TOWARDS MORE EFFECTIVE INTEGRATED WATERSHED MANAGEMENT IN AUSTRALIA: RESULTS OF A NATIONAL SURVEY, AND IMPLICATIONS FOR URBAN CATCHMENT MANAGEMENT

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Introduction

This paper reports findings of a consultants' study of the effectiveness of catchment management undertaken for the Commonwealth Department of Primary Industries and Energy in 1994-5 (AACM and Centre for Water Policy Research, 1995). Integrated Catchment Management (ICM) (or Integrated Resources Management (IRM)) is an approach to natural resources management strongly supported by both national and State governments. In this study the term IRM was used rather than ICM. IRM more accurately captures the comprehensive approach that is being applied to natural resources management in regions of Australia where overland flows characterises ecosystem functioning (that is river basins), and bioregions in lower rainfall regimes where ecosystem functioning is characterised by episodic events, and the rainfall/runoff regime is more dynamic and stochastic. For the purpose of this study, IRM was defined as,

'The co-ordinated management of land and water resources within a region, with the objectives of controlling and/or conserving the water resource, ensuring biodiversity, minimising land degradation, and achieving specified and agreed land and water management and social objectives'. (AACM and Centre for Water Policy Research, 1995)

Aim of the Study

The aim of the study was to analyse the range of policies, programs and activities relevant to catchment management, assess the effectiveness of these approaches and identify key areas for advancing Commonwealth interests in the use of catchment management processes to achieve natural resource management objectives.

Methods

Four Tasks were undertaken in the project:

- assessment of the strengths and weaknesses of current catchment management policies and programs from the perspective of catchment management as a process for achieving specific natural resource management outcomes, such as improved water quality, land and vegetation management and coastal zone management;
- assessment of the effectiveness of catchment management activities, including relevant projects funded under the National Landcare Program (NLP), in meeting natural resource management objectives and identify factors affecting the efficiency and effectiveness of individual projects and catchment management approaches;
- providing advice on key areas for advancingCommonwealth interests in the use of catchment management to achieve national interest outcomes in natural resource management; and
- providing advice on objectives and criteria for future NLP catchment management projects to achieve the sustainable use and management of land, water and vegetation resources.

These tasks were undertaken by assessing catchment management **activities** (the 'bottom-up' initiatives in each state), and catchment management **policies** (the 'top-down' initiatives in each state). ICM literature was reviewed to form a conceptual framework for the investigation of the effectiveness of catchment management.

Catchment management policies in Australia were reviewed by undertaking:

- structured and non-structured interviews of resource management agency staff in headquarters and regional offices of relevant agencies in each State and Territory of Australia (the A.C.T. was ignored due to the relative small size); and
- a small number of non-structured telephone interviews and discussions.

The 'corporate interview technique' of Schoenberger (1991) was used in these interviews. This involved asking direct and leading questions believed to be critical to the formation and implementation of effective government policies and programmes in catchment management, and undertaking a SWOT analysis with interviewees. Usually one person was interviewed at a time, although some agencies set up 2 - 8 interviews in a group interview situation. The interview questions relied on:

- The belief that an integrated approach to natural resources management in catchments was a precursor to effective catchment management.

- Three previous studies reviewing catchment management. These included a review of ICM processes, strategies and options for performance measurement in ICM and a review of ICM in Western Australia.

- International reviews and research in catchment management, including a global review of ICM, a review of institutional processes and arrangements for ICM, and a national review of institutional arrangements for water resources management.

The results of the interviews and discussions were analysed to assess the strengths and weaknesses of current catchment management policies and programs, from the perspective of catchment management as a process for achieving specific natural resource management outcomes such as improved water quality, land and vegetation management.

Outcomes of the Study

Results of a the study revealed that **the philosophy and products of integrated approaches were well understood.** However, there remain **significant process problems** in implementing integrated approaches. Several process issues emerged, including:

- Problems related to the lack of co-ordination;
- The need to help community catchment management groups mature;
- Confusion between bottom-up consultation and community participation and top down policy and government investment;
- The lack of integration of economic development with ecological management;
- Institutional barriers to effective integration; and
- The effectiveness of local community institutions.

