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Article 2: The Value and Limitations of Participatory Action Research Methodology

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Article 2: The Value and Limitations of Participatory Action

Research Methodology

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Abstract

This article describes the Participatory Action Research (PAR) methodology used to trial and evaluate a suite of planning tools to improve the engagement process for statutory water planning in Australia, and assesses its value and limitations in the Australian context. We argue that the strength of this method is its consistency with a social learning and adaptive management approach.
We owe the success of this research approach to five key factors: a high degree of access to the project setting; clear demarcation of roles and responsibilities between researchers and participants; considerable effort spent building and maintaining informal networks and relationships; sensitivity to the relationship between ‘insiders’ (the participants or owners of the issue i.e. government and community) and ‘outsiders’ (the research project team); and continual review of project planning and willingness to adapt timeframes and processes to suit the situation. The value and challenges of Participatory Action Research are discussed with key lessons emerging for improving its practice, as well as the transferability of this knowledge to engagement practice for water planning.

Keywords: Participatory Action Research, Collaboration, Water planning, Deliberative tools, Evaluation.

1.0 Introduction

Throughout its literature and practice, there is widespread recognition that water resource planning and management is to be regarded not only in terms of outcomes, but also as a continually improving process (Barr and Cary, 2000; Stoeckl and Abrahams, 2007). Improvement in management is a result of cycles of observation, experience, analysis, planning, implementation, monitoring, reviewing, and reassessing towards a new phase of implementation based on experiential learning (see Gray and Lawrence, 2001, p 154-155; Pahl-Wostl et al., 2007; Pretty, 2002). The cyclical nature of this process is captured by the term ‘adaptive management’.
In practice though, adaptive management tends to be interpreted narrowly by resource managers as adapting policy or management actions through either a scheduled process (or review) or as a triggered response to unanticipated circumstances or unintended outcomes. An alternative interpretation of adaptive management is evident in the literature of its earliest proponents, and is captured by Lee’s (1999) succinct definition of adaptive management as “implementing policies as experiments”.

Experimentation, Lee (1999) and others argue, is a necessary corollary of both the limitations of our knowledge about managing the environment, and the consequences of postponing action on pressing and wicked environmental problems until “enough” is known (also Holling, 1978). The inclusion of aggressive experimentation as a means of improving practice was definitive in the concept of ‘active’ adaptive management as originally conceived (Walters and Holling, 1990). Integral to its functioning is the documentation and learning from both “planned actions and unplanned environmental surprises” (Fernadez-Gimenez et al, 2008, p3).

Adaptive management requires, though, an intentional process of collective self-reflection through interaction and dialogue among diverse participants (stakeholders) (Fernadez-Gimenez et al, 2008). This resulting growth in understanding and skills from the collective effort of working together to improve a situation is often referred to as ‘social learning’ (Keen et al, 2005, Measham, 2009). Social learning can be structured or happen in many ways, but fundamentally requires a commitment to effective and authentic dialogue (Campel, 2000, Kilvington, 2007) including dispute resolution (Daniels and Walker, 1996) and safe spaces/arrangements where diverse stakeholders can interact and learn together (Buck et al., 2001) in a context open to critical analysis and examination unimpeded by power and knowledge differentials.
Further there is some evidence that experiences of social learning build the adaptive capacities of participants to deal with change (Kuper et al., 2009).

Considered in this way, adaptive management and social learning share many of the characteristics of Participatory Action Research (PAR), the informing methodology used for all of the research presented in this volume (Hoverman and Ayre, 2012; Tan et al., 2012). PAR is an applied research approach, in which participants – those with a stake in the outcomes of the research – take on an active co-researcher role. Researchers enter into a collaborative partnership with participants to facilitate improved practice through the direct application of research findings in a practical context (Carr and Kemmis, 1986; Greenwood and Levin, 1998; McAllister and Vernooy, 1999; Ison, 2008). PAR is characterised by its blurring of the distinction between ‘researcher’ and ‘researched’: researchers and community stakeholders work together to co-generate knowledge through ongoing communicative processes and joint implementation of findings. Both adaptive management and action research apply theory to practice and learn from the process to improve theory. It is a structured means of “learning while doing” (Greenwood and Levin, 1998, p 81; Lee, 1999).

This paper focuses on the value and challenges of using a PAR approach in two research projects on water allocation planning, ‘Collaborative Water Planning in Northern Australia’ and ‘Water Planning Tools’. Funding for the research was provided by the National Water Commission as part of their Raising National Water Standards program, with the explicit aim of developing good practice tools and mechanisms to address capacity gaps in the development of water allocation plans.
Both projects shared a common objective to trial and evaluate a suite of tools aimed at improving the processes of stakeholder engagement by government agencies in water allocation planning in different geographical and hydrological contexts in Australia.

