

## **BUILDING A CATCHMENT INFORMATION EXCHANGE PROGRAM (CIEP), AUSTRALIA CASE # 26**

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The Catchment Information Exchange Program is a knowledge management program for watershed managers. This case study describes a prototype information exchange process allows water resources management professionals and users to exchange best practice information for land and water management for different parts of a watershed, catchment or river basin (that is, it can be applied at many different scales). The case also points out some of the institutional barriers to such exchange programmes.

### **ABSTRACT**

#### **Description**

Information access and exchange for catchment management is problematic. There are problems about how people use information in decision-making, who makes the decisions, and how should information be organised, located and accessed to help decision makers. There is a lot of uncertainty about how catchment management organisations (like Catchment Management Authorities, Committees and Trusts) access, use, exchange and spread information to people in their catchment. The solution developed in this project was to develop and test a prototype catchment information exchange. It involved integrating information from many sources, providing it to decision makers in a simple, straightforward way, and providing people with a facility to easily share their ideas about the information.

The components of a Catchment Education and Information Exchange Program (CIEP) are:

- A User Guide
- An interactive community education program
- A catchment information centre
- A 1800-Catchment phone link
- Legal guidelines for information management
- Institutional arrangements for information management and setting up a CIEP
- Regional libraries for safe deposits of catchment material
- A catchment Information System (CIS).

While there have been many products produced such as GIS and databases (mainly held by government agencies), there has been little similar activity replicated elsewhere.

#### **Lessons learned**

There are substantial institutional and social issues which can be are effective barriers to immediate implementation of an information exchange programme. These include:

- lack of coordination mechanisms,
- lack of long term funding,
- lack of leadership to build regional information exchange protocols and processes, institutional lethargy,
- the scepticism by government of farmers' best practices,
- loss of scientific ownership of project results by researchers,
- unwillingness to handle co-managed, co-owned information management systems

But in the catchments where the programme was piloted there was considerable enthusiasm. A critical issue is to get a long-term sustained funding mechanism in place to enable expansion of the programme.

## **Importance of the case to IWRM**

This case provides an interesting example of how to facilitate information exchange and support communities and catchment management organisations in developing IWRM type strategies in a participatory manner.

## **Main tools used**

The case illustrates the following ToolBox tools:

C8.1 and C8.2 – Information management systems and data sharing  
2 Communication with stakeholders

B2.4 Knowledge sharing

C4.4 Communication with stakeholders

## **MAIN TEXT**

### **1 Background**

#### **Problem of handling information**

The initial motivation was to improve the adoption of best management practices (BMPs) derived in research projects funded by government. The BMPs were for the management of dryland salinity, flooding, soil erosion and water quality management.

Specifically, the Catchment Information Exchange Programme aimed to address the fact that while there is a large quantity of information available, managing it is problematic. It was felt that catchment management organisations and other catchment stakeholders, such as Local Government organisations and regional State Government resource management agency personnel, were finding it difficult to handle the growing amounts of biophysical, social and economic information in their decision-making processes. The information load is meant to facilitate their resource allocation and planning decisions yet there are major difficulties in the effective application of this information. A social science perspective in catchment management planning was thought to add new understandings to information management problems, by focusing on the human elements of the management and planning dimensions of the problem. However, there were and still are problems specific to the handling of social and economic information, and a weak understanding of the institutional arrangements needed to manage information at the catchment level.

The objectives of the project were to develop information management processes (including a conceptual framework and tools) capable of integrating social, behavioural, economic and biophysical information into a form readily usable by catchment and other resource managers. The information management processes would enable such managers to respond adequately to natural resource management issues.

### **2 Decisions and Actions taken**

#### **Defining the problem**

The problem statement was developed in a stakeholder workshop. In summary, the **critical problem** can be stated as:

*Catchment and other resource managers do not have the information and skills (data, knowledge, models, human resources) to integrate and to adequately respond to natural resource management issues, especially with respect to appropriate resource use. In addition, the volume of information is increasing, the reliability of the information is not being tested, and there are few processes in place to deliver the information to end-users. Furthermore, there are uncertainties regarding the institutional arrangements governing catchment management organisations and their role in information dissemination. It is imperative that decision-making by these organisations is understood before effective information management systems can be designed to assist them.*

Five key testable conclusions ('hypotheses') were developed at the workshop and became the basis of work in the project:

