RECOMMENDATIONS FOR WATER DATA PLANNING AND CO-ORDINATION IN SRI LANKA

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1. INTRODUCTION

Quantifiable data and information on how much water is available in the country's river basins is required to provide a sound scientific basis for the water resources assessment, planning and management. Knowledge on quality and distribution of the resource in space and time is also an important requirement for rational water resources planning and management.

In Sri Lanka, like many other countries, the rational development and management of water resources depends to considerable degree on the readily available data and information describing the resource. If resource planning and management practices are to have a scientific base, large volumes of data need to be collated, organised and analysed. Sound management decisions depend not just on the amount of water resources data available but rather on the information that the data can yield. The data therefore need to be organised, accessible and comparable.

The collection, collation and management of natural resources data and information in Sri Lanka involves a complex arrangement of projects undertaken by government agencies, semi-government authorities and boards and includes research, consulting and business organisations. The work is being supported directly as government projects and indirectly by donor funded programs in many areas of natural resource management and development including water resources. Recent years have seen a rapid expansion in the amount of water resources data being collected by these government, semi-government and private bodies. This reflects the growing awareness, within the Sri Lankan community, of the need for safeguarding and managing water resources for the future.

It has been determined, that presently there are over 40 industry groups requiring access to water data and information to fulfil their statutory or business objectives. Of these, five are government agencies that undertake major data collection and data management activities. Seventeen others are semi-government, research and consulting groups, that also collect or use data for specific studies.

The Water Resources Council of the Government of Sri Lanka has identified the need to ensure a systematic approach to data collection and improved arrangements for the co-ordination, access and sharing of data between the major data collectors and the data users (GOSL 1994). This also includes a clearer understanding on matters of ownership, pricing policies and the publication of data.

At present in Sri Lanka, water resources data and information is organised and managed in a traditional manner within the data collection agencies having minimal integration of data archives into a coherent water resources information system. In Sri Lanka there is no water resources database being developed at present, where all the data classes are brought together and integrated. Hydrological data is collected and managed by the Irrigation Department, water quality data by the Central Environment Agency and groundwater data by Water Resources Board and the National Water Supply and Drainage Board. Climate data is collected and managed by the Meteorological Department. Department of Irrigation also collects rainfall data at some selected sites.

This study was undertaken to identify important issues in the existing data collection net works, the present data processing & management, data pricing, data collation, integration and to make appropriate recommendations. This study which falls within the review and upgrading of information systems in the water sector was carried out for the Water Resources Secretariat (WRS) of Sri Lanka which is under the Ministry of Finance and Planning (GOSL 1998).

2. OBJECTIVES

The aim of providing recommendations for water data planning and co-ordination is to detail some of the more important aspects of collection, management, exchange and sale of water resources data in Sri Lanka.

As such the present work:

- Outlines the key issues and reasons for improved co-ordination of water data collection and management.

- Identify issues for improving arrangements for data collection, data storage, data exchange, user awareness and access.

3. WATER DATA PLANNING AND COORDINATION

In making recommendations for water data planning and co-ordination in Sri Lanka for the management of water data and information, it is important to establish an understanding for the responsibilities and accountabilities of the various parties involved in the data management and information processing chain. The parties generally include the data owner, the custodian, the data co-ordinator and the users of the data (information providers). This categorisation referred to as the 'partnership model' is shown in Figure 1. The key members in the partnership model are, 1) the Data Owner, 2) Data Custodians, 3) the Data Co-ordinator, and 4) the Data Users.

The partnership model aims at providing water resources data and information, which is readily available to users, which is of known quality, appropriate to Sri Lanka's

water resource planning objectives such as integrated catchment management strategies, and can be incorporated into other natural resource information systems.

The important element of this approach of incorporating a partnership model is the increased emphasis given to access and dissemination of data to users and the public. Modern database software systems provide the tools for the integration of various water data types such as surface water data, water quality data, groundwater data and climate data into one system under the umbrella of a spatial mapping interface. Such a system needs to be introduced, in a co-ordinated and co-operative way, into the various government agencies currently responsible for water data collection and management in Sri Lanka.

The implementation of the partnership model, and the introduction of a suitable water resource information system, are identified as key elements for improved water data management in Sri Lanka.

3.1. Ownership

Key to the establishment of responsibilities and accountabilities for overall management of the water resources data and information, is the principle that water data is a national resource and that effective, efficient and economical data management requires organisations that collect data to share and transfer data to other users.

