

Chapter IV : The Department and its objectives

Introduction:

The brief history of the Tamil Nadu Public Works Department can be traced back to the period of the East India Company as far back as to 1820s. This is the third oldest Department, the first two being the Revenue Department and Judiciary.

When many parts of India came directly under the British Crown, the Public Works Department had become the Government Department in 1858.

The erstwhile school of Survey and the Guindy Engineering College were also under the Public Works Department in the late 1800s.

Assets in Brief:

Our Department owns 85 dams and reservoirs. The Tamil Nadu Electricity Board have got 38 dams for power generation and their water reach our reservoirs. These dams and reservoirs have got their own system canals and tanks. Our State has got about 39,000 tanks out of which around 10,000 tanks are owned by Public Works Department. Out of 10,000 tanks, about 5,000 tanks are system tanks fed by Reverine channel flows. The rest 5,000 tanks are rain fed tanks. We have got a main channel length of about 9700 K.M. and more. These assets are the source for irrigating a total extent of about 69,00,000 acres. Ground water wells used for irrigation purposes only are 16,44,946 Nos.

Objectives:

This Department was intended primarily for the following purposes:

- To maintain and upkeep of structural and non-structural components of irrigation facilities;
- To develop new additional projects, structures, etc., to augment potential sources for irrigation;
- To maintain, upkeep and develop buildings for the State;
- To maintain and upkeep of navigation and drainage facilities;
- To maintain and upkeep and to build conveyance facilities by way of roads for the agricultural produce to be moved to the interior, rail heads, ports, etc.;
- To identify, investigate, formulate and estimate feasible and viable irrigation projects so that there is always a shelf of projects to implement the policy, promises and the programmes of the Government;
- To conduct tests and research activities in construction materials and hydraulics and hydrology;
- To conduct tests and studies on the potentials and properties of ground water.

Here it is not out of place to mention that successive Governments were rightly keen in creating water resources assets in furtherance of irrigation and agriculture by way of building dams,

reservoirs, canals and numerous cross masonry structures like barrages, weirs, regulators, dykes, outlets, etc.

Further, more objectives were added in the recent past. Having harnessed the surface irrigation potential to 95% (12387 M cum), the Department's main function has turned to be that efficient management, utilization and distribution of scarce water resources.

- To work towards achieving equitable distribution of water resources for irrigation with respect to spatial and temporal distribution of the available quantum;
- To instill participatory Irrigation Management (PIM) by creation of Farmers Association and supporting system through NGOs.

But unfortunately, the yardstick used for maintenance and the actual allocation of funds for it were not provided for adequately. The result was that the structures have attained a critical stage where the very existence and function of the structures were under stress.

At such a situation to mobilize financial resources, we have to necessarily go in for external funding to bring back the systems to attain efficiency in distribution. Water Resources Consolidation Project is one with World Bank aid.

While sanctioning the projects, the World Bank contemplated the idea of strengthening the institution and creation of expertise in the Department having the officials as well as farmers.

Reorganization:

Here the vision shall have to be on reorganisation of the water Resources Organisation with respect to river Basins and functions.

So it was decided to have Regions based on River Basins and Functional Units based on activities. The Water Resources Organisation was structured to have the set up as under for administrative reasons and easy financial flows the controls to be built in the following set up of the Department.

1. The Engineer-in-Chief, WRO and Chief Engineer (GI), PWD, Chennai
2. The Chief Engineer, WRO, PWD, Chennai Region, Chennai
3. The Chief Engineer, WRO, PWD, Pollachi Region, Coimbatore
4. The Chief Engineer, WRO, PWD, Tiruchy Region, Tiruchy
5. The Chief Engineer, WRO, PWD, Madurai Region, Madurai

The Functional Units are under the special activities of :

6. The Chief Engineer, WRO, PWD, Plan Formulation, Chennai
7. The Chief Engineer, WRO, PWD, State Ground and Surface Water Resources Data Centre, Chennai
8. The Chief Engineer, WRO, PWD, Design Research and Construction Support, Chennai