As one type of public participation, stakeholder engagement works with identified groups with overlapping geographic or topical interests, affiliation, or identity to address issues affecting their well-being, to exchange information or to create new knowledge, often to influence policy, behaviour or practices. The benefits of genuine and effective engagement for both government and stakeholders are well-documented (Arnstein, 1969; Pretty, 2002; IAP2, n.d., Ross et al., 2002; Rowe and Frewer, 2005), and include:

- Wider access to information, networking opportunities and resources including access to local knowledge about what is likely to work and what is not;

- Improved decision-making and outcomes by enabling input by a wider range of stakeholders;

- Better understanding by governments of the complex issues in communities and similarly, better understanding by stakeholders of the processes of government;

- Opportunities for co-learning and reflection to build capacity to support current and future initiatives; and

- Increased participants’ ability to take part in productive dialogue on key issues.
Stakeholder engagement contributes to increased effectiveness by improving both the quality of decision-making and the quality of implementation and to increased legitimacy through greater transparency and the pursuit of legitimate self-interest (Newig 2007). The research methodology outlined in this article sought to contribute to the range of tools and mechanisms used by government agencies to enhance the qualities of stakeholder engagement in water resource management. For the purposes of these projects, the definition of a planning tool was adopted from the European NeWater Project - “a guideline, procedure or protocol, method or technique, device, apparatus or software program” to support operational actions to achieve integrated water management (Barlebo et al 2006; Henriksen and Barlebo 2008, p. 1025).

Challenges posed by political changes to planning schedules, access to research settings, and the complexity of issues faced by planners meant the research methodology needed to be implemented in different ways in each instance. In all case study areas, our overall approach was to work closely with the water agencies and stakeholders to identify issues, collaboratively develop participatory methods to address these issues and, in turn, create opportunities for social learning. Efforts were made for participants and researchers to co-generate knowledge through inclusive and deliberative processes.

This paper examines the value of adopting PAR methods in the generation of the research findings detailed in this edition. Through identifying the success factors that facilitated the effective application of this research methodology across these case studies, this paper seeks to outline important considerations for the conduct of research in live policy settings, but also research on adaptive water management and
planning more generally. This paper provides a brief overview of PAR by

distinguishing it from action research, and demonstrates how the method was
developed in the case studies. A review of the challenges to the use of this method is
used as a basis to forward a series of success factors and lessons for future water
policy research using PAR or other collaborative research approaches.

2.0 Overview of Participatory Action Research Methodology

Action research is defined primarily by its research design. This consists of three
recurring stages: inquiry, action, and reflection (Kemmis and McTaggart, 1988, 2005;
Lewin, 1947). Through multiple cycles of these stages, improvements to the
knowledge and understanding of those involved in the inquiry leads to social action,
and reflections on actions lead to new understanding and open up new areas of inquiry
(Greenwood and Levin, 2003, p 149). This iterative process forms the foundation for
continual improvement. Kemmis and McTaggart (2005) argue the stages are in reality
likely to overlap and merge as learning occurs. Action research becomes participatory
action research depending on who is involved in each of those stages, and to what
extent. At its most participatory, researchers engage with participants as collaborators
who can inform project design, propose methods, facilitate some of the project
activities, and importantly review and evaluate the process as a whole.

In the inquiry stage, researchers and participants identify a shared practical problem
and methods to collectively address that problem. The plan of action developed is
ideally based on the best available contextual evidence, and in this way PAR tends to
involve the use of established research techniques selected on the basis of ‘best-fit’ for
the situation. Research is used to provide accurate empirical knowledge of the nature
of the problem, its causes and consequences. Employing a range of techniques can also enlarge the suite of available options for action. This information is also used as a baseline data-set to help assess changes to the situation as a consequence of the action research process.

A planned and structured intervention is executed as part of the action phase, with clearly defined roles for the participants and the researchers (Clark, 1980). Changes in the situation are closely monitored throughout this stage. The reflection stage involves both the observation of the effects of the action and reflection on the results of this action on the situation. These two components align with the monitoring and evaluation stages of adaptive management respectively. It is critical to develop a strategy (prior to the action) for monitoring and evaluating the effects of action. Not only should this strategy identify the scope of anticipated changes, but also articulate a robust epistemology against which the validity and salience of new or emergent knowledge can be assessed, such as a systems thinking frame (Ison, 2008). Effective monitoring and evaluation procedures supply the process with rigour for assessing the effectiveness, appropriateness and relevance of the action-research intervention. Further, it provides a frame of reference for establishing causality in determining the extent to which research activity ‘caused’ or ‘contributed to’ the desired changes in the situation (McAllister and Vernooy, 1999).

A distinguishing feature of PAR, as opposed to action research more generally, is that the participants are also involved in its evaluation. Participant evaluation, originating in evaluation of community development projects, is based upon the concept of communal reflection and self-evaluation (Feuerstein 1986; Garaycochea, 1990). It
operates on principles of democratic participation, cooperation and empowerment by providing the examined community with the opportunity to review and critique the research process, and provides an additional avenue for stakeholder engagement. It is specifically aimed at ensuring reflexivity and validity in the research process. Without this component, the data collection and research methods employed can potentially reinforce researcher assumptions and values: “it is possible that researchers will omit a whole range of data in order to confirm their own pre-established beliefs, leaving the method open to charges of bias” (May, 1999, p 154). Participant evaluation provides opportunity, collectively, for active and critical engagement, where alternative voices are indispensable to any consideration of research validity.