At the national level, all data collected by government agencies in Sri Lanka is a part of the national data resource. Therefore the agencies that acquire and manage data do not own the data but are custodians on behalf of the people of Sri Lanka. That is, the Government owns the copyright of all data generated by government agencies.

This implies that;

- water resources data is considered a public asset when it exists as a part of public funded or donor funded programs,
- since collection, dissemination and use of water data is essential to sound management decisions, water data ownership require resources to remain with public
- the availability to the public of information on this important resource is a necessary component to the environmental debate, and in this light it is necessary to emphasise that the custodians are for acquisition and management of a public asset.
- Continued government funding ensuring the sense of ownership of water data assessment programs is crucial to sound environmental and water planning.

3.2. Custodianship

The principle of custodianship needs to be adopted in many countries as a means of ensuring accountability for the care and maintenance of water resources information in the public sector. Custodianship is seen as the core to efficient and effective water resources information management.

A custodian of a data set, is an agency having the responsibility to ensure that the data set is collected and maintained according to standards and priorities determined by consultation with the user community. The preferred custodians should be those who have the greatest need to guarantee the accuracy and the integrity of the information.

Custodianship does not require all data to be captured and maintained by the custodian, but the custodian maintains the responsibility for quality and availability of the data that is part of the agency database.

In Sri Lanka, there are five government agencies that are acquiring water data and related information and maintaining databases of this information. In some instances they are not the only collectors of this data but are the principle collectors. It is suggested that these agencies would be the most appropriate national custodians for the data types which they currently collect and manage.

The custodians for the major water data types could be;

- Irrigation Department for hydro-meteorological data,
- Central Environment Agency for water quality data, both surface water and groundwater,
- National Water Supply and Drainage Board and the Water Resources Board for groundwater quantity data,
- Meteorology Department for Climate Data.

The proposed water resources information system in Figure 2 shows the concept of custodian agencies for Sri Lanka. The appointment of custodian agencies need not limit other agencies from collecting data to meet their needs. These other groups have the opportunity to be considered as contributing agencies if they provide data to the custodian agencies that meets agreed standards.

Appointing custodianship would ensure accessibility to data, and provide a recognised contact point for the distribution, transfer and sharing of the data and information. Therefore it is recommended to ensure a Co-operating Agency Agreement between the Custodian Agencies and the Data Users.

3.3. Coordination

For successful implementation of the custodianship policy, a significant level of co-ordination between data collectors and users is required. To ensure this, it is recommended to establish a lead agency responsible for water data co-ordination in the country. Under the present setup WRS appear to be a good choice to appoint as the lead agency.

A Water Data Steering Group within the lead agency is recommended to be established to oversee all activities dealing with co-ordination between collectors and users, custodianship and access to data. The steering group is recommended to be of,

- Database managers from within custodian agencies,
- Data user representatives, and
- A chairperson knowledgeable on data matters who can be external to the lead agency.

It is further recommended that this be maintained as an independent entity.

The Steering Group is expected to address the following and report regularly to the WRS:

- Advise the Water Resources Council on appointment of Custodian Agencies,
- Promote co-operation and sharing of data between custodians and user groups,
- Identify data needs of users such as to ensure that the appropriate long-term data is being collected to meet both project and long-term assessment requirements,
- Review data collection networks to reduce duplication of effort,
- Overview the standards and procedures upon which data is collected to ensure that the data is of acceptable quality,
- Identify ongoing sources of funding for both long-term and short-term data collection networks,
- Assist the lead agency with the collation of data for inclusion in an integrated Water Resources Information System.
- Advise the lead agency on the need for publication of water resources data and information.

4. PRICING AND COST RECOVERY

The *user interviews (Wijesekera et al 1998)* indicated that there was general satisfaction with the pricing of data; the major concern being data availability, data quality and the time it takes to actually satisfy the individual data requests. The exception to this was University groups where student requests for information were often not addressed.

The introduction of modern water resources database software systems into custodian agencies will provide a new opportunity for upgrading data services both in terms of speed of answering requests, and the range of data analyses and presentations that could be provided. Prior to such systems are introduced, it is important that data custodians agree on a consistent pricing philosophy for the sale of water data to users.

