

THE SCOPE AND CONTRIBUTION OF SOCIAL SCIENCES IN NATURAL RESOURCE MANAGEMENT

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1. INTRODUCTION

In the context of natural resource management (NRM) in Australia there is general agreement that it is important to consider social ‘issues’ or the social ‘dimensions’ of NRM. Several authors¹ have indicated the importance of the social sciences in NRM and “the need to understand the social dimensions of natural resource management because they are integral to the causes and resolutions of natural resource management problems such as salinity, water quality and vegetation management” (Aitken 2001, p.1).

Furthermore, regional NRM bodies and those state and Australian Government agencies involved in the development, accreditation and implementation of NRM plans, strategies and on-ground NRM activities often find the need to address the social dimensions. For instance, the three overarching objectives of the NHT Bilateral Agreement between the Commonwealth and Western Australian Governments (2002) are:

1. biodiversity conservation - the conservation of Australia's biodiversity through the protection and restoration of terrestrial, freshwater, estuarine and marine ecosystems and habitat for native plants and animals;
2. sustainable use of natural resources - the sustainable use and management of Australia's land, water and marine resources to maintain and improve the productivity and profitability of resource based industries; and
3. community capacity building and institutional change - support for individuals, landholders, communities, industry and organisations with skills, knowledge, information and institutional frameworks to increase capacity to implement biodiversity conservation, and sustainable resource use and management.

The third objective of the bilateral agreement, namely ‘community capacity building and institutional change’ emphasises the importance of the social dimensions in NRM. However what is also important as indicated in this objective is that achieving community capacity building and institutional change *enables* the achievement of biodiversity conservation and the sustainable use of natural resources. If the social dimensions of NRM, which include capacity building and institutional change and which involve people, communities and organisations are not addressed as foundation activities, this will significantly impair our ability to achieve important NRM outcomes, including the sustainable use of natural resources and biodiversity conservation.

¹ As is evident in the numerous papers found in the international "Journal of Society and Natural Resources" which publishes social science research on present and emerging environmental and natural resource issues (www.tandf.co.uk/journals/tf/08941920.html)

Given the importance of the social dimensions to the achievement of NRM outcomes, it becomes critically important that social science is used as a basis for informing NRM decisions, policy and program implementation. The objective of this paper is to examine the scope and contribution of social science in NRM and to assist those involved to better understand issues associated with the inclusion of social science in NRM and the contribution of social science to achieving NRM outcomes. The paper also draws on a workshop on social and economic information in NRM held in Western Australia in 2007, in which speakers from several disciplinary areas within social science described their contribution to NRM².

2. DEFINING THE SCOPE OF SOCIAL SCIENCE

It is important at the outset to make a distinction between applied social science and social practitioners in NRM. Applied social scientists apply scientific methods, theory and conceptual frameworks and undertake social research to better understand social processes with the overall intent of achieving improved NRM outcomes. On the other hand, social practitioners are directly involved in addressing the immediate and practical issues of NRM outside of a social science research context, although often using the broader outcomes of social science research to do so. Social practitioners may be involved for example in directly developing NRM governance structures, developing and facilitating community partnerships and networks, or implementing effective community engagement in NRM.

The social sciences consist of a number of disciplines that study human aspects of the world. They differ from the arts and humanities in so far as the social sciences emphasise the use of scientific method, including quantitative and qualitative methods. They differ from the natural sciences in so far as the focus is broadly on human behaviour and human interaction with the physical and social environment. Furthermore, while the natural sciences utilise the scientific method to investigate the 'objective' and observable environment, social sciences also apply scientific methods to understanding the subjective, perceived or constructed environment. This includes, for example, how people 'know' the environment and their attitudes and beliefs about environmental processes³.

The breadth of social sciences disciplines that are able to be useful and meaningfully applied to understanding and explaining a broad array of social processes within NRM is so large it is sometimes difficult to comprehend. The *International Encyclopaedia of the Social and Behavioural*

² The workshop was held in Fremantle WA on 3rd April 2007. Presentations were made by Ross Colliver (organisational and institutional); Quentin Beresford (political science); Geoff Syme (psychology); Sally Marsh (economics); Colin MacGregor (geography); Andrea Gaynor (environmental history); Daniela Stehlik (sociology) and Roy Murray-Prior (extension).