The types of activity conducted as part of an action research activity are difficult to standardise, for three reasons. First, PAR is context-specific and fluid. As issues arise and relationships develop, the methods and activities conducted are necessarily dynamic, requiring adaptation and revision. It is better described than defined. Second, PAR is context-centred; it aims to solve real-life problems. In this way, it is particularly useful for ensuring that research continues to form action in the longer term and for the integration of research into practice and improvement. Third, PAR needs to be widely inclusive of the diversity of experience and capacities amongst participants in the research to capture potential outlier input and ensure acceptance and ownership of both the process and the findings.

3.0 Development of the Participatory Action Research methodology for water planning research
The use of PAR in the water planning research described here was informed by two components of the Collaborative Water Planning in North Australia project (June 2007 – June 2009). Firstly, a survey of government agencies documented planners’ experience with and expectations of water planning (Mackenzie and Bodsworth, 2009). Secondly, two retrospective case-studies, in the Ord, Western Australia (Ayre, 2008) and the Gulf region, Queensland (Mackenzie, 2008), provided stakeholder perspectives relating to factors that support engagement, and highlighted challenges in evaluating these processes.

These case-studies sought to review qualities of stakeholder engagement in the water resource planning process, by identifying community and agency expectations and assessing the factors that impede or enhance collaboration among stakeholders, agencies and the wider community in water planning. A review of policy documents and the literature was followed by sixty-three semi-structured interviews in the two catchments in 2008 by two researchers over a three-month period. Stakeholder engagement processes were assessed against four sets of indicators: social process; outcomes; decision-making; and change (Ayre, 2008; Mackenzie, 2008).

One of the conclusions related to the quality of interaction and facilitation within the predominant engagement method – representative stakeholder panel meetings. It was found that although a range of popular tools are available to aid in community-led deliberation on natural resource management, their use in the water planning context is extremely limited. Many of these documented tools have assisted individuals in diverse group settings to identify and analyse problems, move beyond private
concerns, engage with competing views and take them into account in subsequent evaluations.

The water planner survey and the two case studies confirmed findings of previous research (Hamstead et al., 2008): that water agencies tend to engage community at lower levels of the engagement continuum. They strongly focus on providing information to participants, listing key issues and soliciting feedback on existing policies; rather than facilitating deliberative processes to reach agreement on the nature of the issues, explore creative yet legitimate strategies, and minimise conflict between interests. The research confirmed the demand for an expanded suite of planning tools to improve the quality of deliberative methods for stakeholder engagement in water planning. This finding reflects the approach of Integrated Water Resource Management (IWRM) internationally, where the achievement of sustainable water resource management requires the participation of affected stakeholders in the decision-making process (Bromley et al., 2005).

In the “Water Planning Tools” research project (October 2008-September 2010), we sought to develop and trial tools that had been used previously in natural resource management and planning, but seldom applied in water allocation planning in Australia. We adopted a modified PAR methodology in three case study regions, namely the Tiwi Islands, Northern Territory; the Regulated Murray River, South Australia; and the Condamine groundwater area, Queensland (see Hoverman and Ayre, 2012; Mooney and Tan, 2012; Tan et al., 2012, this issue). The locations of these case studies are indicated in Figure 1.
To select the case study areas, water planning agencies in all Australian jurisdictions were invited to nominate one or two water planning areas within their jurisdiction. The seven submitted case study areas were then assessed by the project team in collaboration with a project steering committee using a multi-criteria evaluation tool. The criteria were ranked in order of relative importance for the achievement of project outcomes, from both project team and sponsoring agencies’ perspectives. The division of criteria into three categories - pragmatic issues, relevant content, and risk factors - is shown in Table 1 below.

Insert Table near here. Caption as follows

Table 1: Criteria for the selection of case study areas

Proposals that could demonstrate state agency support and capacity, convergent timelines and access to stakeholders were preferred. Preference was also given to pilot regions that would involve the priority issues of groundwater–surface water connectivity and over-allocation of water resources. In each case, the trial and evaluation of stakeholder engagement tools was conducted in close collaboration with government agencies and authorities, and local communities during the development phase of a statutory water allocation plan.

Given the principles of PAR, the project team determined that more salient insights would be gained from working actively with water agencies in current water planning
processes instead of through observation or retrospective analysis. To do this we had
to gain the confidence of water agencies to enable access to the research setting (see
design a methodology that was widely inclusive, and consider the
diversity of experience and skills of all participants including the community. Table 2
provides an overview of the methodological design of the project, including the
timeframes for each component of the methodology as envisaged in the project plan.

Table 2

Table 2: Project methodology and initial expected time frame designed by the
researchers

A context and gap analysis in each case study area within the first six months of the
two year project enabled researchers to develop working relationships with the
participants. The case-study researchers were either located near the sites (Condamine
and Tiwi Islands), or visited frequently (South Australia) working closely with
planners and community. Agency staff and the project team jointly prioritised the
issues and knowledge needs, and aligned the tool trial within the plan development
schedule. A summary of findings from the context analysis is provided in Table 3.

Table 3

Table 3: Summary of findings from the context and gap analysis

Of issues identified by the gap analysis, only three or four could be addressed by the
project, which meant that only certain tools were relevant for consideration. The
selection of tools was informed by an understanding of usefulness of certain
deliberative tools, and pragmatic considerations – such as time, cost, data requirements, experience and skills of stakeholders, availability of resources and expertise. Issues such as innovativeness, complexity and replicability of methods across the diverse cases were also relevant considerations. Table 4 illustrates how each PAR stage was implemented in the three case-studies.

