

# **ORISSA STATE WATER PLAN**

**2 0 0 4**

## **INSTITUTIONAL REFORMS**

## **1.0 INSTITUTIONAL REFORM**

Department of Water Resources (DOWR) is responsible for the planning, development and preservation of water resources of the State.

The areas of operation of DOWR are as follows:

### **1. POLICY AND PLANNING:**

Policy formation.

Measurement of rainfall, runoff, assessment of water resources, Data Bank.

Investigation and survey works.

Water planning

Project formulation.

### **2. CONSTRUCTION WORKS.**

Construction survey

Construction Planning

Land acquisition.

Forest clearance.

Construction designs & drawings.

Contract management.

Work supervision.

Quality control.

Work and expenditure monitoring.

### **3. OPERATION MAINTENANCE AND WATER MANAGEMENT.**

(i) O & M of head works

(ii) O & M of Canals and Canal structure

(iii) Water Management.

### **4. Environment and water quality.**

(i) Catchment management.

(ii) A forestation

(iii) Water quality monitoring.

### **5. Personnel management**

### **6. Budget and expenditure.**

(i) Budget and expenditure

(ii) Letter of Credit

(iii) Expenditure

(iv) Reimbursement.

**7. Water services:**

- (i) Domestic supply
- (ii) Irrigation supply
- (iii) Industrial supply
- (iv) Bills and collection
- (v) Coordination and Stake holders' consultation.

**8. Minor Irrigation.**

- (i) Surface flow
- (ii) Surface lift
- (iii) Ground water lift.

**9. Ground water**

- (i) Assessment of Ground water
- (ii) Measurement of Water Table and water quality.
- (iii) Monitoring development
- (iv) Conjunctive use.

**10. Specialised areas:**

- (i) Flood/Cyclone management
- (ii) Drainage

**11. Information system.**

**12. Other organizations**

- OCC
- OLIC
- WALMI
- CADA.

All the above works are carried out by the DoWR headed by the Secretary and assisted by an Engineering Organisation headed by the Engineer in Chief. Earlier the focus of the department was irrigation and was therefore named Deptt. Of Irrigation. The scope of the department was broadened to encompass all the activities of water resource. A basin was considered as a unit of development and accordingly Basin Managers in the rank of Chief Engineers were posted.

The organization chart of DOWR is given at Appendix-1.

## 1.2 INSTITUTION MODIFICATION

The basic organization pattern has been time tested and is proved sound. The restructured organisation is working well. But there are still some weaknesses in the system which needs improvement.

Minor Irrigation and Ground water Organisation have not yet developed links with the major irrigation under EIC (WR). The EIC (P&D) has been given the responsibility of these two organizations now. His position may be clearly defined in the relevant codes.

Ground water assessment is now under Director, GWS&I and ground water development is under OLIC. Both the activities may be brought under one Chief Engineer (CE, Ground Water Development). He may look after entire ground water scenario and the construction aspects may be only entrusted to OLIC on the same terms as OCCL.

CADA may be suitably restructured to handle formation, handover and management of Pani Panchayats and may function under CE, Water Services.

DOWR is gradually growing from a construction-oriented department to a service-oriented department. The role of CE, Water Services is going to assume importance. He should look after all the services rendered by the department including irrigation supply, industrial water supply and public water supply. He should have a strong monitoring mechanism and should be responsible for billing and collection of revenue.

Water resources development is handled in a disjointed manner. Agriculture, the largest user of water resources does not have proper liaison with DoWR. A task force consisting of Director, Agriculture and CE, Water services may be constituted to plan and monitor the agricultural use of water every year. Similarly a task force of Water supply with CE(W.S), CE(PH) and CE (RWSS) and another for industrial use with CE(W.S), Director, Industries, MD, IPICOL and IDCO may be formed.

There is no mechanism to monitor water quality and take appropriate corrective measures inside the DoWR. A small unit under CE,PPF may be given this responsibility. A task force with CE,PPF and Member Secy, OPCB may be formed to review water quality of the state.

Office of EIC (WR) may be suitably restructured. The monitoring wing may be strengthened.

CE,PPF may handle the works of 01. Policy and Planning and 04. Environment and Water Quality. The office may be designated as Investigation, Planning, Environment and Water Quality and staff may be suitably augmented.