³ This includes the values, beliefs and meaning that people impose on the world around them. For example a landholder's knowledge about the underlying causes and processes of dryland salinity may differ from the scientific knowledge about these processes. It is important to understand the landholder knowledge as it is this which is influencing behaviour.

Sciences (Smelser and Baltes 2004) provides an overview and documents 96 subject classifications (from adolescence and youth to urban studies) in which are embedded numerous subfields and domains. Each subfield and domain often has content which is directly applicable to the NRM context or which is able to be reapplied to the NRM context.

Even a cursory examination of subject headings in the encyclopaedia of the social sciences (Smelser and Baltes, 2004) provides an indication of useful applications. For example, these include natural environmental psychology; environmental ethics; population composition and transition; environmental history; political science and public opinion; organisational behaviour; environmental anthropology; local economic development and social impact assessment.

While an examination of disciplinary areas within social sciences helps in providing an understanding of social science, it is also important to recognise that not all social scientists will align themselves with a specific disciplinary area. Even though their training may have been within a specific discipline, they may well draw knowledge from a range of disciplinary areas from both within and outside of social science.

Furthermore, in addressing social issues in an NRM context it will often be the case that knowledge will have to be drawn from multiple disciplinary perspectives and that there may well be competing explanations provided by the different disciplines. For example, a conceptual framework applied to understanding capacity building in NRM from a psychological perspective may emphasise the characteristics of individuals including their cognitive and behavioural attributes; from a sociological perspective it may place greater emphasis on social, organisational and institutional issues; and from a political science perspective it may emphasise the role and function of government and political process. For social scientists addressing applied NRM issues, knowledge may need to be drawn from many different disciplinary perspectives from within the social sciences.

It is also important to emphasise the distinction between social science research methods and the conceptual and theoretical frameworks that may be applied to understanding the social dimensions of NRM.

Across the different social science disciplines there is a wide range of social research methods from the more quantitative demographic analysis used to describe population characteristics to the more qualitative use of participant observation and interview methods. While there is often some tendency for people to characterise social scientists as holding either a qualitative or quantitative position to social research, ultimately the choice of method is dependent upon the research context, including the research questions, the research participants and the research audience.

Conceptual and theoretical frameworks assist in explaining the social phenomena under study and should underpin the use of specific methods. These frameworks maybe developed or 'grounded' in the data and information that are being collected or they may be used to guide data collection and

test specific hypotheses. An example of the former is the use of unstructured interviews with irrigators to identify key issues to better understand the impacts of water trading (Fenton 2006a). Examples of the latter include the use of a social resilience framework to better understand human response to climate change (Fenton *et al.* 2007); the use of Valency-Instrumentality-Expectancy Theory (Vroom 1964) to explain the motivation and capacity to adopt sustainable practices (Fenton *et al.* 2000); and the use of diffusion theory (Rogers 1995) to explain the adoption of sustainable NRM practices.

3. THE RECOGNITION OF SOCIAL SCIENCE IN NRM

While it is recognised that people and organisations are involved in NRM and that the social sciences may therefore have some relevance, the scope and contribution of social science enquiry is often narrowly defined or at worst misdefined entirely. For example, the National Natural Resource Management Capacity Building Framework (2002) provides a national framework for capacity building and although useful as a starting point in understanding the role of capacity building within NRM, it does not make use of social science enquiry in the development of the framework. The concepts of motivation, knowledge, awareness, skills, facilitation and support are identified and discussed but the framework is not built on the foundations of social science. For instance, the concept of motivation has been a primary field of enquiry within psychology since at least the early 1930s (McDougall 1932). Similarly, the concept of knowledge as identified in the framework has been the subject of considerable debate, enquiry and discussion among geographers who have specifically investigated the concept for the past 30 years (Moore and Golledge 1976; Moore 1979).

It appears that while there is recognition of the importance of the social dimensions of NRM, social science has not always been used in supporting its further development within NRM. There appear to be two core reasons for this.

3.1 The Limited Application of Social Science to Environmental Issues

While the social sciences represent a broad field of scientific enquiry, including for example the divergent disciplines of history, psychology, economics and geography, there are relatively few social scientists across the breadth of social sciences disciplines that focus on environmental and natural resource management issues⁴. As a consequence, the infusion of social science knowledge and expertise into NRM is limited and often narrowly focused when compared to the infusion of knowledge and expertise from those in the natural sciences.