- 1) There is no single catchment management decision-maker in a catchment, and this affects information management
- 2) The role of catchment management organisations (like the Liverpool Plains Land Management Committee at a rural case study site in New South Wales, Australia) in information management is poorly defined, as they are one of several information providers and catchment management decision-makers.
- 3) The dissemination of information about natural resources management in a catchment (including output from research projects) involves a complex, interacting and dynamic set

of flow paths (channels) between nodes (individuals and organisations). For example, information flow paths in any catchment may be of these types:

- between farmers,
  - between farmers and public and private consultants/extension agents,
  - between the catchment management organisation, farmers and Local Government, and
  - Commonwealth and State Government.
- 4) Information management by catchment management organisations is constrained by current institutional arrangements for catchment management. The organisational structures by which catchment management organisations have been established impede information flows because of lack of governance and clear jurisdiction and mandate, and an alternative structure should be tested.

Finally, it was concluded that information flows in a catchment would be facilitated by CIEP. This comprises an information delivery system which includes:

- Co-ordinated support programs for farmers and Local and State Government agency staff (peer-led adult education through one-to-one learning, leadership training programs, conflict resolution training, co-ordination of Landcare programs),
- Linking information flows to conservation partnership agreements (which are contracts between farmers, catchment management organisations and governments to achieve conservation goals) supported by geo-referenced interactive databases and modelling,
- Protocols for information management (addressing legal liability, reliability, ownership and copyright, and freedom of information issues),
- A community-based catchment information centre (which contains information repositories such as atlases and indexes, and operates a farmer phone-in service, a Website and farmer server, community education programmes and conservation partnership agreements);
- A toolkit of models and databases including information technologies, landuse and other modelling tools (such as 'what if' models to analyse catchment management policies and which integrate social and economic information with biophysical information about land and landuse), interactive databases, an interactive geographic information system, and catchment visualisation technology.

## **Developing the Catchment Information Exchange Programme**

The first step was to form project reference groups in the two Australian catchments where the project was undertaken. These groups comprised members of the community-based catchment management organisations in those areas, to advise on the project's management, design and outcomes. Other actions included a survey of current information management practices and institutional arrangements for catchment management in two catchments, design, development and testing of a prototype catchment information system and expansion into a CIEP with the project reference groups and an evaluation of the effectiveness of the CIEP in the two catchments.

Other organisations involved in the project were the Queensland Department of Natural Resources, which provided modelling support for the Catchment Information System component. The University of Queensland housed the project and provided technical support to the publication of the project outcomes on a CD-ROM. Land and Water Australia provided support subsequent to the project to fund the project's principal investigator, Bruce Hooper, to run workshops on the CIEP throughout Australia and publish the CIEP on the World Wide Web (at [www.catchment.com/CIShome](http://www.catchment.com/CIShome))

The case study was developed as a prototype during 1996-1999. The prototype was field tested in the three catchments (1998) and an Australia-wide workshop program was promote the CIEP (2000). The prototype was published as a resource on the World Wide Web ([www.catchment.com/CIShome](http://www.catchment.com/CIShome)) (2000). Recommendations were made to national government on how to implement the prototype which are currently under review (as at 11/2001).

The cost of implementing a CIEP is approximately (US\$40000) per river basin, comprising \$30000 staffing costs (information manger), and \$10000 software and hardware development, training workshops). The CIEP is owned and managed by a cost-sharing arrangement between

catchment management organisations, Local and State Government, Landcare Groups and private sector interests. Alternatively, it could be owned and managed solely by a government agency as an in-house tool and/or have various levels of stakeholder accessibility.

## Components of the CIEP

The Catchment Information Exchange Program comprises:

- A User Guide,
- An interactive community education program,
- A catchment information centre,
- An 1800-Catchment phone link,
- Legal guidelines for information management, institutional arrangements for information management and setting up a CIEP, regional libraries for safe deposits of catchment material, and a Catchment Information System, comprising land use modelling and decision support, interactive web pages and searchable databases, and a geographical information systems (electronic maps).

Features of the catchment information system on the World Wide Web include a searchable, interactive, relational database allowing easy access to information on management of specific land types in a subcatchment. The database:

- locates and retrieve reports and links the user to the right person and their knowledge.
- Identifies best management options based on prescribed criteria and sound technical, social and economic judgements.