The study developed Guiding Principles for enhancing catchment management, and made several recommendations to the Department of Primary Industries and Energy. Results of the study were presented in a Final Report which was distributed widely to natural resources management agencies at the Commonwealth level for comment.

Guiding Principles

Based on the outcomes of the implementation activity and policy reviews, a series of guiding principles were identified which succinctly define the critical factors for successful integrated resource management (Table 1). These are developed further in the discussion of options for change that follows.

Recommended Options for Change

The following options for change were identified from the review of catchment planning policies and activities across Australia. The options were presented in a generic form in the interim report to encourage debate and comment from the resource management community. These options provide a set of opportunities which are the elements for evolutionary change.

In the short-term - within the next 3 years - the study identified opportunities to implement:-

- priority planning and investment framework processes;
- linkages between regional economic development and integrated resource management;
- co-financed catchment management partnerships; and
- a contractual basis for Commonwealth co-finance investment in integrated resource management.

In the medium-term - within the next 10 years - the study identified opportunities to introduce:-

- regional financial management and program administration systems; and
- market based systems for resource allocation and valuation.

Investment Strategy to Achieve National Interests

The study found that there is an opportunity to develop **a national Integrated Resource Management Investment Strategy** to establish a framework for public sector investment in natural resource management. The strategy would ideally:-

- be developed through an on-going process which included community, local government and state agency consultation;
- have an effective period of three years - to fit budget and government cycles;
- identify and give priority ranking to problems and solutions which would receive national investment support during the life of the investment strategy;
- identify the split between public and private benefits for each component as a guide for co-financing cost sharing arrangements between regional groups and the Commonwealth
- state the national interest outcomes expected to result from the investments;
- identify independently verifiable indicators for the evaluation of outcomes; and
- outline the mechanism to account for national investment received.

Table 1. Guiding principles for s uccessful integrated resource management

CLEAR INVESTMENT FRAMEWORK A national Integrated Resource Management Investment Strategy, based on resource economics, which clearly establishes priorities for Commonwealth and State investment in natural resource management as a framework for regional resource management planning activities.
CYCLICAL RESOURCE MANAGEMENT PROCESS A cyclical approach to planning which uses rolling renewal of programs to allow dynamic responses to changing priorities and community perceptions whilst demonstrating a long-term commitment to integrated resource management.
COST SHARING FOR CO-MANAGEMENT PARTNERSHIPS Clear co-financing of resource management activities on the land to establish a strong foundation for co-management partnerships between government and individuals. Use of resource economics to allocate public and private costs and benefits for different resource management activities.
CONTRACT FOR ACTION Contracts - between incorporated community groups and landholders, technical services agencies, local government and public sector investment programs - lead to open and sustainable co-financed management partnerships. Contracts would involve the development of appropriate cost-sharing, co-financing and co-management arrangements.
MULTI-DISCIPLINARY TEAM APPROACH Multi-disciplinary teams provide a means of integrating different skills, and establishing working relationships and communication between and within different government agencies. This approach integrates institutions horizontally and vertically.
STRENGTHEN WITH LEGISLATIVE FRAMEWORKS A legislative framework is required to strengthen and formalise the process for coordination and management of resource management investments. It also provides a mechanism of last resort for minimising risks affecting outcomes expected from Commonwealth investments in integrated resource management.

It was proposed in the study that these strategies would cross portfolio boundaries to allow for effective integration, but recognise likely funding allocations for various program outcomes. For example, an integrated resource management investment strategy might identify sustainable management of Aboriginal land as an investment priority. This might include soil conservation components (perhaps funded through NLP/DPIE), training and community development components (perhaps funded through ATSIC), biodiversity conservation components (perhaps funded through ANCA/DEST), and employment and work skill components (perhaps funded through DEET).

In addition there may be enterprise and community development components which may be funded by the Aboriginal community or Land Councils directly. Similarly, in other regions co-funding arrangements could include local government and individual beneficiaries.

Integrated resource management investment strategies would include regional socio-economic and ecological variations and would focus on activities at a river basin or regional scale.