⁴ *This is most likely a function of the higher education process which generally separates the social and natural science disciplines. Furthermore, those with an interest in environmental and natural resource management issues are most likely to undertake courses of study in the natural sciences rather than the social sciences.*

Across the social sciences, those with skills in economics and human geography and their associated subdisciplines and fields, have made perhaps the most valuable contribution, with the contribution of others with expertise in anthropology, history and political science being more limited⁵.

For example, economics has influenced approaches to water management and in particular the development of water trading (Young *et al.* 2006) and environmental management issues at the farm, catchment, regional and national scales (Marsh and Pannell 2007). Human geography, given its focus on the relationship between people and the environment in a spatial context (MacGregor 2007) has been particularly important in describing the spatial variation in characteristics of populations (Larcome *et al.* 2002; Haberkorn *et al.* 2004).

3.2 The Social Science – Natural Resource Management Gap

Within an NRM policy context the questions which are posed by government and others and which appear to require social science expertise, do not always fit neatly within existing social sciences disciplinary fields; or are questions which are often misaligned with prevailing social science knowledge. This is not to say that such policy questions are irrelevant, but that there are few applied social scientists with the expertise and knowledge to address the policy questions that are presented to them.

While NRM policy questions do not always align directly with social science knowledge it should also be emphasised that social science knowledge is not always being developed in anticipation of the NRM policy questions that may be asked. In broad terms there is in effect a gap in knowledge, language and understanding between social scientists and those in NRM policy and practice (Edwards 2004).

Of course, with few social scientists willing or able to address these NRM policy and practice questions, those in an NRM policy and practice context often find themselves attempting to address the question themselves; often through the application of lay theories of social processes and human behaviour and the application of sometimes questionable social science methods.

As Browne and Bishop (2006) have indicated, environmental issues are defined through the disciplinary, professional and political lens of those examining the problem:

“The characteristics of many NRM settings have been one in which scientific or political professional groups involved in the policy, research and

⁵ *As economics and human geography (demographics) generally deal with more objective ‘data’ and information they also tend to have the most powerful influence across social science disciplines, while those disciplines which focus on more subjective attributes are given less weight and influence. As Levesque-Lopman (1988) indicates, the more objective natural sciences are seen as the hard rational sciences; while the more subjective the science, the softer, more emotive and non-rational the science.*

technology of land and water management have controlled definitions of problems within these systems. Historically, the features and problems of the environment are defined through disciplinary, professional and political definitions. This has led to a situation where environmental problems have been defined by the theoretical lens of the professional group looking at the issues, and by political groups who focus on specific environmental problems as it is a condition necessary for their political control.”

Certainly this view could be extended to the extent that the lens through which environmental problems are defined is also the same lens through which the contribution and scope of social science is defined. This is clearly evident in much social research in NRM, where projects which are often funded and supported by Government are those based on a positivist scientific paradigm⁶ emphasising the use of indicators, the analysis of objective content and the use of quantification – the same paradigm in common use in the natural sciences.

Whether it is due to a lack of social science knowledge and expertise or whether it is a consequence of the ‘frame of reference’ amongst those who define environmental problems and areas of social science enquiry within NRM, after 20 years the role of social science in NRM remains somewhat marginalised:

“...it is important to acknowledge that the social sciences are still marginalized compared to the biophysical sciences when spending priorities are being set for competitive research or when expert voices are requested on important resource issues affecting people or communities” (Selin and Pierskalla 2005 p. 933).

Roughly (2005), in summarising the use of social science in major national, state and Australian Government NRM agencies, found that within agencies there was:

- (i) a lack of understanding of social science epistemology and methods, their diversity, development, and history;
- (ii) a dogmatic rejection on non-positivist, non-quantitative data;
- (iii) a view that technical approaches were more ‘scientific’ and politically ‘saleable’;
- (iv) a rejection of social science terminology as jargon; and
- (v) lack of recognition of social sciences as intellectual disciplines in their own right.