Extensive use of IT may be resorted to enhance efficiency of DOWR. An intranet may be designed and set up. Network management may be outsourced and information made available to Director (Monitoring). Selected MIS may be made available to all Division heads. An indicative MIS plan has been discussed else where.

GIS and remote sensing may be used in Irrigation management, flood management and other relevant areas. A special cell may be created in the office of CE (D&R). Specialized skills may be outsourced but posts of operating staff (system manager, programmer, data entry operators) may be created by sacrificing some of the existing staff.

Expert advice in Engineering, W R mananement and Engineering Economics may be inducted in the Office of the Secretary DoWR.

## **2.0 Information System Plan for DoWR**

Due to the magnitude and complexity of water resource development aspect of the State, the engineering and management aspects are also complex and intricate, and hence it is becoming increasingly difficult to manage varied functionalities of the DoWR using traditional management/engineering methods. It is also difficult to manage such projects using conventional management methods because of the time and cost aspects involved.

Keeping the above in view, and with Information Technology making it's presence in all spheres, it is being felt that usage of Information Technology based tools and systems, if properly deployed, could go a long way, in helping the DoWR in efficiently managing the water resources projects, water resources operations and maintenance functions.

Using appropriate technology for the diverse functional areas of the DoWR, with facilities to consolidate and integrate information at various levels is a key requirement in today's management, apart from shortening the Information generation time cycle and accuracy of the information.

An exercise of Identification of Functional Areas where Information Technology can suitably be deployed for benefit of the DoWR has been done.

The key functional areas are Water Resource Management, comprising of Water Resources Planning and Development, Water Resources Operations and Maintenance, Hydrogeology, Hydrometeorology etc., Computer Aided Design (CAD) services comprising of Design and Analysis of Structures, Management Services and Executive Information System.

The Information System infrastructure has based on the logical groups identified.

Information exchange between logical groups is cardinal for smooth functioning of the DoWR with up-to-date information from the logical groups,

In some functions, the DoWR depends on external data sources. Data collection or direct access to their information and vice-versa would have to be smooth.

Information Technology infrastructure presently available is not sufficient to meet the data/information demands of the DoWR as well as external agencies in the near future.

No Electronic Information System is in place.

Computer Literacy for basic operations need to be improved.

High speed network would have to be installed at all locations for faster data access/transfer between locations.

## **2.1 Review the existing Information Technology Tools in DoWR.**

The DoWR has been using Information Technology and tools in some of the functional areas but does not have a very well defined and up-to-date Information System/Technology Plan as on date,

As regards the present situation of deployment of Information Technology, it is mainly concentrated in the Design Section and the OPWO. Some usage of Information Technology is also made in the Flood, Monitoring and Evaluation Cells.

The systems are operated on a stand alone basis. There is no scope of automatic data sharing amongst users and as such, no full-fledged application software for any functional area is existing for MIS.

The OWPO uses some software models like RIBASIM, HYMOS etc. for Basin Planning and Surface and Ground Water Hydrology, Meteorology etc.

The Design Cell uses Auto C.D, a Computer Aided Design software, along with some in-house developed software that help in the Design process.

The Monitoring and evaluation unit also uses MS-Office and Ms-Project for their regular jobs.

Office of the Secretary, DoWR at Rajiv Bhavan uses some office management software. Two independent LAN are functioning in Secha Sadan and Rajiv Bhavan and there is an OFC based connection between the two buildings.

## **2.2 Proposed Information Technology architecture:**

Today, Information Technology is moving at a very rapid pace. The technology is being updated every quarter and hence any information technology tool, hardware or software deployed today is bound to get obsolete within a period of 2 years. It is therefore very important that Information Technology architecture is very carefully selected and planned so that the technological obsolescence does not affect the entire system.

The Information Technology architecture alternatives available today are:

- Host based computing
- Client/Server computing
- Internet/Web based computing
- Stand-alone computing

Of the above alternatives, Host based computing, though very stable will not meet the concept of integrated Information distribution as data is collected and processed from a central resource and then reports etc. are generated based on demand.