Define a Process for Investment in Integrated Resource Management

There study found a need for Commonwealth investment in integrated resource management - across all portfolios - to be clearly linked to a process which links the philosophy of integration with products which meet national and regional needs. The process needs to be clearly defined and sufficiently generic to be applicable across Australia.

While there is general agreement in Australia on the philosophy and products of integrated resource management, there is both confusion, ignorance and uncertainty of how an integrated resource management process should be put into practice. A set of guiding principles is useful, but what would be of more use is the development of core processes - a **set of best management practice guidelines for integrated resource management** be developed. The study recommended that this should be developed at scales no smaller than river basins or bioregions as developed by the appropriate Commonwealth agencies.

The study identified an opportunity to develop a sustainable process with the following core elements:-

- clear identification of an investment framework which uses resource economics and national policies to define national resource management interests - across all portfolios - over a three year planning horizon;
- a cyclical approach to planning which uses rolling renewal of programs to allow dynamic responses to changing priorities and community perceptions, whilst demonstrating a long-term commitment to integrated resource management;
- broad allocation of public and private responsibilities for each component of the investment strategy;
- integration of national investment priorities and regional needs, by regional institutions and local communities, through planning of detailed resource management activities (for example in regional land and water management plans) within the national priority and co-financing framework;
- allocation of national funds directly to regional groups according to co-management partnership agreements confirmed in writing between Commonwealth and regional authorities;
- allocation of responsibilities for implementation in co-management partnership agreements;
- monitoring of implementation activities according to agreed evaluation indicators relevant to each component of the investment strategy; and
- annual reporting of progress, lessons learned, and regional resource conditions for integration with national State of the Environment reporting activities.

Some of these elements already exist at Commonwealth or State levels but they are not integrated across portfolios and there is not a formal framework which clearly outlines the national interest as a guide for regional communities

Invest in a Contract System

The study also identified an opportunity to develop a process which enables incorporated community groups to receive and account for national integrated resource management investment directly from the Commonwealth. In this way such groups could combine their funds with Commonwealth funds to create a co-financed integrated resource management program which clearly allocates public and private responsibilities for resource management.

One practical component of the proposed process could be negotiation of contracts or agreements between the incorporated community groups and landholders, technical services agencies, local government and public sector investment programs. Modifications of this approach have already been tried with apparent success. Landholders appreciate the openness of this approach. A contractual process for cost sharing leads to open and sustainable co-financed management partnerships.

Contracts would involve the development of appropriate cost-sharing, co-financing and co-management arrangements. These arrangements should be linked to a process of annual reporting that will allow the Commonwealth and participating regional institutions to monitor the effectiveness of their investment. This process is particularly important to allow increased investment in field works and direct resource management actions on farms and other land. This, in turn, encourages greater ownership of integrated resource management by regional communities.

The basic tenant for a successful contractual approach to resource management is the development of Regional Natural Resource Management Plans by Regional Integrated Management Committees. These are developed on guidelines that require community participation and agreement, technical rigour by agency staff, economic evaluation of cost and benefits of programs, determination of the regional priorities in terms of regional resource management needs, community support as identified in co-financing or cost sharing arrangements and relevance to regional sustainable development.

Contractual Arrangements to fund the implementation of the Regional Plan would be negotiated between the Commonwealth and Regional Committee once the Plan was endorsed by the State Government.

Contractual arrangements to implement the priority programs of the plan would be entered into between the Regional Committee and State Agencies for technical support, consultants, local government and industry to achieve the most effective utilisation of resources and to negotiate other co-financing arrangements.

Institutional Linkages - Communication and Process

Integrated Resource Management is weakened by poor inter-institutional communication and by ineffective linkages between bottom-up community participation and top-down policy and public investment components.

There are opportunities to overcome these weaknesses by strengthening the focus of resource management investments through integrated resource management processes which include:-

- multi-disciplinary problem solving and resource planning teams;
- regional resource management institutions which combine the skills and resources of state government agencies, local government, industry groups, and catchment communities;
- allocation of public funds for implementation of field activities proportional to the public interest; and
- co-financed partnerships for co-management of natural resources.