The following are stressed as key points for consideration in the pricing of water data;

- The primary aim of the pricing policy is to promote maximum use and dissemination of the data to the water community,
- Water resources data requires to be categorised as either 'basic' or 'interpreted' data;
- Charges for basic data should be levied on the cost of disseminating only and no charges to be made for data collection process. No profit margins should be included.
- Added charges could be made for value added processing. This applies in cases where a user makes a specific requirement for such processing or interpretation,
- No charge should be made for the exchange of basic data between Co-operating Agencies.

While this pricing policy recommends that agencies adopt a common set of principles for the pricing of data, it is understood that the actual charges will vary with individual agency overheads and internal cost factors. This pricing policy will mean that water data users will not have to pay for past or future costs of data collection and processing in it's basic form.

Considering the above it is clear that the government is required to continue with its obligation to fund data collection which provides a public good. An ongoing assessment of quality and quantity of the water resources of Sri Lanka is one of the elements in a series of events in this regard.

5. DATA PUBLICATION

Through the identified water data and information coordinator, the custodian agencies need to work together to achieve higher levels of data access for agencies and the public. This can be achieved by better co-operation and providing advice at the Water Data Steering Group level on the collation and integration of data and the use of new data publishing technologies.

Specifically, custodian agencies and other data collectors and users will need to co-operate to:

- Develop an integrated Water Resources Information System (WRIS) of their various water data archives and information,
- Introduce new database software systems to improve the publication of their water data archives in both hardcopy and on electronic media,
- Advise the water community of the availability of water data information and publications.

As found during the data surveys, with over 40 different groups requiring access to water resources data and information in Sri Lanka, new optical data-storage mediums such as CD-ROM offer vastly improved and cost effective technology for the dissemination of large quantities of data in a microcomputer format. Data in this format, can also be readily distributed to international organizations, such as WMO, who are collating global databases to study such issues as global warming.

6. WATER RESOURCES INFORMATION SYSTEM

A preliminary design of Water Resources Information System is shown at Figure 2. This would involve modules of the individual database systems for time-series data (surface and climate data), water quality data and groundwater data being installed at the various Custodian agencies. An integrated database of all modules could be installed and managed by the Water Resources Secretariat. This would be the integrated Water Resources Information System referred to in this paper.

7. RECOMMENDATIONS

The recommendations outlined were developed after undertaking detailed surveys and interviews with water agencies and data user groups (GOSL 1998). From a total of 22 groups, considered majority of the information was acquired through questionnaire and face to face interview. In addition, the consultants drew on their experience and knowledge of data collection and management arrangements in other countries, such as Australia, New Zealand and United States. (WRCNSW 1991, DISR 1989, WMO 1990, AWRC 1989, USGS 1982).

The summary of recommendations is to;

- Develop a water data policy based on a 'Partnership Model' between the data owners, custodians, co-ordinators and data users,

- Establish a 'Co-operating Agency Agreement' between the custodian agencies and the date users , covering the aspects of Ownership, Custodianship. Co-ordination, pricing and publishing of water data and information.(GOSL 1998).

- Identify the *lead agency* responsible for water data co-ordination activities in Sri Lanka.

- Establish a 'Water Data Steering Group' within the lead agency that would oversee custodianship and the management, exchange and access of data to data users, identify data needs, review networks, over view the standards etc.

- Implement a modern hydrological database system in Custodian agencies for efficient management of water data and information,

- Install or maintain compatible database systems at the co-ordinator agency to facilitate integration of the various data sets into a Water Resources Information System,

- Develop a program of systematic and co-ordinated analysis, dissemination and publication of water data between the WRS and Custodian agencies.

- Develop a system to provide data , in formation and publications to the users at reasonable cost.

8. REFERENCES

AWRC 1989, "Guidelines for the Design and Operation of Surface Water Information Systems" – Australian Water Resources Council, Water Management Series 18-1989.

DISR 1989, "Policy on the Management of the Water Resources Archive in New Zealand" -Department of Industrial and Scientific Research, March 1989.

GOSL 1994, "Comprehensive Water Resources Management in Sri Lanka-Volume I & II", Report prepared under the project TA 1918-SRI with the Asian Development Bank and the USAID, January 1994

GOSL 1998, "Information System Analysis – Final Report", Report prepared by Water Resources Consulting Services(Australia) in association with DHV consultants (The Netherlands), Environment Management Lanka(Pvt) Ltd (Sri Lanka), Resources Development Consultants Ltd. (Sri Lanka), and Lanka Hydraulics Institute Ltd. (Sri Lanka) under the project TA 2422-SRI with the Asian Development Bank, July 1998

USGS 1982, "Water-Data Program of the U.S. Geological Survey" - Geological Survey Circular 863, 1982.