Insert Table 4 near here. Caption as follows

Table 4: Implementation of Participatory Action Research methodology in three case study contexts

Follow-up evaluations of the tool trials and of the research project generally demonstrated the value of PAR for participants. Many attributed the relevance and usefulness of the project’s research outcomes to the participatory nature of the research method. In the next two sections, we discuss some of the factors that contributed to the success of the methodology in the Water Planning Tools project, and canvass the implications for PAR as a methodology, and water research generally.

4.0 Factors for success in Participatory Action Research

4.1 Negotiating access to research setting

To gain access to the three case study sites, we developed principles of collaboration which were cognisant of the political sensitivity of water planning, and also the relationship that needed to be built between researchers and water planners prior to our involvement. Political risks attached to the project from the planning agencies perspective were several and evident. There was potential for conflict between interest
groups, for possible adverse media attention, and for perceived conflicts of interest.

We also wanted to ensure that agencies and other partners understood the collaborative method, and recognised the team’s need to carry out independent research. It was also imperative to demonstrate the benefits of engaging in this research project. To that end we negotiated and entered into Memoranda of Understanding (MoU) with each of the relevant water agencies which included the principles for guiding the research (see Table 5).

Extended negotiation and consent to these principles very much embedded the concept of full participation by water agencies as co-researchers. In the Tiwi Islands, a wholly indigenous estate, researchers entered a Research Agreement with the Tiwi Land Council, which is the statutory representative body for Tiwi people on matters of land, water and resource administration and governance. Working with local stakeholders required a less formal, but no less onerous, process of building trust and rapport. Participant evaluations of the trials of tools assisted the researchers to clarify and define those success factors that contributed to developing trust with stakeholders, and included: demonstrating our independence from the process; being visible, accessible and responsive to stakeholders and requests for information; and providing clear information about our motives and expectations from the research. Routine and frequent contact was supplemented by the use of participation consent forms and ‘plain-English’ communication materials.
4.2 Defining the problem

Using a combination of qualitative and quantitative research methods, the context and
gap analysis for each site revealed several catchment-specific issues for water
planning. The research team then prioritised the issues and tested these with water
planners (Figure 2). With full agreement from the planners, and their managers and
others in the department, the issues for inquiry were more fully defined. For example,
in the Condamine, seven members of the Department of Environment and Resource
Management (comprising two members of the regional planning team, a
hydrogeologist, two managers from head office, and two economists) were fully
briefed on the gaps analysis, discussed and agreed on the issues before the inquiry into
suitable tools. In the Tiwi Islands, researchers took guidance from the Tiwi Land
Council and reported regularly on interactions with the community and larger
stakeholders.

Problem definition was subject to consideration of technically feasibility within the
timeframe and scope of available planning tools. For example, in both the Condamine
and Murray case studies, researchers and agencies reached agreement that further
socio-economic analysis on the effects of reduced water allocations on the community
was a priority, but the question of how to select between the range of tools available
required more information. As a result, agency staff participated in a socio-economic
methodology workshop organised by the project team, where experts presented a
range of different methods for review and discussion. This workshop provided both
planners and the project team with a deeper understanding of analytical tools, their strengths and limitations, and assessment of their suitability for the addressing specific problems.¹

4.3 Aligning timeframes in a dynamic context

A major challenge to the research was that planning timeframes are dynamic. In all case-studies, we encountered delays in the planning schedule. In the South Australian case study, for example, we had anticipated working alongside the statutory planning process. Soon after the release of South Australia's Concept Statement for the River Murray in August 2008, it became apparent that the Murray-Darling Basin planning would complicate South Australian timeframes. Under Commonwealth water legislation, South Australia would be required to comply with the basin-wide water plan. Additionally, media and consultation relating to the Murray-Darling Basin Plan Concept Statement released in 2009 had strong implications for communication around South Australia's process. These factors led the River Murray Natural Resource Management Board, the key project partner for this case study, to review its planning schedule, resulting in major adjustments to our project design. As indicated in Table 6, more time was required for undertaking the context analysis, developing and obtaining agreement to the use of engagement tools, and conducting the case study inquiry than had been anticipated (cf. Table 4 above).

Insert table 6 near here: Caption as follows

Table 6: Revised timelines for the stages of the project methodology

¹ Publications arising from this workshop, including proceedings, are available on the Water Planning Tools website (www.waterplanning.org.au)
These events show not only the challenge of aligning our own research timeframes, but the highly dynamic political context and the discretion with which researchers had to proceed. Contingency alternatives, ongoing consultation, flexibility in project design, and the sheer determination of the project team minimised the risk to final delivery of the project; beyond this, such changes in external circumstances beyond the researchers control can be anticipated, but are unavoidable.