⁶ *In this context and in simple terms a paradigm represents an approach to research. The positivist scientific paradigm is one used in the natural sciences and is based on a belief in an objective reality which can be directly experienced and verified by independent observers. There are natural laws that are discoverable in a logical manner through empirical testing and through a methodology which is heavily reliant on quantitative measures. In contrast an interpretive paradigm emphasises the use of qualitative approaches and a belief in a socially constructed, subjectively-based reality that is influenced by culture and history.*

If this is the prevailing view of social sciences within major NRM agencies, there must certainly be some disquiet amongst both social scientists and those within Government about how social science is being progressed in the context of NRM (Quentin 2007). As Gill (2006) points out in the context of the Roughly (2005) research: “Social sciences were denied their own identity, made subservient to the approaches of the natural sciences, were seen as simply common sense, and consequently, as not needing methodologies and a language of their own” (p. 13).

The prevailing climate for applied social science research as noted by Gill (2006) has generally led to the retreat of social scientists back to academia or at least away from the NRM policy context. The void in social science knowledge and expertise has been partially filled by the natural scientist who had an interest in social processes, but saw these processes through a natural sciences paradigm⁴. It has also been filled by those in NRM policy, who perhaps because of their own frustration with social science, have begun to redefine the scope of social science to answer the questions that they themselves have posed.

4. THE CONTRIBUTION OF SOCIAL SCIENCES IN NRM

The requirement for social science involvement in NRM has generally increased with the movement from a state-based system of NRM governance to a regional delivery model, or what Lane (2006) refers to as ‘civic regionalism’. Through such changes in NRM governance, where regional NRM boards, stakeholders and regional communities are directly engaged in the development of regional NRM policy, planning and the identification of investment priorities the importance of social science has taken on a higher priority.

There are a number of diverse areas within an NRM context in which social science is currently being applied or utilised. A brief overview of the application of social science in five key areas is presented which includes: (i) governance and regional delivery of NRM; (ii) activities and processes which ‘enable’ the achievement of NRM outcomes; (iii) monitoring and evaluation; (iv) social indicators; and (v) social capital.

4.1 Governance and Regional NRM Delivery

The regional delivery model, rather than emphasising a singular state-centric, ‘expert-based’ top-down model of NRM decision making, emphasises NRM governance arrangements and decisions are achieved through the process of inclusion and engagement of stakeholders, interest groups and communities. This change from a state to regional delivery model now requires, for example, a broader understanding of the social context of NRM including issues related to governance and organisational development; the role and contribution of stakeholders and interest groups in decision making; the social relationships, networks and power relationships that exist in relation to NRM; and the importance of understanding local knowledge in contributing to NRM decision making (Colliver 2007).

In other words, social science knowledge, information and expertise are required to support the regional delivery model itself. As Lane (2006) has indicated:

“NRM has moved into the social sciences by changing the scale of governance, emphasising citizen engagement, and recognising the role of multiple players. Designing effective governance arrangements therefore requires far more effective utilisation of social scientific research and advice. The evidence from institutional experiments elsewhere - such as decentralisation - needs to be taken into account when the new institutional framework is being designed” (p. 10).

In relation to regional NRM governance, one example of social science research is the interdisciplinary project ‘Pathways to Good Practice in Regional NRM Governance’ which is being conducted by social scientists and researchers from the School of Geography and Environmental Studies at the University of Tasmania and the Institute of Land, Water and Society at Charles Sturt University. The most recent of four reports, based on interviews with key stakeholders, focuses on the strengths and challenges of NRM governance amongst regional NRM bodies in Tasmania, Victoria and NSW (Lockwood *et al.* 2007).

In Western Australia a three-year research program has also been undertaken by the Australian Research Centre for Water in Society (CSIRO) to examine issues in regional NRM volunteerism across Australia; including future options for volunteerism and NRM and the development of alternative futures for improved resilience and efficiency in volunteerism (Johnston *et al.* 2006).

From a policy perspective there has certainly been an interest in assessing the effectiveness and quality of regional NRM governance arrangements. The ‘Pathways to Good Practice in Regional NRM Governance’ program with funding from Land and Water Australia; research on the capacity of NRM Boards funded by the Rural Industries Research and Development Corporation (Robins 2007); research undertaken by the CSIRO; and recent research funded by the NLWRA to assess the social and institutional foundations of NRM (Fenton and Rickert 2008) all attest to an interest from a policy perspective in matters of NRM governance. From a social science perspective there is a body of knowledge and expertise in governance from which to draw and with a relatively common understanding about governance from both a policy and social science perspective, research within this area is likely to be used more extensively in shaping good governance practices in NRM.