Client/Server computing is a distributed information processing concept where data is collected at the client end and is distributed to other clients through the server. The data distribution here is much faster and in most cases on-line and up-to-date information is available. However, this architecture requires a lot of system discipline to be followed.

Internet/Web based computing also follows the Client/Server computing concept except that the computing resources required are of higher capacity, a very strong communication network is required to be in place for implementing this architecture.

Stand-alone method of computing is again like the Host based computing except that the data processing workload is distributed into smaller systems. Data/information exchange is a major hurdle here in absence of any network.

After analyzing the computing requirements of DoWR and evaluating the above architectures, the proposed Information Technology architecture at DoWR would be based on a 2 layer Client/Server technology.

The first layer would comprise of a system at the Division level and circle offices and the second level would be at the Head Quarter in Bhubaneswar.

At a future date, with the proposed Information Technology architecture at DoWR, it would be relatively easy, to upgrade the current architecture to a Web based computing environment. This can be taken up, once the proposed architecture has stabilized and DoWR has started to get benefits of the Information Technology deployment.

The basic strategy of the proposed Information System at DoWR would adopt a top down approach for MIS report generation ,while a bottom up approach would be adopted for data collection from the base level for consolidation and generation of appropriate MIS.

The Databases that would be attached to the Irrigation Division/Basin maps for data collection and analysis would be for:

List of dams, barrages along with relevant data base.

- Maintenance Schedules and Standards
- Drawing Database
- Contracts data/ List of procurement packages
- Budget data
- Expense data
- Rainfall data
- Flood data.
- Gauge Level data at various points of the water distribution system
- Water Quality data
- Soil data
- Ground and Surface Water data.
- Land Usage
- Water supply data base
- Billing and Collection data
- Forest area
- Major Crops grown
- Crop Demand and Yield
- Marketing Information
- Canal network data bank
- Farm and farmer data base
- Data on crop grown
- Environment database
- Industries database

Databases, would be available at the Head Quarters, where data pertaining to each function from each division would be consolidated. The consolidation of data received from the Division, electronically, to the Head Quarter would be done using the Wide Area Network (WAN) proposed for the DoWR. The data updation from the division offices to the Head Quarter can be instantaneous or time specific.

At the Head Quarter level, the data from various divisions pertaining to various functional areas would be distributed through the Local Area Network (LAN) and stored into the appropriate Servers.

The Servers would be primarily associated to the **Logical Workgroups** and would be based on related functions.

The consolidated as well as raw data would be available for use to the users from other logical groups also but would depend on the access levels specified in the security system.

The Logical Groups proposed are as follows:

- Water Resource Management (WRM) group
- Computer Aided Design (CAD) Services group
- Management Services (MS) group

The **Water Resources Management (WRM)** group is responsible for the following:

- Basin Planning
- Project Formation and evaluation
- Project Execution
- Hydrometeorology
- Ground and Surface Water Hydrology
- Operational Plan for Water distribution
- Maintenance Planning of Assets
- Remote Sensing Applications

The **Computer Aided Design Services (CAD)** group is responsible for the following functions.

- Analysis and Design of Structures
- Image Processing
- Maintenance of Drawing records – Project wise
- R & D on Design of Structures
- Safety Methods

The **Management Services (MS)** group is responsible for the following functions:

- Project Monitoring and Evaluation
- Financial Data Management
- Personnel Information Systems
- HRD and Training Systems
- Library Management Systems
- Document Management System
- Office Automation and E-mail within the organization as well as external.

The Information System is designed to build an Integrated Information System, instead of islands of Information. This would eliminate manual intervention to consolidate and integrate data and generate meaningful information across the DoWR. This would also minimize data duplication and reduce redundancy.



It is therefore being proposed that data for all operations would be captured at the source, where it is being generated and that would be consolidated and filtered at various levels to provide appropriate and useful information to various levels of hierarchy in DoWR.

The Logical Functional Groups, as described earlier, at the DoWR Head Quarters would provide Information System services through 4 High-end Servers. Out of the 4 servers, one each would be dedicated to:

- Water Resources Management (WRM) group
- Computer Aided Design (CAD) services group
- Management Services (MS) group

The fourth server would be a common server for all the groups and would be used for Communication Services for E-mail, Fax, Internet and Document Management.