Multi-disciplinary teams provide a means of integrating different skills, and establishing working relationships and communication between different government agencies. This approach integrates institutions horizontally and vertically. Whilst in many regions of Australia this approach is used in an informal way, it is rarely adopted as a formal component of the integrated catchment management process.

Regional resource management institutions provide the most effective linkage between bottom-up and top-down flows of information and resources. Successful integrated resource management relies on effective and planned integration of community participation and public policy and investment. There is an opportunity to build on the experience in Victoria (*Catchment and Land Protection Act* (Vic., 1994)); and New Zealand (*Natural Resource Management Act* (NZ, 1991)) to establish the regulatory and socio-economic institutional frameworks required for sustainable investment in integrated resource management. The community participation and socio-economic framework experience from South Australia (*Soil Conservation and Landcare Act* (SA, 1989)) also provides useful lessons for integrated resource management.

With these institutional requirements in place, it is possible to allocate national investments - from a range of portfolios - directly to incorporated regional resource management institutions. In this way these regional institutions:-

- integrate field activities implemented by community groups, landholders, local government, state government agencies, and other resource users;
- clearly allocate national investment funds as the public sector contribution in proportion to national benefits or interests;
- provide an avenue for regional and local co-financing of resource management activities; and
- act as a broker between different Commonwealth, state and regional programs.

Develop Integrated, Cross-Portfolio, Policy Frameworks

There are currently three significant levels of institutional involvement in integrated resource management - Commonwealth, State and Regional (including Local Government). There is very little horizontal or vertical integration between these institutional structures.

There are opportunities to change this by integrating policy frameworks and institutional structures at the top

(Commonwealth) or bottom (regional) levels. Integration in the middle (State) level without concurrent integration at top or bottom levels will not result in integrated resource management. Given the powerful incentive for change which national investment presents, the most efficient opportunity for change is likely to be integration of Commonwealth policy frameworks and institutional structures.

The study found that an opportunity exists to develop cross-portfolio policy frameworks which integrate national resource management interests across Commonwealth portfolios and programs. These actions should aim to eliminate contradictory messages to regional Australia, and the States, about Commonwealth priorities and national interests for investment in integrated resource management.

Opportunities exist for DPIE, DEST, DEET and ATSIC to develop joint initiatives and co-financing agreements for various components of an agreed national integrated resource investment strategy. This approach will also provide government with a mechanism, associated with the proposed contractual system, in which it can account for funding programs believed to be in the national interest in natural resources management.

Implications of the Study for Urban Catchment Management

These recommendations provide an overall framework in which catchment management can be implemented more effectively in Australia, in both rural and urban catchments. The study found, however, that implementation of urban catchment management processes are affected by a number of unique issues. These include:

The Rural Catchment Management Template - Is It Inappropriate to Urban Catchments?

Urban catchments are characterised by large populations, the majority of which may not claim any allegiance to the geographical area designated as the catchment in which they reside or work. Many of the population may work in the catchment but reside elsewhere. There are a numerous stakeholders in an urban catchment and it is often difficult to co-ordinate their interests and competing demands. Rural catchment management in Australia has been able to capture the interest of the relatively smaller number of catchment landowners, and harness their interests into collaborative team building and management strategies. In urban catchments, the sheer number of potential stakeholders appears to overwhelm catchment managers, and more clearly defined administrative frameworks and methods for community participation are needed. The Clean-Up Australia campaign offers one example of an effective strategy to harness community values towards the environment and use them towards effective on the ground action.

Catchment Management or Ecosystem Restoration?

Many urban catchments are highly developed with few if any areas remaining as remnant bushland and open space. Even remnant bushland areas reveal significant alteration of the original ecosystems with the invasion of exotic fauna and flora. Some urban catchments in Sydney are so highly altered that river flow is completely channelised and there are few opportunities to improve the riparian zone without major infrastructure refurbishment. These features suggest that the focus of urban catchment management should be to restore ecosystem functioning rather than focus on land and water management per se. In highly built environments, the opportunity exists to develop strategies through planning codes to monitor further development of the built environment, and to force the recreation of original ecosystems. This approach remains a major challenge for urban catchment management today.

