

# Integration: Organising Research

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*(Edited from the Powerpoint presentation by Dr Gabriele Bammer)*

The six papers I am discussing are:

- Simon Fisher and Lisa Watts, Incorporating community and/or indigenous knowledge in research—which describes a joint Masters project
- Lorrae van Kerkhoff, Strategic integration—which compares two Cooperative Research Centres (CRCs)
- Bob Wasson and Steve Dovers, Integrated R & D in an academic institution—which reviews the functioning of the Centre for Resource and Environmental Studies at the Australian National University
- Geoff Syme, Interdisciplinary research in an NRM organisation—specifically CSIRO
- Lindsay White and Sarah Ryan, Integration across disciplines in the Living Murray
- Alice Roughley and David Salt, Historical perspectives on integrating social science in NRM agencies.

## WHAT SORT OF INTEGRATION?

The papers illustrate four types of integration:

- Across cultures/knowledge systems. This is exemplified by the paper by Fisher and Watts
- Between organisations. This is illustrated by van Kerkhoff's paper on CRCs.
- Within organisations. The papers on CRES, CSIRO and the CRCs are all examples of within organisational integration.
- Between disciplines. Again this is shown by the papers on CRES, the CRCs, and CSIRO. The paper on the Living Murray is another example here.

Let's now look at these issues of integration, paper by paper.



## ALTERNATIVE KNOWLEDGE SYSTEMS

Simon Fisher, a Warlpiri man and Lisa Watts, a non-indigenous person, undertook a joint Masters by research at Northern Territory University. They were investigating concerns of the Warlpiri people of Central Australia, specifically policy relating to contested site—Pikilyi—an important water source. The key issue is the exclusion of Indigenous traditions in public policy processes leading to obliteration of Indigenous knowledge and the denial of the right to practice traditions.

### Why is this integration important and what type is it?

There is a need for Indigenous perspectives in recording history and in policy processes, but Western systems don't facilitate this. A key question therefore is how to bring the two together? To avoid distortion, the involvement of Indigenous people in the collection and interpretation of data is required. Further, it is important for sustainable land management for both Western and Indigenous economies. In addition, the substantiation of Indigenous findings by western research findings strengthens the Indigenous argument. As the paper shows, a multi-disciplinary integrated and collaborative approach to research from the two traditions produces research of higher quality. A remarkable aspect of this paper is that the process described produced a joint Masters thesis.

### Key messages from the study

First, the perspectives of Indigenous people can only be authoritatively represented if Indigenous people collect and interpret data. The paper has developed a model for this. Further, the model created synergies between traditional-, cultural- and scientific- based knowledge to create 'new' knowledge. The paper also showed that it is important to coincide the collection of Western and Indigenous data to ensure that both forms are available for the same topic.

Another key message is that academic recognition of the research model, through the joint thesis, is important to authenticate the research process and provide quality control of the research material. The fact that they produced a joint thesis, rather than two separate reports, is vital. The university structures had to adapt to accommodate these dual needs both through the supervision and the production and examining of a joint thesis.

## STRATEGIC INTEGRATION: INTERDISCIPLINARY RESEARCH IN CONTEXT

Lorae van Kerkhoff's work is about relating the scientific content of research to the larger context within which it will be used. She explores this by comparing two CRCs. One was the Coastal CRC, which is bridging science and the community, as well as science and decision-making in the coastal zone. The second was the Greenhouse

Accounting CRC, which is ‘science specific’ and specific in science—non-science integration. As Lorrae points out, all CRCs involve integration and this occurs at many levels. It occurs at the organisational level. It is typically also interdisciplinary, especially in order to achieve a coordinated suite of investigations. Finally it is also integrated between researchers and end users.

### **Why is this integration important and what type is it?**

Disciplinary fragmentation is a key barrier to the application of scientific knowledge to land management, so that interdisciplinary science is needed. Further, research must effectively link with ‘users’ of research to ensure useful outcomes. Lorrae’s work illustrates two types of integration. First is scientific integration within the research community, which is demonstrated by the Greenhouse Accounting CRC. Second is the integration of science into non-scientific decision-making and doing so by involving a wide range of stakeholders from grassroots to high-level bureaucrats. This is exemplified by the Coastal CRC.