9. The Chief Engineer, WRO, PWD, Operation and Maintenance, Chennai
10. The Chief Engineer & Director, WRO, Institute for Water Studies, Chennai
11. The Chief Engineer & Director, Irrigation Management Training Institute, Tiruchy

Functional Description of Units :

Role of Engineer-in-Chief, WRO and Chief Engineer (General), PWD

- Develop mission, goals and objectives for the Water Resources Organisation
- Establish policies necessary for effective and efficient organisation
- Establish effective Management Information System
- Establish a system to periodically review organisational performance
- Ensure that environmental, land acquisition and economic rehabilitation and farmers organisations and turnover concerns are resolved.

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Inter State Waters:

- Analyze inter-State water transaction
- Assemble data on Inter State water impacts
- Evaluate issues in disputes
- Coordinate with Regional Chief Engineers

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Administration Unit:

- Establish, review and update establishment policies and rules
- Develop and maintain official records of all personnel
- Develop recruiting, posting, promotion, retirement and training orders
- Establish a public information cell to distribute information to the media, public and others
- Establishment of training cell to formulate training policies, review and report status, progress and performance of organisation training program and consolidate organisation-wide annual training program.

Programme Budgeting and Account Unit:

- Administer programme budgeting and cost accounting system
- Prepare annual budget
- Allocate funds to WRO organisational units
- Co-ordinate preparation of cost estimates for budget
- Develop reporting format for reviewing and monitoring programme progress
- Develop and maintain management information system
- Develop, maintain, review and update cost accounting codes
- Prepare management report

Monitoring and Evaluation Unit :

- Review and report on organisational functions of Water Resources Organisation and their effectiveness
- Provide adequate information on a macro level of the progress and benefits of ongoing and completed programme
- Audit Water Resources Organisation records as necessary to ensure compliance with established standards.

Land Acquisition and Economic Rehabilitation Cell :

- Reports to the Secretary, Public Works Department
- Plan, Co-ordinate, monitor and evaluate all land acquisition and economic rehabilitation (LAER) for Water Resources Consolidation Project
- Contract with NGOs to implement Rehabilitation Action Plans
- Serve as the Secretariat for the State Level Coordinating Committee
- Supported by the Negotiating Committee and an Economic Rehabilitation and Grievance Committee at the District level.

Project Officers :

- Appointed by Engineer-in-Chief, WRO and Chief Engineer (GI), PWD to track and report progress to Engineer-in-Chief, WRO and Chief Engineer (GI), PWD on special projects and programmes which are of vital and critical importance to Engineer-in-Chief, WRO and Chief Engineer (GI), PWD or are requested by the funding agencies.
- Officers have no authority to direct the activities to which they are assigned.

Functional Chief Engineers**Role of Chief Engineer and Director, Institute for Water Studies :**

- Serve as Member Secretary for the Water Resources Control and Review Council
- Prepare Basin assessments in coordination with Regional Chief Engineers and other Government agencies for all river basins in the State
- Prepare State-wide framework plan based on basin assessments
- Prepare and update State Water Plan
- Provide policy and advice to Water Resources Organisation in environmental matters
- Staff, equip and maintain remote sensing laboratory and GIS for WRO
- Utilize advanced computer technology for river basin system analysis
- Establish State-wise planning standards.

Role of Chief Engineer & Director, Irrigation Management Training Institute

- Assist WRO in identifying training needs and developing training strategies to meet WRO requirements

- Provide for broad based training programmes for WRO with particular emphasis on operation and maintenance, system modernisation and farmer turnover programmes.
- Maintain and disseminate to WRO management units a listing and data of training programmes available both domestically and abroad
- Provide data on ongoing and completed training sessions to Engineer-in-Chief, WRO and Chief Engineer (General), PWD.

Role of Chief Engineer, State Ground and Surface Water Resources Data Centre

Water Resources Data Centre :

- Initiate, set and maintain data collections, verification, dissemination and reporting standards in accordance with National Criteria and Standards
- Collect, verify and publish surface and ground water data and meteorological data
- Review data collection net works for adequacy and modify as necessary
- Report verified data to the National Surface Water Resources Data Centre and the Central Ground Water Board.