4.2 Capacity Building and Enabling Activities

Social science is also being used to assist in the achievement of those outcomes which ‘enable’ the achievement of on-ground NRM outcomes - what is generally now being referred to as ‘intermediate outcomes’ within NRM program logic. For instance, the Swan Regional Strategy identifies ‘regional capacity’ as a key asset to achieve sustainable NRM outcomes with communications, capacity building, engagement and community support being defined. While the Swan Regional Strategy

identifies specific targets for regional capacity, the Rangelands NRM Coordinating Group has no specific capacity targets, but integrates its capacity building with other activities seeking to achieve resource condition change.

While there are many social practitioners (See Section 2) involved in capacity building, engagement and other enabling activities, social science is also contributing to the development, understanding and implementation of these activities.

Research associated with the use of market-based instruments (MBIs) which draws broadly on the social sciences and specifically economics, is also being used to influence behaviour and achieve environmental outcomes. These approaches use trading mechanisms, auctions and price signals to positively influence the behaviour of people managing natural resources and environmental assets and are generally accomplished by altering market prices, setting a cap or altering quantities of a particular good, improving the way the market works and creating a market where no market exists (Australian Government 2007a).

The Natural Resource Management Ministerial Council (2006) released over \$3.2 million in funding for nine MBI pilot projects. One project which continues to be funded under this program is the Auction for Landscape Recovery (ALR) being implemented in the north-eastern wheatbelt of Western Australia (Gole *et al.* 2005). This project used an auction process with private landholders who tendered for \$200,000 worth of on-ground works focusing on biodiversity conservation measures. Twenty-one management contracts were awarded through the establishment of a competitive market tendering process. Overall, the auction was two to three times more efficient in economic terms than a fixed price scheme.

The success of this and other similar MBI schemes has seen the establishment of a national MBI capacity building program for government agencies and regional NRM bodies coordinated by the Queensland Department of Natural Resources and Water (Australian Government 2007b). State agencies certainly need to become more involved in this program and facilitate the development of MBIs with their regional NRM bodies.

In addition there is research on landholder attitudes and beliefs which influences or enables the achievement of NRM outcomes. This general stream of research focuses on 'capacity building' and identifying those elements of human capacity and institutional change (Land and Water Australia 2004), which if improved or increased could lead to improved NRM outcomes. An example of social science research being used to enable the achievement of NRM targets and outcomes is also found in the Western Australian research of Toric (2005), which applied qualitative research and the theory of planned behaviour (Ajzen and Fishbein 1980) to identifying key issues influencing decision making in farming communities. Similarly in Western Australia, the research of Pannell and others over the past 15 years has provided a significant contribution to understanding the key issues influencing

decision making amongst landholders and others involved in land management (Graham *et al.* 2004; Pannell 2007; Marsh *et al.* 2006).

Across Australia and within Western Australia there have been a number of social science projects which have addressed issues associated with building capacity to achieve NRM outcomes. Many of these projects are often very specific to a particular context or capacity building issue and have generally drawn on knowledge from within economics, community development, sociology and psychology. In addition to the cross-disciplinary breadth of social science knowledge, there is also some depth to social science knowledge in this area. As such, there are significant opportunities for the application of social science knowledge in this context, as for example in supporting the National Capacity Building Framework as discussed in Section 3. However research in this area is somewhat fragmentary and there is a need for greater coordination and greater focus on examining opportunities for implementing research findings within a policy and on-ground NRM context.

4.3 Monitoring and Evaluation

While a significant amount of applied social science research focuses on identifying or improving those human, social and institutional aspects of NRM which contribute to NRM outcomes, there is also a significant corpus of social research which focuses specifically on monitoring social and behavioural change related to NRM.

At a regional scale several NRM bodies, including in NSW the Southern Rivers CMA and the Central West CMA (Fenton and Rickert 2007), are currently ‘benchmarking’ landholder and community behaviours, attitudes and beliefs in relation to NRM with the intention of monitoring change across time. At a national scale, the NLWRA is also implementing and ‘benchmarking’ a program to monitor and evaluate the social and institutional foundations of NRM, again with the intention of monitoring change in these foundation activities across time (Fenton 2006b). Within an NRM context there have also been specific program evaluations which make use of social science research methods, including for example the recent evaluation of the National NRM Facilitator Network (Fenton 2007).