4.4 Collaboration with external ‘experts’

Some of the issues identified and prioritised by stakeholders required skills and expertise that was not available within the project team. To address this, partnerships were formed with external research providers and consultants. Better outcomes were achieved when the experts had an existing working relationship with members of the project team, some familiarity with the catchment, or had some prior experience with community engagement in the research process. For example, hydrogeologist Malcolm Cox and his team from the Queensland University of Technology had developed several groundwater visualisation models in collaboration with community stakeholders, and their knowledge of groundwater systems in South-East Queensland reinforced their credibility with participants. The use of experts in participatory modeling, including groundwater modeling (Molina et al 2011) and Bayesian belief networks (Carmona et al 2011), is increasingly used in water management planning to establish effective, collaborative ‘platforms’ from which stakeholders can create meaning and generate new knowledge (Henriksen et al 2008, Hoverman et al 2011).

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2 The full portfolio of groundwater visualisations developed by Malcolm Cox and his team is available online at: http://www.isr.qut.edu.au/gsr/compl_proj/index.jsp
Contributory funding for external expertise was negotiated with the participating agencies, thus tripartite contracts were entered into. With governments and universities insisting on stringent legal provisions to protect liability and intellectual property rights, these arrangements lent administrative complexity to the management of the research. The more easily managed arrangements were entered into with independent consultants as experts, but this was complicated by the need for project activities to align with their availability and schedules, often subject to change at short notice, and by limited appropriate and available alternatives.

The involvement of experts outside of the project team added an additional layer of complexity to the issue of ownership of the research. Ownership in this sense relates not only to the formal intellectual property considerations, but also the objectives and direction of the research process itself. Our experience confirms Denscombe’s position that issues arising from partnerships with researchers “need to be worked out sensitively and carefully by partners to ensure that there are shared expectations about the nature of participation in action research” (1998, p 62). In addition, the external expertise needed to be seen as credible to participants. In the South Australian case study, this was achieved through the use of recognised local authorities, as participants related best to those familiar to the area instead of ‘imported’ expertise. This experience underlined the importance of selecting appropriate persons based not only on their expertise, but also on personal qualities and experience.

4.5 Monitoring and evaluation

Systematic information gathering and collation is an essential component of PAR, so that improved understanding from monitoring and evaluation can be re-incorporated
into the adaptive cycle. A monitoring and evaluation approach that could be applied to all of the case-studies was pivotal for generating transferable research findings and determining the outcomes of the process.

In each case study, the trial of planning tools was evaluated using indicators for process, technical quality or content, stakeholder learning and planning outcomes. Indicators within these themes were developed by the project team on a tool-by-tool basis, with reference to the specific objectives and desired outcomes of the tools. The following table (Table 7) outlines the tool evaluation criteria, and the types of indicators used.

Each tool was assessed by the research participants in terms of its contribution to practical and achievable pathways for improvement, not as a means for performance assessment. In this sense, the benchmark for the effectiveness of the tools trialed was the extent to which they met the (subjective) needs of the community in addressing an area of common concern. In each case, the tools were evaluated through the use of established methods, appropriate to the tool and context. This included participant feedback, surveys, interviews, technical peer review, facilitated workshops and focus groups, structured observation and content analysis. The use of participant evaluation, whilst consistent with the aims of PAR, does limit the extent to which the findings from the research are generalisable beyond the specifics of the trial.
Monitoring and evaluation activities in the project were also limited by its duration, and the limited opportunity to observe longer term impacts of the PAR on water management or the community. The broad-scale targeting of awareness raising activities across several communities in the Tiwi Islands meant that only the Tiwi Land Rangers, with multiple interactions as co-facilitators, were well placed to provide regular and deliberative feedback on tool effectiveness and appropriateness.

Ideally, a project such as this would have capacity for a follow-up evaluation of social learning outcomes and how the work contributed in concrete ways to statutory water plans. Part of the success of this type of research relies on the co-development or communication of the project methods to participants to enable them to continue to apply aspects of the methods for ongoing improvement. In this case, the evidence of long term outcomes, such as improvements to the quality of the water plans themselves, is speculative. This limitation to PAR has been similarly observed when it is conducted as a ‘project’ style intervention, rather than an integrated and systemic approach to continual policy improvement through social learning (Ison 2010).

5.0 Lessons for researchers

5.1 Clarity of roles and responsibilities

The preparatory work in this project, although extensive and comprising a third of the time for the field work as a whole, was essential for establishing the parameters of the research and community participation. It confirmed that deliberation and negotiation with participants in PAR is vital for establishing a ‘social contract’ for conducting this type of research. Both ethically and practically, affected stakeholders must have sufficient understanding of the risks associated with this type of research, and the
onus is on the researcher to ensure their participation is informed and consensual. In exchange for community participation, the mode of engagement required of the researcher places a much higher emphasis on the provision of information, early engagement, agreed objectives and transparency of process than would be required of more traditional research approaches.

5.2 Project management and relationship to research funders

The dynamic and reflexive nature of action research poses challenges to standard contractual and milestone reporting arrangements generally required of funded research. A first lesson is that it is essential for funding bodies to maintain a flexible approach to reporting requirements and administrative responsibilities, such that the fluidity of the research process is balanced with financial accountability. Second, it is highly desirable to have expertise within the team for contract (re-)negotiation, or to have ready access to this. In exchange, funders can be confident of research outcomes that are targeted, demonstrable, and able to feed directly back into practical improvements.