Basin Water Resources Data Collection Units:

- Install and maintain data sites
- Read and record data from surface water gauges
- Measure and record ground water level
- Make and record meteorological observations
- Collect water samples and send to laboratories for water quality analysis
- Monitor and verify field data collection procedures.

Regulatory Unit:

- Prepare draft legislation for regulation of surface and ground water
- Determine potential areas of ground water regulation without legislation
- Develop a public information programme to inform the public and other interested parties on the need for regulation.

Role of Chief Engineer, Plan Formulation:

Engineering / Hydrology

- Identify specific data needs from Basins
- Conduct engineering analysis
- Evaluate alternative engineering solutions
- Conduct applied hydrology studies
- Performance preliminary designs and estimates.

Environmental Cell :

- Perform environmental review of projects to comply with Environmental Protection Acts and Regulations

- Provide expert advice to WRO management units
- Conduct water quality analysis
- Plan for environmental mitigation and enhancement
- Provide environmental clearance from Government of Tamil Nadu
- Periodic reviews during operation and maintenance.

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Socio / Economic / Agronomy

- Conduct sociological studies
- Conduct benefit cost analysis and impacts
- Analyse agricultural prices on a macro basis and make available to farmers
- Analyse land acquisition impacts
- Analyse soil conditions for agricultural purpose
- Periodical evaluation of benefits
- Review and update economic criteria for project evaluation.

Project Planning :

- Establish planning data base, standards and periodical review
- Preparation of preliminary and feasibility studies of specific projects / programmes
- Coordinate planning activities with Regional Chief Engineers and other Chief Engineers
- Reviews planning reports prepared in Regions
- Supervise WRO drilling programme.

Report Preparation :

- Prepare narrative tables, charts, graphs and assembles reports
- Provides for review of reports and summaries by all appropriate parties.

Special Studies :

- Prepares, analysis, studies reports, usually not leading to specific schemes of particular concern such as conjunctive use, drainage relief, recharge potential, sea water intrusion and pollution

Role of Chief Engineer, Design Research and Construction Support :

Designs of Irrigation Structures

- Establish, review and update design standards
- Designs all features including rehabilitation, tank modernisation, safety of dams, civil, mechanical, electrical in WRO except those delegated to Regions
- Furnishes feasibility designs to Chief Engineer (Plan Formulation)
- Final responsibility for all designs in Water Resources Organisation
- Prepares technical specifications

- Prepares feasibility and final designs and specification estimates
- Prepares designers operating criteria for all structures.

Soils Mechanics and Research :

- Engineering geologic evaluations
- Aggregate and soils testing
- Concrete mix design and testing

Institute of Hydraulics and Hydrology, Poondi :

- Respond to requests for solutions to new and recurring problems to designers and users
- Conduct special studies in applied hydraulics such as river scour, calibration of weirs and energy dissipation structures
- Conduct special modeling in flood control studies
- Conduct sedimentation surveys in reservoirs and tanks
- Construct and evaluate hydraulic models of new and innovative structures

Construction Policies, Procedures and Standards :

- Develop, review and update general construction policies and procedures
- Field construction staffing and mobility requirements
- Training
- Inspection
- Laboratories
- Reports
- Tendering procedures
- Mode of payment
- Develop, review and update standards
- Tender documents
- Claim (normal and disputed) and additional work
- Inspection reports
- Payment vouchers
- Completion plans
- Laboratory tests
- Construction scheduling.

Contract Administration and Quality Control:

- Review tender documents
- Assist Regions in complex, construction problems
- Assist in problems with contractors
- Review design for design unit for construct ability

- Recommend changes in designs due to differing site conditions
- Ensure quality control procedures and standards are implemented.

