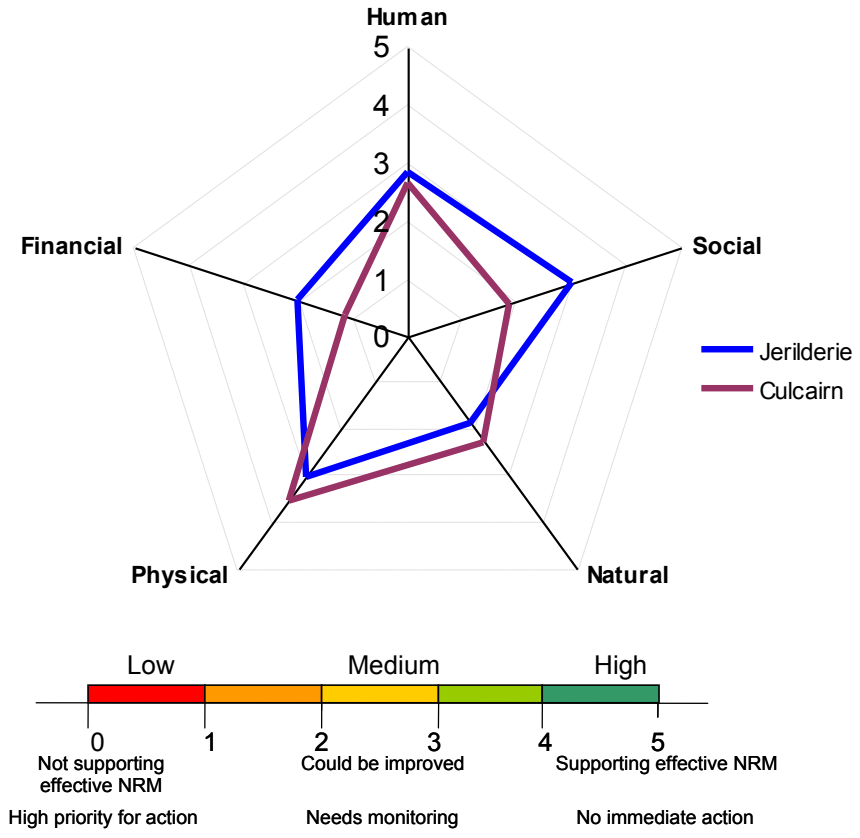


Figure 2 NRM capacity in the Murray region

The combined assessment of each capital resulted in the following:

- both workshops agreed that the *human* and *physical* capitals in their areas were moderate
- *natural* capital was rated low to moderate. In both areas, lack of water was a major impediment to this capital. In the cropping area around Culcairn, dry years and changes in cropping practices were attributed to the drop in water tables. In Jerilderie, graziers were concerned about low rainfall which, depending on markets for stock, tended to result in overstocking and degradation of the pasture resource
- *financial* capital indicators were consistently rated lowest across the areas, with costs of inputs a common concern. In the Jerilderie area, decreasing returns on investment and labour constrained *financial* capital while farm management deposits were considered important in building capacity to fulfil NRM. In Culcairn, *financial* capital was constrained by cash flow
- social networks were considered an important indicator of *social* capital in both areas. In Jerilderie this indicator was rated as effectively supporting NRM; however, in Culcairn it was considered unsupportive. In both areas, the indicator of *social* capital relating to the relevance and coordination of research and extension was rated low. It was agreed that there was a need for targeted research, development and extension (RD&E) to build up *natural*, *financial* and *physical* capitals.

The groups also identified action priorities for nearly all of the indicators; these are shown in Table 2 for the Jerilderie area and Table 4 for the Culcairn area. Tables 3 and 5 outline the pressures on the various condition indicators identified for the Jerilderie and Culcairn regions, respectively.

Table 2 Action priorities for the Jerilderie area

Indicator	Collective action priorities
Human Capital (the skills, health and education that contribute to the capacity to manage natural resources)	
Age of farmers	Drivers of ageing farm population were considered market forces and shifting interest away from work; they are not amenable to change through likely or desirable action.
Attitudes and beliefs	Community members, CMAs and industry organisations need to create a positive image for farming by expressing its value rather than associated problems.
Availability of labour	Grazing enterprises need to become more efficient and streamlined so that labour shortages are less limiting on capacity.
Social Capital (the family and community support available, and networks through which ideas and opportunities are accessed)	
Social networks	No action needed except maintenance and support of existing social organisations by community and the local council.