Much of this research tends to be methodologically rather than conceptually driven and while emphasising the use of quantitative research methods such as social indicators, there is also increasingly use being made of qualitative and interpretive methods from the perspectives of evaluation (Dart and Davies 2003) and environmental history (Gaynor 2007).

4.4 Social Indicators

The use of social indicators in NRM has a long history of use and application in Australia. Social indicators were used extensively in the Regional Forest Agreement process in the early 1990s as a basis for profiling and identifying regional communities that were ‘sensitive to change’ and

predicting the potential social and economic impacts of changes in wood supply on forest and timber-dependent communities⁷.

Extensive use is made of social indicators in NRM with indicators being used for example in mapping regional capacity (Webb and Curtis 2006); as the basis for social and economic monitoring in the National NRM Monitoring and Evaluation Framework (Australian Government, 2003); and the development of tools to assess community capacity (Raymond *et al.* 2006).

More recently, social indicators have formed the basis for much of the National Land and Water Resources Audit (NLWRA) social and economic workplan (Cody 2004) where both objective and subjective social indicators are used almost exclusively as the sole method of social science enquiry. Social indicators are used to undertake regional profiling, to identify 'socio-economic drivers', regional trade-off analyses and the assessment of change in regional NRM groups, communities and institutions. The current national social research program of the NLWRA is also defined under three indicator headings which focus on indicators of land managers' capacity to change and adoption of sustainable management practices (Byron *et al.* 2006); regional NRM groups' capacity to make decisions in relation to NRM (Fenton 2006) and understanding the relationship between resource condition and community vitality, viability and health.

This is not to say that social indicators are not an important methodology, however in some instances the singular focus on social indicators at the exclusion of other applied social science methods and approaches to NRM is of concern. In the context of much applied social science research including evaluation research, the use of multiple and mixed methods is in most contexts an accepted approach to social science enquiry (Tashakkori and Teddlie 2003).

The focus by government and NRM policy on social indicators represents a view that, like the natural sciences there is a singular objective science to be applied and that each scientist gathers data and information together adding to the store of objective knowledge in a linear and uni-dimensional understanding of the world. However, while this may be a reasonable approach in the natural sciences, the social sciences are essentially pluralist, with different explanations and methodologies contributing to our understanding of the interface between social and natural processes. As Redclift (1998) stated: "...while the natural sciences proceed by closing down debate, by establishing near consensus between everybody, the social sciences proceed by opening up debate, by admitting the existence of competing controversial universes, or distinct epistemic communities" (p. 178).

There are several additional reasons underpinning the emphasis on social indicators. Indicators are used to assess progress towards the achievement of NRM resource condition targets in many

⁷ The application of indicator methods in a number of RFA regions throughout Australia is evident in the social assessment reports for these regions found at www.daff.gov.au/rfa.

national and regional NRM plans, strategies and frameworks. Clearly what is appropriate in the biophysical assessment is also regarded as transferable and equally appropriate in social assessment.

There is also the prevailing view that because the indicators are objective and quantifiable they are essentially more valid and reliable than other interpretative and qualitative methods used in the social sciences⁸. If social indicators are able to be spatially represented (see for example Byron *et al.* 2004) using the technology of geographic information systems, there is also often the presumption that the validity and reliability of these indicators must be on a par with those found in the natural sciences.

Furthermore, social indicators can often be derived from secondary data sources, including for example census data, which avoid both the cost of primary data collection and the sometimes politically uncertain task of working directly with communities when investigating 'sensitive' issues.

It is important to emphasise that social indicators are an important social science method which may be applied in the context of NRM. However, it needs to be recognised that there is a range of other applied social science methods, including for instance, the ethnographic research of anthropology to experimental and correlation research used in psychology and the case studies of political science which may be equally if not more appropriate in addressing many applied social science NRM policy questions.

4.5 The Capitals

While the use of social indicators is currently one of the most common methods for applied social science research within NRM, the theoretical or conceptual basis underpinning the application and use of indicators is either wholly lacking or is commonly anchored to a conceptual framework based on 'the capitals'.