### **Key messages from the study**

The differences in strategies of the CRCs are attributable to the interplay between researchers and the context of the application of their science. It is noteworthy that there are scale differences; differences in credibility and risk, and finally in the capacity to use research. In addition, understanding how and why interdisciplinary research may or may not be successful in bringing about improved NRM needs to look closely at ‘goodness of fit’ between the scientific and socio-political contexts.

## **LESSONS FROM INTERDISCIPLINARY AND POLICY-ORIENTED RESEARCH AND POSTGRADUATE TRAINING**

The paper by Bob Wasson and Steve Dovers examines integration in CRES from 1973 to 2004. It explores CRES’ role in integrative and policy-oriented research and post-graduate training relevant to natural resources and environment conservation. They note that around 25% of their PhD research is ‘deeply interdisciplinary’, 25% is multi-disciplinary, and the rest is largely disciplinary. The paper examines the evolution of the organisational structures and the consequences of these for interdisciplinarity. It also examines the opportunities and barriers for integrative research within a University setting.

### **Why is this integration needed and what type is it?**

The problems of concern to CRES are complex and involve the relationship between the human and non-human worlds. Their solution requires interdisciplinary research, resting on strong training and understanding of the disciplines. A consequence is that CRES should concentrate on issues too broad to be undertaken by the specialist sections

of the University and that CRES should focus on the development of concepts and methodologies for this. Integration in CRES has evolved to focus on policy relevance and sustainability.

### **Key messages from the study**

There are many messages regarding the forces acting against interdisciplinary research in universities. For example, university rewards systems for promotion and so on act against interdisciplinarity. In addition, publication avenues, or rather the lack of them, act against interdisciplinarity.

The paper also identifies a number of criteria that need to be satisfied to successfully run large integrated projects. It notes the limited success achieved by integration using systems analysis as a shared framework and critiques a number of the frameworks used at CRES for interdisciplinary research. In addition, the paper notes that although significant advances have been made, the distances between disciplines often remain significant. The bottom line is that interdisciplinary and integrative agendas need cohesive effort by many groups.

## **SOLVING PROBLEMS IN CSIRO**

Geoff Syme's paper is about CSIRO's role in addressing significant NRM problems by combining the wisdom of a range of disciplines. The paper has two parts. First, is a discussion of the organisational challenges involved in integration. Second, is a discussion of the role of scientists in NRM problem solving and whether it can be enhanced by development of theory. The paper draws on a retrospective review (Kington 2003) of lessons learned from earlier multidisciplinary research in CSIRO. Kington identified more than 70 initiatives.

### **Why is this integration important and what type is it?**

The paper shows that problem-focused research groups involve a 'matrix' approach leading to 'Flagship Programs'. An example is Water for a Healthy Country. The paper points to the need to invest in 'new science'. Two such areas have emerged—Complex Systems Science (CSS) and Socio-Economic Integration (SEI). Both areas require integration between social sciences and science and policy. They require inputs (including negotiating research process) from outside 'experts' and community to ensure that local knowledge is included.

The paper points out that there are different integrative models in different CSIRO divisions. Sustainable Ecosystem has all disciplines in one Division, whereas the Land and Water Division has socio-economic people assembled in 2 two groups.

## Key messages from the study

Organisational issues are the vital ones to solve in order to advance in integration. In terms of rewards, CSIRO has similar problems to Universities, as outlined above. The Kington review (2003) makes 8 recommendations: the development of the SEI program; the need for cultural change; the requirement for project management skills; the need to learn from previous SEI groups; the necessity of reward integration; the need to minimise transaction costs; the importance of addressing the 'right' problems; and the need for succession planning for projects (for 'change role' projects particularly).

'Addressing the right problems' incorporates 'action learning' and local knowledge. Here the researcher is just one of the participants and this can be a confronting role for professional scientists. Finally the use of complex systems analysis concentrating on interaction between the parts and within human systems can significantly enhance the role of scientists in NRM.

## INTEGRATION ACROSS SYSTEMS IN THE LIVING MURRAY

The 2002 Ministerial Council (Council of Australian Governments) requested further analysis of the impacts of recovering water for the environment. They wanted this to extend beyond previous hydrological and ecological analysis and to include economic and social impact analysis. This paper by Lindsay White and Sarah Ryan overviews the interdisciplinary analysis leading up to the Ministerial Council of November 2003.