5.3 Resource requirements of Participatory Action Research

The PAR method is time and resource intensive, and involves a high degree of personal investment on behalf of the researcher. It requires researchers to develop close working relationships with participants. This necessitated weekly meetings with water planners, either face to face or by telephone, in each of the case study areas. It also required researchers to develop good working relationships with other funders, external research providers and an ability to work in a constantly evolving policy
landscape. Considerable time was allocated to communicate findings to participant agencies and stakeholders, and for evaluation of the specific tools developed.

As social learning processes are resource intensive, it is essential that issues addressed are of high priority to agencies and stakeholders and carefully delimited. This is conducive to shared ownership of and commitment to the process and outcomes and enhances the likelihood of implementation of the findings.

5.4 Sensitivity to stakeholder needs versus research needs

In general PAR requires sensitivity to the relationship between ‘insiders’ (the participants or owners of the issue, in this case government and community) and ‘outsiders’ (the project research team). This extends to expected outcomes of PAR activity, and should recognise that what constitutes ‘success’ in the conduct of a project is likely to differ between these two roles. Success for ‘insiders’ may be gauged by the extent that material improvements result from the work. By contrast, a successful project outcome from a researcher’s perspective is more likely to be measured against the extent to which the work allows for an original contribution to a peer-reviewed body of scholarship. These outcomes are not mutually assured, and the greater the investment in producing community valued outcomes, the less time that is available for ensuring that work meets the quite different standards demanded of academic outcomes. In some cases the action-researcher may need to make a deliberate decision to trade-off one for the other, as long as this is ethically defensible and within the expectations of the project funder.
Additionally, government agencies may have particular sensitivities to the intervention of researchers given the politically reactive nature of water planning. While some are open to having areas of improvement identified by the research, and are fairly relaxed about publication of research results, others have a more risk-averse approach and desired editorial role. This is a particular challenge where personnel change in either agencies or the project team require relationships to be rebuilt. To guard against any disruptions to publishing results, the Memorandum of Understanding entered into should provide for research neutrality. In this research, agencies were given the opportunity to comment on reports or papers before publication and corrections on factual matters were accepted.

The Water Planning Tools project used a number of strategies to balance between the expectations of the research team and potential users of the research outcomes. Initially, a Knowledge and Adoption (K&A) strategy was developed prior to the commencement of the research to identify preferred communication techniques and products tailored for the different target audiences, including water planning agencies, community stakeholders and the academic community. Professional communication consultants were retained to assist in the production and implementation of this strategy. As a consequence, research findings were presented in multiple publishing formats, and all publications for a wider audience were reviewed by a professional science communication editor. Additional project funding was reserved at the outset for the implementation of the knowledge and adoption strategy, in recognition of the importance of this aspect of PAR in the execution of a successful project.

5.5 Researcher or facilitator of research?
Much of the work for a PAR researcher consists of co-ordination of multiple activities and contributors, facilitation of dialogue and knowledge exchange between participants, and organisational tasks to maintain the structure and cohesion of the process. This ‘action’ component can become all-consuming, and certainly tends to dominate the action-research equation in practice. The role of the ‘researcher’ can seem more that of a facilitator of a research and learning process, particularly if the nature of the learning is about eliciting and documenting values and knowledge held by participants. Whilst this need not be construed negatively, it does diminish the extent to which the contribution to research activity is able to meet traditional requirements of academic scholarship.

6.0 Conclusion

Participatory Action Research has a number of strengths, particularly in its capacity to provide robust real world application and testing of in-principle research findings and to ensure that research activity responds directly to the needs of the participating stakeholders. For the Water Planning Tools project, PAR contributed directly to the success of the tool trials in three ways:

- Research interventions were specific and targeted at knowledge and information priorities that had been set by stakeholders themselves, providing policy and stakeholder relevant contributions;
- The integration of the research in the planning process expanded the opportunities for stakeholder engagement; and
As a result of participant evaluation, tools were able to be assessed against additional evaluation criteria, including their contribution to social process and stakeholder acceptability.

Access to the dynamic research setting provided immense value to the mixture of empirical and qualitative evidence gathered. Five key success factors were identified by the project team as enabling successful outcomes in this case:

1. the degree of negotiated access to the project setting;
2. the clarity of demarcation in roles and responsibilities between researchers and participants;
3. the commitment of time spent building and maintaining informal networks and relationships;
4. the extent of sensitivity to divergence in the expectations of ‘insiders’ (the participants or owners of the issue i.e. government and community) and ‘outsiders’ (the research project team); and
5. the scope for flexibility within the project plan to adapt timeframes and processes to suit the situation.

We suggest that the findings presented here have broad implications for conducting policy-salient water research, even if a PAR methodology is not adopted. Several of the techniques used in project could be adapted in future research initiatives. For example, the criteria developed for the selection of the case studies (Table 1) highlight the importance of considering potential risks and pragmatic issues when determining the appropriateness of PAR methods. In addition, providing research participants with a projected overview of the stages of the research (Table 4) clarifies the opportunities
for participation and involvement in the research process and assists in demonstrating
the linkages between staged research findings and practice changes. Working with
stakeholders to develop research principles for the conduct of research (Table 5) and
the criteria to be used to assess and evaluate research success (Table 7) are additional
stakeholder engagement pathways that are frequently overlooked in the conduct of
research. Although the method outlined in this paper is project-specific, the general
research framework articulated in this research can be used to scaffold future water
research initiatives.