The early work of Putnam (1995), Coleman (1998) and Fukuyama (1995) focused on the role of social networks, norms of reciprocity and trust in their approach to social capital. Portes (1998) in a review of social capital and its origins emphasised a definition in which social capital "stands for the ability of actors to secure benefits by virtue of membership in social networks or other social structures." (p. 6). In other words, the term 'social capital' was used to explicitly define and describe a number of core interrelated social and psychological processes related to how social networks or structures function.

Following much of the early research and enquiry associated with 'social capital', the concept has also been extended. In a recent paper, Beeton (2006) describes multiple capitals, including financial,

⁸ *There has been a recent shift of emphasis within the Australian Government Monitoring Evaluation Reporting and Improvement Team (MERI) towards an interpretive approach based on performance story reporting, although the outcomes and critical review of this approach are yet to be determined.*

physical, environmental, social and knowledge capitals; the interrelationships amongst these capitals and the contribution they make towards understanding human interaction with the environment and natural resource management.

Other variations and types of capital appear to be continuously defined. For example, Webb *et al.* (2004) in discussing the type of social and economic information relevant to NRM, categorised 'social information' on the basis of: (i) human capital; (ii) social and institutional capital; and (iii) produced economic capital. References are also made in the literature to emotional capital (Thomson 2000), intellectual capital (Stewart 2001), infrastructural capital, natural capital and cultural capital.

The research associated with social capital and related areas has made a valuable contribution to highlighting and promoting the importance of social processes within the context of natural resource management (Dart 2000; Flora 1999). However, there are two cautionary issues which need to be addressed.

First, like the application of social indicators in NRM, the conceptual frameworks associated with the various forms of capital have become the central focus for understanding human interaction and social process in the context of natural resource management. Unlike much of the early research associated with social capital and the strong conceptual and theoretical basis on which the concept of social capital was based, much of the recent discussion in the context of multiple capitals is lacking in substantive and conceptual content. Only by going beyond the labels of capital and utilising social science knowledge from a range of disciplinary perspectives can the lack of conceptual and substantive content be addressed.

The application and use of multiple capitals is descriptive and is often simply a redefinition of social science terminology. Given the lack of substantive content, little is to be gained by simply redefining the field of economics as financial capital; physical geography as physical capital; psychology as human capital; sociology as social capital; cognition as knowledge capital; and engineering as infrastructure capital. Rather, the depth of knowledge within the social sciences needs to be used to develop an explanation of social processes within an NRM context.

5. CONCLUSION AND NEXT STEPS

While there has been an upswelling in interest in applied social science and NRM in the last 10 years, the scope of social science contribution to NRM has been relatively narrow and fragmented within specific policy-directed and disciplinary areas of enquiry. In relation to social science methods, while there continues to be a focus generally on social indicators or other quantitative assessment methods, there is a need to explore a wider array of methods, including both interpretive and mixed methods approaches if a more meaningful enquiry is to continue.

From a social science perspective, the narrowness of scope is not only evident in the application of social science methods, but also in the contribution of social science knowledge more broadly. While

trying to avoid a disciplinary based compartmentalisation of social science, each of the many social science disciplines, associated subfields and domains have the potential to make a valuable contribution to social science enquiry in NRM, either through the direct application of theory and conceptual frameworks or the reapplication of theory and frameworks from otherwise very different contexts.

Gill (2006) notes that, “social science and its many theoretical approaches and methodologies are often not well understood by many policy makers, including those in the NRM realm” (p. 15). In this context, policy makers and those that support the delivery of policy and funding of ‘on-ground’ NRM activities often determine and ‘approve’ the type of ‘social science’ that is applied in addressing NRM issues. The ‘social science’ that evolves is often based on lay epistemologies of the social world and social science methods, overlaid with view of science grounded in the natural sciences and embedded in a language of ‘social sciences’ which may be understood as a common language amongst policy makers, but which is often alien to the literature and discourse of social science research and enquiry.

A key issue as identified in this paper is to improve the level of communication and understanding between those involved in NRM policy and practice and those from within the social science disciplines. It is important that NRM policy, program and practice issues are communicated to social researchers and at the same time an understanding of the breadth and depth of social science enquiry, including methods and conceptual frameworks is brought to those in the NRM context.