Effectiveness of extension	Research and extension need to focus on improving whole-of-enterprise performance. This requires better consultation and coordination between industry groups, government bodies and land managers.
Natural Capital (the productivity of land, water and biological resources from which rural livelihoods are derived)	
Weeds	No actions were identified.
Timely destocking	No actions were identified.
Rainfall	No actions were identified.
Physical Capital (the infrastructure, equipment and breeding improvements to crops and livestock that contribute to rural livelihoods)	
Containment of stock	Drought preparedness strategies of containment could be extended by Industry & Investment NSW (I&I) and funded through tax incentives.
Financial Capital (the level and variability of the different sources of income, savings and credit available to support rural livelihoods	
Price of feed	Drivers of financial indicators were considered beyond influence of collective actions, and instead require efficiencies of businesses and strategies to prepare for climate variability.
Farm Management Deposits (FMDs)	Continue to maintain FMDs.
Return on investment	No actions were identified.
Return on labour input	No actions were identified.

Table 3 Pressures on condition indicators in the Jerilderie area

Indicator	Condition	Trend	Pressures/Importance of indicator
Human Capital (the skills, health and education that contribute to the capacity to manage natural resources)			
Age of farmers		↓	The average age of farmers is increasing, which may impact on capacity to fulfill NRM. Younger people are uncertain about the future of farming and the stresses of farm life and are attracted by opportunities in other sectors.
Attitudes and beliefs		↔	Though there is much optimism about the future of farming, there was also concern that farmers may not generate positive sentiments. This was seen as contributing to the declining rural population.
Availability of labour		↓	Labour has declined, due to drought and the minerals boom. People have moved to regional and urban centres. Low rates of labour limit the capacity to benefit from good farming seasons.
Social Capital (the family and community support available, and networks through which ideas and opportunities are accessed)			
Social networks		↔	Jerilderie has a strong social environment that supports NRM through encouraging social interaction. This helps create more positive attitudes and gives individuals a 'lift', and provides forums for discussing land management.
Effectiveness of extension		?	In general, graziers felt that research and extension were poorly focused, as they were too centred on genetics of stock rather than holistic approaches to management and enterprise performance.
Natural Capital (the productivity of land, water and biological resources from which rural livelihoods are derived)			
Weeds		↔	Weeds are an ongoing problem, though some conditions exacerbate the problem. Despite continued efforts, the weed problem remains the same.

Timely destocking		↑	Timely destocking reduces grazing pressure in dry times and thus reduces degradation and enables speedier recovery. Graziers are often unwilling to destock in a timely fashion for diverse reasons.
Rainfall		↔	There is tension surrounding variability and timeliness of rainfall. Land resilience, productivity and the need to stock conservatively were compared to the need for short-term viability high stocking rates.
Physical Capital (the infrastructure, equipment and breeding improvements to crops and livestock that contribute to rural livelihoods)			
Containment of stock		↑	Containment of stock allows graziers to feed stock through dry periods and reduce grazing pressure on the pasture resource. Containment options include agistment and feedlotting and are not often pursued.
Financial Capital (the level and variability of the different sources of income, savings and credit available to support rural livelihoods)			
Price of feed		↓	The price of feed constrains ability to use feedlotting as a containment option. In widespread drought (eg El Niño) when agistment is not available, stock must be sold. If stock prices are low, stock may die in paddocks.
Farm Management Deposits (FMDs)		↔	FMDs allow equalisation of income for tax purposes, which enables financial resources to be available for projects during drought years and NRM capacity over different seasonal conditions.
Return on investment		↓	The increasing cost of land, driven by price rises in urban, regional and higher rainfall areas, makes return on investment difficult because returns are not increasing at a comparable rate. If this trend continues, it will threaten farm viability.
Return on labour input		↓	Financial returns on labour input make it difficult to justify the long hours of work and high levels of financial risk associated with farming, especially compared to non-farm sectors with better pay and conditions.