There are notable similarities between PAR as a research method and the practice of
water planning itself. Success in both areas is subject to the ability of a skilled
facilitator to bring together multiple stakeholders in a working relationship, and to
structure social learning experiences in order to improve practices. The issues and
constraints faced by PAR practitioners are analogous to issues and constraints of
planning. Whilst we would not advocate PAR as a necessary part of a planning and
adaptive management framework, it is clear that these lessons are relevant to planners,
particularly those who wish to understand how technical and community knowledge
can be better harnessed and integrated for improving water management.

REFERENCES

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Carmona, G., Molina, J.L., Bromley, J., Varela-Ortega, C., García-Aróstegui, J.L. 2011. Object-Oriented Bayesian Networks for Participatory Water Management: Two


Hoverman, S., Ayre, M. 2012. Methods and approaches to support Indigenous water planning: An example from the Tiwi Islands, Northern Territory, Australia. J. Hydrol. [online] URL: http://dx.doi.org/10.1016/j.jhydrol.2012.03.005


Figure 1

Legend
Case Study Areas

[Map of Australia showing regions labeled as Case Study Areas: Murray River, Cordamine, and Thi Islands]
### Selection Criteria

#### Category

- **Pragmatic issues**
  Criteria relate to the feasibility of the project and likelihood of successful outcomes
- **Relevant content**
  Criteria relate to the presence of key and targeted water planning challenges in the region
- **Risk factors**
  Criteria relate to the presence of risks within the pilot region that could impact on successful delivery

#### Criteria

<table>
<thead>
<tr>
<th>Selection Criteria Category</th>
<th>Criteria</th>
</tr>
</thead>
</table>
| **Pragmatic issues**        | - Support from state agencies  
- Access to stakeholders  
- Logistical access to location  
- Timing of planning process  
- Timeframes of planning process |
| **Relevant content**        | Pilot region is likely to include:  
- groundwater and surface water interconnections  
- Indigenous issues  
- urban–agricultural trade  
- overallocation and claw-back  
- inter-jurisdictional planning  
- integration and alignment of plans  
- integration of quality and quantity issues  
- interception issues  
- climate change issues |
| **Risk factors**            | - Level of conflict around decision  
- Extent of existing research in area  
- Adequacy of resource capacity in state agency to support trials  
- Political pressure on state agencies |
### Table 2

<table>
<thead>
<tr>
<th>Main Activity</th>
<th>Preparatory/Review Activity</th>
<th>Ongoing activity</th>
</tr>
</thead>
</table>

#### Method

1. Pilot study regions finalised
2. Conduct of water planners national survey
3. Context analysis of case study regions
4. Early issue identification and gap analysis
5. Development of tools
6. M & E framework developed
7. Conduct of pilots
8. Review of pilot progress
9. Synthesis of project outputs
10. Final Report