Construction Progress Reporting Unit:

- Assemble all monthly construction reports in Water Resources Organisation
- Prepare consolidated reports for Engineer-in-Chief, WRO and Chief Engineer (GI), PWD and Programme Budget Office
- Review reports for deviations from the programme schedule and inform contract administration unit

Machinery Unit:

- Provide all heavy equipment for construction and operation and maintenance
- Assist construction and operation and maintenance in assessing equipment needs

Role of Chief Engineer, Operation and Maintenance:

Operations:

- Develop policies, regulations and standards for reservoir and delivery system
- Coordinate with Environmental Cell on operational issues
- Assist Regions in preparing operation plans and standing operating procedures
- Review and approve Region operation policy
- Advise Chief Engineer (Plan Formulation) on operational issues for new studies / schemes

Special Analysis:

- State of the art systems analysis for river basins
- Environmental impacts of river / delivery system operations
- Develop drought plans
- Affects of flood on delivery system operation
- Adequacy of communication systems

Dam Safety Directorate:

- Establish statewide standards in cooperation with the Central Water Commission, Government of India for dam safety measures
- Develop proposals for dam safety deficiencies
- Monitor adequacy of designs, design reviews and quality control of large dams and other large structures
- Monitor and report status of operation and maintenance manuals, designers operating criteria and standing operating procedures for all large dams and other major structures
- Ensure preparation of emergency action plans.

Maintenance Standards:

- Develop review and update standards for maintenance of facilities including those turned over to Farmers Organisation
- Develop preventive maintenance procedures
- Develop procedures for review of maintenance

Review of maintenance :

- Maintain maintenance records state-wide
- Schedule review of maintenance of Region facilities turned over to farmers
- Identify and resolve common and / or recurring deficiencies.

Farmers Organisation and Turnover (FOT):

- Ensure maximum possible participation of farmers in irrigation management including operations and maintenance, implementation of rehabilitation / modernisation and new schemes
- Establish and update necessary legal and policy criteria in support of the FOT program
- Ensure the integration of system improvements with farmer participation
- Ensure that resources in terms of funds, trained staff, consultancy assistance and support services are available
- Maintain systematic socio-economic and other relevant data on the formation and functioning of FOT
- Ensure through Irrigation Management Training Institute that training needs for FOT program are met.
- Ensure linkages between WRO and other non-Government agencies to meet needs of manpower, training and FOT program implementation.

Workshop and Stores:

- Establish standards for design and maintenance of gates and related structures
- Design and fabricate gates and related structures based on data from design units
- Install gates and related structures
- Repair gates and related structures.

Role of Regional Chief Engineers:

- Develop goals and objectives for the Regions
- Establish priorities of work
- Establish adequate quality control measures
- Ensure sound environmental, land acquisition and economic rehabilitation and farmer organisation and turn over program
- Maintain public participation program
- Coordinate Region activities with other Departmental units, other Government agencies, water users and the public
- Maintain appropriate interstate relations
- Establish Region Advisory Committees

Formulation of proposals and Coordination:

- Collect data for planning of projects / schemes / programmes
- Analyse data and perform engineering and hydrologic analysis for inclusion in reports
- Plan and complete reports on projects and programmes in coordination with Chief Engineer (Plan Formulation) and other Water Resources Organisation Units
- Perform environmental monitoring and data collector and evaluate specific field problems
- Conduct water quality tests in laboratories
- Coordinate closely with other Tamil Nadu Agencies (e.g. Agriculture, PCB, TWAD, Metro Water)

- Coordinate with farmers and farmers organisations on new schemes
- Determine land acquisition requirements.

Design and Construction:

- Collect design data for basin designers and for Chief Engineer (Design Research and Construction Support)
- Transmit certain designs to the Chief Engineer, Design Research and Construction Support for review and approval
- Monitor, assist and report to Regional Chief Engineers' construction activities in the Region
- Review all quality control measures in the Region

Operation and Maintenance:

- Assist in preparation of operation and maintenance plans in territorial Circles
- Furnish operational data to Plan Formulation and Coordination Division for use for planning purposes
- Schedule review of maintenance in coordination with Chief Engineer (Operation and Maintenance)
- Negotiate Memorandums of Agreement with Farmers' Organisation and implement Farmers' Organisation Turnover programme.