The search method uses a combination of a *keyword*, a subcatchment name, and a catchment land type (e.g. how to manage *salinised* land). There is also a Joint Discussion facility to provide instant and ongoing feedback by people in a catchment and/or a catchment organisation about the information provided. The feedback is catalogued in a database which is searchable on the web. This allows a growing archive of comments on catchment management options.

The World Wide Web allows people to transfer data and information over big distances quickly, and be accessed even from remote locations. Thus a farmer in a remote part of a river valley can provide information to government on how to manage a type of country, and government can link this information to the best science, and make sound policy decisions, and provide the farmer with best advice. It also allows government at all levels to access the same data and information no matter where they are located. Like the farmer, all they need is access to the Web.

What happens when they don't have web access? All anyone needs is a phone to call to an 1800 phone number. This links them to the catchment management organisation where an operator can handle their inquiry, search the databases and respond. If the information is not available immediately, a fax, surface mail or other culturally and technologically appropriate method is used to send the information when found.

## The test catchments

The case was developed in three Australian catchments:

- The *Dawson Valley*, the heartland of a rich pastoral, coal mining, gas production and irrigation region. The Dawson Catchment is located in east-central Queensland and encompasses an area of approximately 50,800 square kilometres. This large subtropical catchment is part of eastern Australia's Brigalow South bioregion and is one of the largest river basins, the Fitzroy Basin, flowing eastward to the Coral Sea. Major resource management issues include soil erosion and loss of river health. About 35000 people live in the valley. About 50% of the valley population are involved in the irrigation and coal mining industries. The Dawson Catchment Coordinating Association is the regional catchment management organisation in the valley, and is linked to the Fitzroy Basin Association.
- The *Dee Valley*, part of the Fitzroy River Catchment and the Dawson River Sub-Catchment. The Dee River forms part of the Upper Dawson River Catchment. The Dee

River flows in a southerly direction for approximately 70km before joining the westerly flowing Don and Dawson Rivers. The major issue being addressed in this catchment is acid-mine drainages, polluting the Dee River.

- The *Liverpool Plains Catchment* is one of the most fertile and productive agricultural areas in Australia. Situated in the north-western New South Wales, Australia, some 300 km N/NW of Sydney, the catchment covers approximately 1200 square kilometres. One of Australia's prime farming areas, the Liverpool Plains is regarded as the heartland of innovative dryland and irrigation farming, with about 1500 farms. The catchment landscape consists of black soil plains scattered with abrupt hills, and enclosed by mountain ranges. The fertile soils of the catchment are predominantly very deep black earths, grey clays, or brown clays. The main land uses in the catchment are grazing (48%), cropping (37%), and timber (reserves) (14%). The main resource management issues are dryland salinity, soil erosion and floodplain management. This catchment is part of the Murray-Darling Basin (Case Study #25).

## Alternatives considered

The alternatives considered those developed in a field study of similar work in Canada and the USA and comparative studies of similar experiences in Australia. That study found that institutional arrangements play a key role in facilitating R&D information delivery to catchment managers. It is important to develop social organisations and institutional arrangements able to deliver research products and other catchment information to decision-makers. These arrangements must consider the scale, jurisdiction, financing and administration of research and catchment management. What are the most effective social organisation and institutional arrangements to deliver catchment information? One option is the use of **inter-firm networking**. This is a generic term and includes contractual arrangements between data and information providers and users in a catchment, to deliver information to assist natural resources management decisions. These contracts involve setting up cost-sharing arrangements whereby participants agree on providing data and information and legal protocols to protect participants information-sharing.

The study of information delivery to catchment managers in North America suggests that workable institutional arrangements, reframing government budgets to regionalise information provision and allowing open access for community information contributions will assist information delivery and ownership of resource management solutions.

## 3 Outcomes and Performance

### Achievements

The project has been fairly successful, and because of its significance in information brokerage it has been selected by the Government (which funded it) as a project to be tagged for a ten year monitoring of product outcomes. There was also endorsement of the CIEP by the funding agency and selection of the CIEP as a member of the Australian Innovations Database in natural resources management research and development.

The project raised awareness of the need for improved exchange and integration at the national level, but it has not achieved significant policy development such that a national CIEP is being established in Australia. Considerable work is needed in capacity building in catchment management to build the institutions capable of implementing a CIEP.