WMO 1990, "Progress in the Implementation of the Mar del Plata Plan and Strategy of the 1990's" – WMO/UNESCO Water Resources Assessment Program –1990.

WRCNSW 1991, "Co-operating Agency Policy on Water Data Management." – Water Resources Council of New South Wales, Australia, July 1991.

Wijesekera et al 1998, Wijesekera NTS, Malone DC, Ranwala DAJ and Mendis BPN, "Status of Water Data Collection, Processing and Management of Sri Lanka", National Conference on Status and Future Directions of Water Resources in Sri Lanka, (To be published), IIMI, Colombo, Sri Lanka, 1998.

PARTNERSHIP MODEL FOR WATER DATA COORDINATION

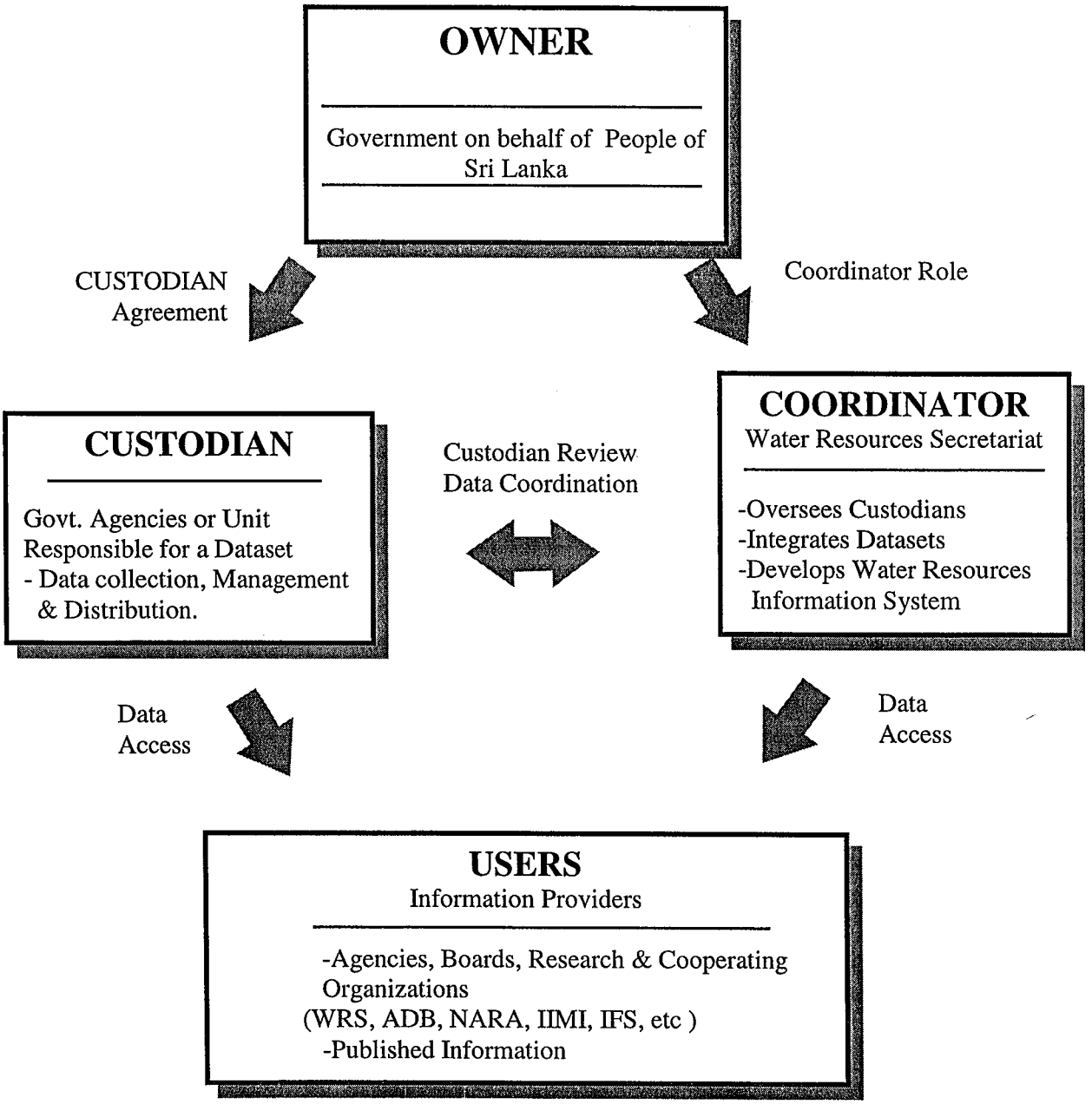
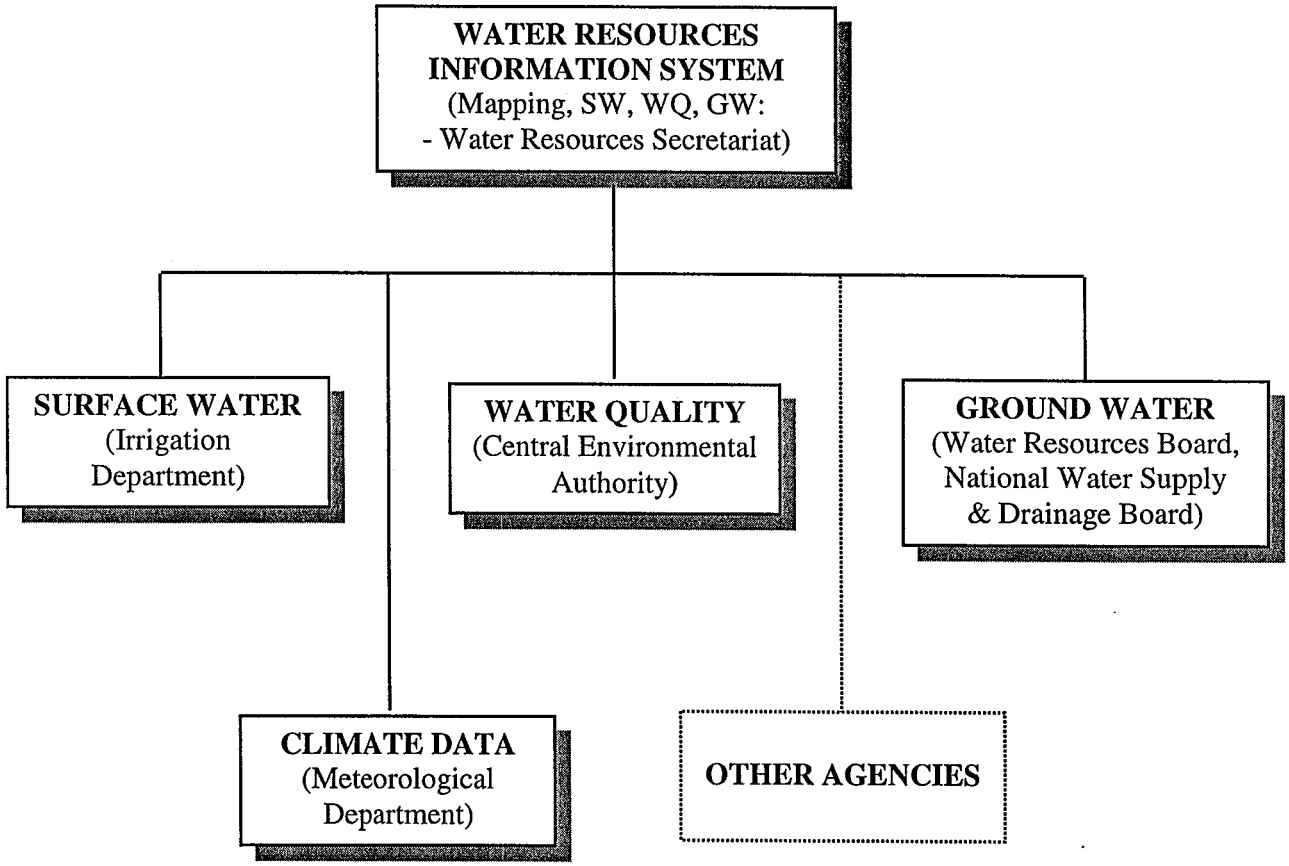


Figure 1: Partnership Model for Water Data Coordination

WATER RESOURCES INFORMATION SYSTEM



Each custodian agency operates a database for its own particular data set. These databases are integrated into a Water Resources Data Information System (WRIS) incorporating a copy of each custodian data set which is upgraded regularly (e.g monthly)

Figure 2 - Water Resources Information System