The Living Murray was developed as a significant policy initiative of the Murray–Darling Basin Commission leading up to November 2003 and was linked to the National Water Initiative of COAG 2003. The focus of the paper is on the interdisciplinary analysis to develop understanding of the consequences of changing water sharing between consumptive use and the environment.

## Why is this integration important and what type is it?

Many factors were involved to achieve ecological outcomes for the Living Murray. There was a need to match the characteristics of flow requirements for ecological outcomes with water access rights of irrigators and social impacts. The analysis needed to be synthesised into a form suitable for decision-makers to decide on allocating funding to acquire water for environmental flows. Many types of integration were necessary, between:

- Government organisations
- Government organisations and the community
- Types of knowledge
- Disciplines
- Rapid policy development processes and longer term research programs

- Analytical approaches

### **Key messages from the study**

One key message was the consideration of how to faithfully reflect the different perspectives of relevant disciplines into an integrated picture of sufficient detail for decision makers. In addition, in informing policy decisions there is the need to ‘get right’ the balance between producing technical information (outputs) and communicating the results (process). Generally too much time is spent on outputs here. Finally there is a need to tailor the supply of information to meet the demands of senior decision makers and advisers. Don’t strive for big comprehensive integrated analysis—this loses the key messages!

## **HISTORICAL PERSPECTIVES ON INTEGRATING SOCIAL SCIENCE IN NRM AGENCIES**

This paper by Alice Roughley and David Salt is based on interviews with six social scientists in five NRM government and statutory agencies. Three were essentially biophysical science agencies (MDBC, CSIRO, GBRMPA), and two were social impact units (WA & Queensland). It covers the period 1978–2002. Five of the six people interviewed were the first social scientists appointed by their agencies, which were long term biophysical science agencies. There were dedicated social science positions in NRM agencies from the mid to late 1970s.

### **Why is this integration important and what type is it?**

The agencies’ mandates encompass biophysical, social and economic aspects of NRM. They respond to increasing public concern over environmental degradation and the way in which natural resources are managed. Therefore there is a need to integrate to understand the human dimension of NRM (including community perspectives). To integrate social science into biophysical work was a task that typically fell to the social scientist. The integration of the community with the agency role involved engaging, empowering and placating the community. This may lead them to challenging the agency.

### **Key messages from the study**

Roughley and Salt highlight a number of key impediments to integration, especially:

- Lack of consideration by agencies as to the culture of the organisation and the structures required to promote the social science perspective. The agencies also must know what they want the social scientist to do.
- The typically hierarchical structure in organisations is not suited to multidisciplinary integration, which requires a network model.

- Social science methodology did not ‘fit’ with the ‘hard science’ culture of the agencies, so there was a lack of understanding of social science theory and methods.
- Lack of status of social scientists in the agencies shows lack of commitment to integration.
- The social scientist is often seen as both the ‘integrator’ and the change agent and these are hard roles to fill.
- If the integrator is not a social scientist, it needs to be someone who is a strong advocate for social science inclusion.
- Social scientists are isolated within these agencies and also professionally.
- Relationship building is seen as a most positive strategy for integration and involves developing trust.
- Integration is assisted by social scientists contributing a balance of technical and political competence.
- Use of accessible language is important for knowledge exchange.

## CONCLUSIONS

### Within organisations

- The culture and structure of the organisation must facilitate integration *on equal terms*
- Need to minimise transaction costs
- Need mutual respect, trust and good communication skills between different groups in the integration exercise
- Need suitable resourcing
- Need to reward integration
- Make sure professional links and advancement do not suffer

### Between organisation and the wider context

- Make sure the ‘right’ question/problem is addressed—incorporate local knowledge, lengthy scoping and action learning
- Good communication is critical and must match the target audience
- Understanding how and why interdisciplinary research may or may not be successful in bringing about improved NRM needs to look closely at the ‘goodness of fit’ between the scientific and socio-political contexts

### Across disciplines

- Language is important—must have mutual understanding

- Relationship building and trust are important
- Need to work at it, like lots of relationships
- Must be beneficial and bring rewards

### **Across cultures**

- The needs of both cultures must be respected. It requires language and special skills to be sure this is achieved.
- Needs to result in an outcome accepted by both cultures without dominance.