Furthermore, the CIEP will not be sustainable in the long term unless there is significant investment by governments in the project products. There is significant public good benefit (in improved adoption of best management practices in natural resources management) which should qualify the CIEP for public financial support.

The resources for the project came entirely from Commonwealth Government at a cost of about US\$325,000 over a three year period. Community-based catchment management organisations provided much in-kind support for the project over this period.

## **Problems encountered during the implementation phase**

The key implementation issue for a CIEP is the fact that catchment management organisations in Australia do not have secure institutional arrangements for their existence. This means that they do not have a strong enough funding base to invest in long term information exchange and brokerage amongst their stakeholders. The same weaknesses which made it difficult for them to manage catchments effectively (lack of secure jurisdiction and funding) also mean that they find it difficult to manage catchment information effectively amongst their own stakeholders.

Another implementation problem is the reluctance of governments to exchange information sets they possess freely on the Internet. The concern is more than copyright issues, and includes fear of litigation, misuse of data and concern the information they provide will be used for commercial purposes. These problems have not been resolved and will require further innovative institutional arrangements to be developed to secure more rigorous catchment management entities and information exchange protocols by and between government agencies and community organisations.

The long-term lack of enthusiasm to implement the prototype reflects governments' inability to follow through on its commitment to not only fund R&D but also work across its own departments to facilitate implementation of R&D products.

## **4 Lessons learned and replicability**

The CIEP is a unique programme in that it can be co-owned and managed by government and community-based catchment management organisations. There was sustained enthusiasm by the catchment management communities engaged in this project to build a prototype CIEP. The critical issue is to get a long-term sustained funding mechanism in place for catchment management organisations.

However, a number of institutional and social issues have precluded immediate implementation of the prototype such as:

- No coordination mechanisms in place to share information,
- Lack of long term funding of catchment management organisations,
- Lack of leadership in government and catchment management organisations to build regional information exchange protocols and processes.

Furthermore, issues such as the lack of data sharing protocols, the scepticism in government about farmers' best practices, loss of scientific ownership of project results by researchers, and an unwillingness to handle co-managed, co-owned information management systems have proved obstacles. There seems to be an institutional lethargy about addressing such issues.

To try to overcome these problems, the CIEP project developed a set of institutional arrangements to facilitate implementation. These included: a costing structure for the CIEP, a cost-sharing arrangement to pay for it, and methods to engage local government and use the CIEP to address local planning as a key watershed management procedure and to co-own the CIEP.

Nonetheless, the CIEP has high potential for replicability. The institutional arrangements which can facilitate adoption of the CIEP and the design of the CIS on the World Wide Web are easily transferred to other contexts, although they would require adaptation to the unique socio-cultural conditions of each site.

## 5 **References and contacts**

The key source of information about the case study is a demonstration at [www.catchment.com/CIShome](http://www.catchment.com/CIShome) Here readers can also review the results of eight workshops in capital cities throughout Australia during which application of CIEP was discussed.

The data about the person that prepared/presented the case study:

**Dr Bruce Hooper**

Director, Integrated Resource Management Research Pty Ltd., Brisbane.  
126 Hawken Drive, St Lucia, Brisbane. AUSTRALIA 4067.

Email: [Bruce.Hooper@catchment.com](mailto:Bruce.Hooper@catchment.com)

Mobile Tel: within Australia 0407 209 306

Outside Australia +61 407 209 306 [includes message bank]

Fax: Australia +61 7 3876 1616

Homepage: [www.catchment.com](http://www.catchment.com)

Contact for software development:

Mr Tim Murphy

Murphy's Solutions

PO Box 85

Sussex Inlet. NSW. AUSTRALIA 2540

Email: [tim@msolutions.com.au](mailto:tim@msolutions.com.au)

Homepage: [www.msolutions.com.au](http://www.msolutions.com.au)

Other contacts, references:

**Dr Richard Price**, Program Manager, Salinity

Land and Water Australia

GPO Box 2182

Canberra 2601

Email: [richard.price@lwa.gov.au](mailto:richard.price@lwa.gov.au)

Tel: +61 2 6257 3379

Fax: +61 2 6257 3420

Land and Water Innovations Database

Contact: **Roberta Dowd**.

Land & Water Australia

GPO Box 2182, Canberra, 2601

Tel: (02) 6262-6207 --- Fax: (02) 6257-3420

Email: [roberta.dowd@lwa.gov.au](mailto:roberta.dowd@lwa.gov.au)

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