Territorial Circles:

- Perform day-to-day operations and maintenance
- Coordinate with farmers and Farmers' Organisations
- Coordinate with other Water User Organisations
- Prepare, record and provide to management in coordination with the Collector(s)
- Manage the Divisions responsible for Sub Basin activities.

Additional Circles:

- Perform construction administration
- Perform other duties as prescribed by the Regional Chief Engineers.

General Set up of Personnel:

Section:

- The basic functional unit of the Department is the Section. The Section is headed by a Section Officer, designated as Assistant Engineer (Degree holder) or Junior Engineer (Diploma Holder). Normally he will be assisted by the erstwhile Work Charged Establishment now brought into regular establishment.

Sub Division :

A few Sections, normally 3 to 4 will be a Sub Division under the control of a Sub Divisional Officer, designated as Assistant Executive Engineer. The Assistant Executive Engineer will be from the Section Officer and from the promotees from Draughting officials. Normally the Assistant Executive Engineer will be assisted in his office by the ministerial staff like Junior

Assistants, Assistants, Superintendents, etc. For promotions and other establishment matters well laid rules and procedures find their place.

Division:

The next official hierarchy is the Divisional Officer promoted from the Sub Divisional Officers and designated as Executive Engineer. With respect to financial management and control and as well as for all the works related matters and issues, the Division is the basic unit of accounts. The Executive Engineer will be directly corresponding with the Accountant General (A&E) for all financial accounts concerned to his Division. The Executive Engineer is assisted in his office by ministerial staff like the Junior Assistants, Assistants, Superintendents, Cashiers, Divisional Accountants, etc., and technical staff like Junior Draughting officer, Draughting officer, Blue Print Operator, Technical P.A.

Circles:

Three or four Divisions will constitute a Circle which is headed by a Superintending Engineer promoted from the Executive Engineer. He will be having the overall control of works, accounts and finance. He will be assisted by Administrative Officer, Ministerial Staff and Technical Staff and also by Deputy Superintending Engineer, Assistant Executive Engineer, Assistant Engineer, etc.

Chief Engineer's Office:

Normally three or four Circles will constitute a Chief Engineer's office, which is headed by Chief Engineer promoted from the Superintending Engineer. Actually it varies between three to sixteen. He is directly corresponding with the Government for all the matters, works concerned, forwards budget target and other financial matters through Engineer-in-Chief, WRO and Chief Engineer (GI), PWD and issues under his control. He will be assisted by a Joint Chief Engineer in the capacity of Superintending Engineer, Administrative Officers, Executive Engineers, ministerial categories, technical categories, Chief Accounts Officer, etc. Engineer-in-Chief, WRO and Chief Engineer (GI), PWD or the level of a Chief Engineer will be directly contacting Government on policies and financial matters as a spokesman of the Department and also general Administrator.

Though the Division is the basic unit of finance and accounts, the finance flow down to the Sections, which is headed by Section Officer, designated as Assistant Engineer /Junior Engineer. Therefore, it is imperative to know about causative factors, affecting such flows. The financial flow in the Sections is only on the works. The work starts from the estimates. The estimate constitutes budgeting. Therefore, on the above light, the functions of the Section rather the works of the Assistant Engineer / Junior Engineer can be broadly seen as order.

Job Description

Section Officer (Operation and Maintenance):

- Maintenance and upkeep of already created assets
- Water Regulation, flow control, flow measurements, crop water requirement, budgeting
- Estimate preparations like plans preparation, detailed estimates, data preparation and costing of estimates for the purpose of technical sanction for the administratively sanctioned works on major and minor irrigation works
- Prepare rough cost estimates for administrative sanction for rehabilitation works and small minor irrigation projects

- Budget preparation on ongoing works, backlog works, Government promised works, potential works, maintenance and repair works, preparation of revised estimate on budget and preparation of final modification appropriation
- Maintenance and inventory control of tools and plant, machinery and equipments, etc.