If the key issue is essentially about improving communication and understanding, the question then becomes: “what may the state do to address this issue?” It may also be argued that in addition to the state, social scientists themselves must address this issue, and whilst this is also correct, the power relationship across state and social scientists is by no means equal. The state ultimately governs social science in NRM (Donovan 2005), setting the social research agendas and allocating much of the funding for social science research and inquiry which is determined by the priorities and resources of the state and not by social scientists.

At state level a more strategic approach is required to address governance issues associated with social science in NRM. Such an approach should communicate and address the requirements of state and regional NRM bodies within the broad context of social science knowledge and expertise. A strategic approach to social science would provide an important basis for the governance of social science within NRM and ensure the development of effective partnerships between social science researchers and practitioners, NRM decision makers within state agencies and those in regional NRM bodies.

In addressing the issues as identified in this paper it is important to develop a state-level program which is specifically directed at engaging and encouraging partnerships in social science research and enquiry between social scientists, regional NRM bodies and state agencies. With the

involvement of social scientists in the establishment and governance arrangements of such a program there will be significant opportunities to ensure the broader inclusion of social research and enquiry in critical NRM issues at the regional and state level.

One example of a more strategic approach to addressing these issues occurred in Queensland between 2005 and 2007 and which appears to have been instrumental in increasing social science knowledge amongst regional NRM bodies (Fenton and Rickert 2008). Although it is no longer funded, the Queensland Government established under the National Action Plan for Salinity and Water Quality several state-level investment projects (SIPs). One of the SIPs focused on social and economic issues in NRM and was overseen by a Social and Economic Program Implementation Board with social scientists themselves providing technical and governance oversight. Within the social and economic SIP there were a number of individual projects established which included:

- SE01: Institutionalising social and economic considerations and assessment in regional arrangements;
- SE02: Coordination of social and economic information for the development of a regional information service;
- SE03: Social research, development and extension;
- SE04: Integrated research, development and extension for regional NRM;
- SE05: Understanding economic drivers for natural resource management and developing and trialling a toolkit of incentives and market based instruments for regional NRM.

In particular, SE03 funded partnership-based research, development and extension projects on key social issues related to the regional implementation of NRM plans and strategies. Over two funding rounds, 10 partnership-based research projects were funded between regional NRM bodies and social scientists. A discussion of the SE03 objectives, achievements and challenges has since been written and would provide valuable insights into the development of similar strategic programs in other states (Department of Natural Resources and Water 2006).

If a more strategic state-level approach is not possible, then other less resource intensive options should be considered. This may include encouraging the employment of social scientists within NRM organisations and regional NRM bodies; developing partnerships between NRM activities at the state and regional level with social scientists in universities and other research institutions; and encouraging greater interaction between social scientists and NRM decision makers through workshops and other similar activities as occurred in the precursor workshop to this paper.

Other potential options, many of which have previously been identified by Edwards (2004), which may be implemented individually or embedded in a more strategic approach include:

- Establishing directories of expertise in the social sciences;

- Establish a social science capacity building program, as has recently been developed for the use of market-based instruments (Australian Government 2007b);
- The use of social scientists in NRM program reviews and evaluations;
- Seconding social scientists into government as part of project teams on key NRM policy issues, for example, a 'social scientist in residence' and internships for social science students;
- Encourage those in NRM policy to join university bodies through, for example, social science research committees;
- Placing conditions on social science research funding that encourage more interaction with those involved in NRM policy and practice;
- Develop internal training programs within government to improve the knowledge of social sciences;
- Examine other mechanisms to encourage social science research in NRM through:
 - Directly funding undergraduate and postgraduate social science research in NRM;
 - Introducing an 'awards' program for excellence in NRM policy research;
 - Providing a fund to 'buy-out' academics to involve them on NRM policy tasks (i.e. to cover their replacement teaching costs); and
 - Providing a resource centre for social science researchers in NRM.

Irrespective of what specific approach is taken to address these issues, the core objective must be to ensure that the governance of social science in NRM is undertaken in partnership between the state and those involved in social science research and practice. Through such a process, social science knowledge and practice can be better utilised in addressing many of the very critical NRM problems that are now being confronted.

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