Condition		Trend		Data confidence	
	Very good	↑	Improving	H	High
	Good	↔	No change	M	Medium
	Fair	↓	Declining	L	Low
	Poor	?	Unknown		
	Very poor				
	No data				

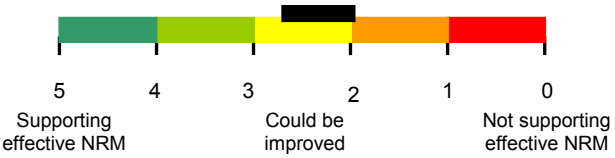
Table 4 Action priorities for the Culcairn area

Indicator	Collective action priorities
Human Capital (the skills, health and education that contribute to the capacity to manage natural resources)	
Stress	Proactive engagement among farmers can help reduce stress, depression and isolation. Community events and prioritisation of holidays and breaks are crucial for stress reduction.
Motivation/behaviour	Market-based instruments can provide substantial motivation for NRM. There is also a need to develop marketing of food on the basis of environmental credentials.
Attitudes and beliefs	Attitudes are slow to change therefore information needs to be focused, relevant and user friendly. This can be achieved through good extension and engagement.
Social Capital (the family and community support available, and networks through which ideas and opportunities are accessed)	
Social networks	Improving social networks is difficult as they are often large and widespread. There is some potential for reinvigoration of groups through community action.
Coordination between organisations	Organisations need to work cooperatively to provide mutually beneficial services.
Border anomalies (regional focus)	The Murray CMA could benefit from a PR person who is entertaining and informative on radio.
Natural Capital (the productivity of land, water and biological resources from which rural livelihoods are derived)	
Planning	Plans need to be living documents and backed up by action.
Soil health	The roles of soil carbon in soil health requires further research and extension; carbon sequestration effects of management need to be specified. There is difficulty in obtaining comprehensive and unbiased information about soil.
Weeds	Research, development and extension (RD&E) on weed management in low-till cropping are required in the context of genetically modified organisms, herbicide resistance, and low or no stocking.
Water	Governments must correctly price water. CMAs need to consider seasonal conditions when planning projects (eg tree planting) to ensure their success.
Physical Capital (the infrastructure, equipment and breeding improvements to crops and livestock that contribute to rural livelihoods)	
Water-use efficiency	No-interest loans were suggested as a means of encouraging water-use efficiency.

Machinery and technological improvements	No actions were specified.
Financial Capital (the level and variability of the different sources of income, savings and credit available to support rural livelihoods)	
Cash flow	The problems of cash flow were seen as largely unavoidable as they are driven by markets and climate.
Input costs	No actions were specified.
Diversity of income strategies	Diversification is not occurring because of drought, but future advice and training in financial management and drought preparedness may be very useful.

Table 5 Pressures on condition indicators in the Culcairn area

Overall condition:



= indicates overall condition

Trend: ⇔

Confidence: L

Indicator	Condition	Trend	Pressures/Importance of indicator
Human Capital (the skills, health and education that contribute to the capacity to manage natural resources)			
Stress		↓	Drought-related stress and poor terms of trade and cash flow have reduced morale and proactive management. A lot of effort has gone towards keeping 'heads above water'.
Motivation/behaviour		?	Motivation and behaviour affect priorities and strategies, eg some farmers are adaptive and others are reactive or counter-adaptive. Motivations relating to succession and branding have substantial NRM implications.
Attitudes and beliefs		↑	Attitudes to farming direct action and are considered positive, in relation to NRM capacity, in the area.
Social Capital (the family and community support available, and networks through which ideas and opportunities are accessed)			
Social networks		↓	Local social networks were seen as poor and in decline; this is driven by the proximity of the area to Albury, which is increasingly centralising social functions and off-farm work in regional centres.
Coordination between organisations		↔	Government bodies, regional development corporations, CMAs and industry groups are often competitive. This results in duplication, redundancy, and conflict over resources and roles which can subsequently lead to poor collaboration, RD&E, and ineffective NRM.
Border anomalies (regional focus)		↔	Proximity to the Victorian border means that much NRM-related media and communication focuses on Victoria. This presents major challenges for CMA engagement.