Many Administrators, Environmental Laws and Regulations.

Urban areas have traditionally been the focus of a plethora of different administrative arrangements for land and water management. These are primarily regulatory functions such as the provision of water utilities (potable water supply, stormwater management, and sewage systems) and land management functions such as land use zoning, rating of land parcels, and reviewing building applications. Urban councils and city utility authorities play a major role in environmental management of urban catchments. Their role is extremely important to improved catchment management, and the future of catchment management will involve increased integration or local government powers and practices at the regional level to achieve effective catchment management.

Conclusion

This paper has described a new investment framework in Australia for catchment management, one that can be applied to urban areas. The challenge remains, however, to develop more effective integrated approaches to resource management in urban areas, knowing the unique characteristics of urban catchments.

There is a growing awareness of the need to have visionary thinking regarding urban catchment management. A new National Vision for Catchment Management is needed in Australia, and this was provided in the Final Report of the study discussed above.

This vision suggests that **catchment management in Australia must be undertaken on a bioregional, integrated, systems-based, strategic basis. It should be stakeholder driven, with clearly identified roles of regional communities and resource management agencies.**

In urban catchments, a Best Practice Management (BMP) approach is needed, one sees the need for increasing unity and interdependence of all elements of design and operation in resource management projects in urban areas. BMP assumes that technical excellence must be coupled with a commitment to environmental responsibility.

Four perspectives are needed:

- **Correct scale:** Planners and managers should focus on the small to medium scale of most resource users: for example, small family businesses, suburban residential allotments, larger scale residential developments, and large corporate firms. If this perspective is ignored, it is "business as usual" without effective natural resource management by the individual or business.

- **A best technical (?) management approach:** Previous approaches commonly focus on Best *Technical* Management, that is the best technology to solve a particular environmental management problem. This approach may be best for the resource, may be best for the agency, yet not good for the resource manager. It may not fit the technical expertise of an urban dweller, nor his/her financial capability, nor his/her type of urban land use. Consequently, new technologies should be adapted to suit individual, local needs, if thorough adoption is sought.

- Congruence and accountability: The policy directions set by agencies can be different to the policies and programmes of other government agencies and resource managers. There needs to be shared goals, parallel management processes, and clear links established between these groups, to produce what Lee (1992) calls *congruence*, to achieve 'ecologically effective social organisations'. The use of contractual arrangements between resource management agencies and practitioners offers one way of improving congruence. This includes reporting the performance achievements in bioregional natural resources management by regional communities who have contracted with a government funding agency. Benchmarks for success will need to be established in this approach.

- **A task force/teamwork approach:** A Task Force could identify appropriate organisational arrangements to produce congruent outcomes between policy-makers, planners and stakeholders in an urban catchment. A Task Force could identify the most appropriate range of incentives to be used (tax relief, direct payments through subsidies etc.), by using the expertise and involvement of all natural resources management decision-makers. New Trusts (such as the Hawkesbury-Nepean Catchment Management Trust) could take on this role.

Indicators of Success

Integrated resources management is explicitly appealing. It suggests that if a more comprehensive group of resources and resource management issues are examined simultaneously, then more effective resource management outcomes will be achieved. However, while this attraction exists, and has stimulated innovation in Australian catchment management, it is yet to be determined how feasible and what are the effective gains that can be made using IRM.

Two sets of indicators are needed:

- *Multi-dimensional indicators of changes to ecosystem health:* While one-dimensional indicators of catchment health have been developed, such as stream quality measures, indicators of and techniques to measure total system health are still needed. An IRM approach uses a range of 'system health' indicators, for example, biodiversity, riparian vegetation ecosystem condition, geomorphological condition.

- *Indicators of social and economic gains:* The need exists to develop useful indicators of changes in economic and social conditions in bioregions, that are linked to incremental gains in ecosystem health. This is important to urban catchments where changes in the built environment (for example, large-scale business development) are reflected in changing social conditions of urban residents and workers.

Despite these difficulties, urban catchment management in Australia is progressing and its participative, stakeholder-driven, regulatory approach is showing signs of limited success, equal to those in similar highly developed societies of the world.

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