#### Expert Reference Panel

- Inception Meeting with Expert Reference Panel
- Meetings and review

#### Knowledge and Adoption

- Communication and Engagement Strategy
- Learning Strategy
- Decision-Support Strategy
<table>
<thead>
<tr>
<th>Case Study Profile</th>
<th>River Murray</th>
<th>Condamine</th>
<th>Tiwi Islands</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water Planning Jurisdiction</td>
<td>South Australia</td>
<td>Queensland</td>
<td>Northern Territory</td>
</tr>
<tr>
<td>Resource type</td>
<td>Surface water</td>
<td>Groundwater</td>
<td>Surface/Groundwater</td>
</tr>
<tr>
<td>Key Issues Identified</td>
<td>Social and economic impacts of changed water management regime</td>
<td>Overall allocation of groundwater resources</td>
<td>Alignment with traditional arrangements of resource governance</td>
</tr>
<tr>
<td></td>
<td>Incorporation of Indigenous values into planning</td>
<td>Access to credible technical information</td>
<td>Integration of traditional Indigenous knowledge with technical and science-based information</td>
</tr>
<tr>
<td></td>
<td>Transparency of tradeoffs for the allocation of water between competing uses (including environmental)</td>
<td>Adaptability to climate change and variability</td>
<td>Limited awareness of legal and administrative frameworks of water management</td>
</tr>
<tr>
<td>Planning Tools Trialled</td>
<td>Concept Modelling</td>
<td>Indigenous cultural mapping</td>
<td>Community workshops</td>
</tr>
<tr>
<td></td>
<td>Deliberative Multi-Criteria Evaluation</td>
<td>Intergenerational equity workshop</td>
<td>Visits to Country</td>
</tr>
<tr>
<td></td>
<td>Social Impact Assessment</td>
<td>Water Users Survey</td>
<td>3D Groundwater model</td>
</tr>
<tr>
<td></td>
<td>Cultural Value Assessment</td>
<td>Multi-Criteria Analysis</td>
<td>Participatory mapping</td>
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<tr>
<td></td>
<td></td>
<td>Water Users Survey</td>
<td>Capacity building workshops</td>
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<tr>
<td></td>
<td></td>
<td>Climate Risk Assessment</td>
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<tr>
<td>PAR Stage</td>
<td>Action</td>
<td>Explanation</td>
<td></td>
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<tr>
<td>Inquiry</td>
<td>1. Identify issues and needs</td>
<td>Each case study commenced with three inquiries: a stakeholder analysis; a gap analysis and a context analysis. These were conducted by the researcher in collaboration with the community to identify key issues or information gaps impacting on the water planning process.</td>
<td></td>
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<tr>
<td></td>
<td>2. Prioritise issues and needs for pilot program</td>
<td>Based on the findings from the two inquiries, issues and information gaps were prioritised through a community workshop or agency consultation, and a shortlist of tools to address these issues selected. These were then presented for review to the agencies, and between four and seven tools selected for pilot.</td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td>3. Form partnerships with collaborators and research teams</td>
<td>As water planning agencies were one of the major collaborators in this research, in each of the jurisdictions Memoranda of Understanding were entered into between the research team and the agency as a first step. Some tools also required partnerships with science providers from outside of the project team to provide input and collaboration.</td>
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<tr>
<td></td>
<td>4. Conduct pilot with appropriate monitoring</td>
<td>Tools were piloted in conjunction with the preparation or development of the water planning process. In each case, the process of the pilot was monitored using a consistent assessment framework.</td>
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</tr>
<tr>
<td>Reflection</td>
<td>5. Present findings</td>
<td>Outcomes from the pilots were presented to stakeholders for review and for consideration. Where appropriate, participants were able to suggest amendments to the interpretation of findings or to prompt areas for further clarification.</td>
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<tr>
<td></td>
<td>6. Review process</td>
<td>Each of the tools was subject to a summative review by all participants through surveys, facilitated discussions, interviews, focus groups or peer review, and most frequently a combination of these.</td>
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<td></td>
<td>7. Implement</td>
<td>Outcomes from the pilots were</td>
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<tr>
<td>Recommendations</td>
<td>disseminated to agencies and participants. Although the objective was to provide input directly related to the development of water plans, the findings were not implemented in all cases.</td>
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<tr>
<td>Inquiry</td>
<td>8. Identify any emergent issues and needs Reflection from each of the case studies allowed for areas of future investigation to be identified.</td>
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<tr>
<td>Main Objective</td>
<td>PAR Design Considerations</td>
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</table>
| Openness and compliance            | 1. The process should comply with statutory and national policy requirements.  
2. All relevant stakeholders should be able to participate in the pilot process.  
3. The process and its management should be transparent and lead to improved trade-offs in decision-making.  
4. The project team members are neutral and will work collaboratively with all stakeholders.                                                                 |
| Building social learning           | 5. The process should recognise the cultures, livelihood, identity and values of different stakeholders.  
6. The process should create prospects of gain and incentives for cooperation.                                                                                                           |
| Engaging or (interactive) participation | 7. Participation for stakeholders is voluntary.  
8. Agencies, once agreement is reached, should commit themselves to be involved to the pilot study.  
9. The process should offer stakeholders an exit option.  
10. The pilot should enhance stakeholder engagement in the water planning process.                                                                                                         |
| Time and resource responsiveness   | 11. Stakeholders should be engaged early in the pilot process.  
12. Time and resource commitments of stakeholders should be outlined before participation.  
13. The process should be time and cost effective.                                                                                                                                 |
| Tailored to the issues             | 14. The roles of scientific and technical experts and stakeholders in trial of tools should be clear.  
15. How tools are to be used, and for what purpose should be made clear to participants.                                                                                                           |
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Table 6
<table>
<thead>
<tr>
<th>M&amp;E Theme</th>
<th>Description</th>
<th>Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process</td>
<td>Assessing the extent to which the tool contributed to the process objectives of water planning to facilitate community involvement and consider public benefits in an open and transparent manner</td>
<td>Contribution of the tool to representative participation, inclusivity, transparency, conflict resolution, fairness, flexibility, communication, deliberation and facilitation</td>
</tr>
<tr>
<td>Technical Quality</td>
<td>Assessing the extent to which the tool allowed for the inclusion of best available knowledge and socio-economic analysis in the planning process</td>
<td>Best available knowledge, range of information sources, integration of knowledge, legitimacy and defensibility</td>
</tr>
<tr>
<td>Stakeholder Outcomes</td>
<td>Assessing the extent to which the tool contributed to changes amongst stakeholders relevant to water planning and management</td>
<td>Changes to stakeholder knowledge, relationships, motivation, attitudes and practices</td>
</tr>
<tr>
<td>Water Planning Outcomes</td>
<td>Assessing the extent to which the tool contributed to the improvement of the water plan</td>
<td>Contribution to the effectiveness, efficiency, legitimacy, public endorsement and stated objectives of the water plan</td>
</tr>
</tbody>
</table>
Highlights:

- Participatory action research (PAR) was used to trial engagement tools.
- The method ensured the trials addressed specific in-situ water planning issues.
- PAR directed the research towards policy and stakeholder relevant outcomes.
- In contested political contexts, PAR requires expert-level skills in facilitation.