Natural Capital (the productivity of land, water and biological resources from which rural livelihoods are derived)			
Planning		↑	Developing and implementing strategies and operational tactics were considered, in this area, robust and enabling improved productivity and NRM outcomes.
Soil health		↑	Increasing focus on soil health (eg tillage reduction, GPS usage, precision agriculture, control traffic, variable rate lime, gypsum programs) shows strong commitment. High-end applications require excessive capital outlays.
Weeds		↓	Weed management is an ongoing challenge and consumes money and time. As application of herbicides become more central to farming through development of no-till systems, development of resistant weeds becomes a risk.
Water		↓	Both groundwater and surface water are in short supply. Shallow water tables have dropped, reducing salinity but making stock and domestic water a problem. Low-till may have changed hydrology of area.
Physical Capital (the infrastructure, equipment and breeding improvements to crops and livestock that contribute to rural livelihoods)			
Water-use efficiency		↑	Water-use efficiency was mostly viewed in terms of piping and stock water points. Stubble retention increases efficiency in dryland cropping.
Machinery and technological improvements		?	Machinery and technology have improved rapidly, but high-end equipment (eg variable rate application and sowing machinery) is expensive, not user friendly and only adopted by large-scale and corporate enterprises.
Financial Capital (the level and variability of the different sources of income, savings and credit available to support rural livelihoods)			
Cash flow		↓	Cash flow is critically low, limiting ability to get credit that can stifle all forms of action. Cost cutbacks include reductions in application of fertilisers and herbicides, which can worsen weed problems and productivity.
Input costs		↓	Financial difficulties are worsened by increasing input costs which make management of weeds and soil health difficult. Input prices are not predictable which makes such risks difficult to manage.
Diversity of income strategies		↓	Diversity of income streams was considered poorly managed.

Management activity

New South Wales government agencies and CMAs are actively involved in building aspects of adaptive capacity through numerous programs; such programs include CMA community engagement strategies and CMA and NSW agency training in NRM practice change.

State level

State level activities include:

Capacity building

- developing a state-wide Aboriginal land and NRM Action Plan 'Healthy Country – Healthy Communities'. This will assist in developing clear policies, principles and tools to improve socio-economic outcomes for Aboriginal people through enhanced capacity to participate in land management and NRM
- measuring the increase in the capacity of Aboriginal communities to contribute to regionally relevant NRM. This will be guided by the State Government's *Two Ways Together* strategy that assists in building Aboriginal community resilience
- DECCW is facilitating the delivery of enhanced decision-support tools to CMAs for targeting NRM actions at both catchment and property levels
- DECCW is augmenting CMAs' capacity to monitor and report on the condition of natural resources, socio-economic outcomes and community capacity by developing a monitoring, evaluation and reporting system to track progress against the state-wide NRM targets
- coordinating NSW Waterwatch, a national community water quality monitoring network that encourages all Australians to become active in protecting their waterways.

Education

- I&I land management and property planning courses. See www.dpi.nsw.gov.au/agriculture/profarm/courses.

Regional level

The Murray CMA is undertaking the following activities in relation to the NRM capacity target:

- implementing the Murray CMA Community Participation Strategy and Community Participation Toolkit
- developing a community participation action plan and associated communication plan. The Landholder Community Advisory Group is involved in developing and reviewing NRM incentives, knowledge and skills program. It is comprised of 90 members representative of various socio-agricultural zones. The Murray Aboriginal Advisory Group effectively targets NRM and improves communication with traditional owners and Aboriginal people
- collaborating with 14 local government areas to implement a local environmental plan and Catchment Action Plan (CAP) synergies framework; this is being developed by the Local Government and Shires Association
- producing up-to-date information and targeted advice on NRM issues related to the CAP; this is achieved through media releases, fact sheets, presentations, newsletters, field days, websites and various other platforms

- undertaking cross-catchment knowledge exchange along the Murray River, involving NRM bodies from NSW, Victoria and South Australia.

Local level

Various work is carried out at a local level:

- DECCW's target 13 State of the Catchment reports are based on focus groups and interviews conducted in November 2008
- Murray Irrigation Ltd's delivery of four Land and Water Management Plans include significant capacity building elements
- research is conducted by the EH Graham Centre (Charles Sturt University), in conjunction with Eastern Riverina Landcare Network, on the environment and economic gains of changing land management to meet NRM targets
- coordinating with Victorian CMAs (North East, Goulburn–Broken, North Central and Mallee) that border the Murray CMA.

Further reading

Brown PR, Nelson R, Jacobs B, Kokic P, Tracey J, Ahmed M & DeVoil P (in press), Enabling natural resource managers to self-assess their adaptive capacity, *Agricultural Systems.*

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