CENTRAL WATER COMMISSION

ANNUAL REPORT

2006-07

NEW DELHI

INDIA – LAND AND WATER RESOURCES : FACTS

•	Geographical Area & Location	328.7 M ha Latitude 8^0 –4' & 37^0-06' North Longitude 68^0 – 7' & 97^0 – 25' East
•	Population 2006 (Estimated On 2001 Census)	1128.52 Million
•	Rainfall Variation	100 mm in Western most regions to 11000 mm in Eastern most region
•	Major River Basin (Catchment Area more than 20,000 Sqkm)	12 Nos. having catchment area 253 M ha
•	Medium River Basin (Catchment Area between 2000 and 20,000 Sq km)	46 nos. having catchments area 25 M ha
•	Total Navigable Length of Important Rivers	14464 km

WATER RESOURCES

•	Average Annual Rainfall (2001-2005)	3693.6 BCM
•	Mean Annual Natural Run-Off	1869 BCM
•	Estimated Utilisable Surface Water Potential	690 BCM
•	Total Replenishable Ground Water Resources	433 BCM
•	Ground Water Resources Available for Irrigation	369.6 BCM
•	Ground Water Potential Available for Domestic, Industrial And Other Purposes	71 BCM (approx.)
•	Ultimate Irrigation Potential	140 M ha
•	Irrigation Potential from Surface Water	76 M ha
•	Irrigation Potential from Ground Water	64 M ha
•	Storage Available Due to Completed Major & Medium Projects (Including Live Capacity less than 10 M.Cum)	213 BCM
•	Estimated Additional Likely Live Storage Available due to Projects Under Construction / Consideration	184 BCM

LAND RESOURCES (2000-01)

•	Total Cultivable Land	183.5 M ha
•	Gross Sown Area	190.6 M ha
•	Net Sown Area	140.9 M ha
•	Gross Irrigated Area	76.8 6 M ha
•	Net Irrigated Area	55.1 M ha

HYDROPOWER

•	Ultimate Hydropower Potential (As per reassessment)	148701 MW
•	Potential Developed by 31st March, 2007	30873 MW

From Chairman's Desk

The Annual Report for the year 2006–07 of Central Water Commission (CWC) is in your hands. The Report gives an insight into the functions and activities of CWC highlighting the contribution made in the development and management of Water Resources.

CWC continued to forge ahead in providing the necessary leadership and guidance for the development of the water sector and provided necessary support to the Ministry of Water Resources on all technical and policy matters in the year 2006-07. Officers of CWC headed several committees and contributed substantially on various issues. CWC provided technical assistance to the Ministry in respect of Baglihar and other projects of Indus basin in respect of issues under Indus Waters Treaty provisions. Regular activities of appraisal of major and medium irrigation projects and other water resources development schemes, monitoring of major, medium and extension/renovation/modernization (ERM) projects, environmental issues related to projects, design of hydraulic structures, hydrological observations and studies and flood forecasting services were successfully carried out during the year. Some of the important achievements of CWC during the period are:

Consultancy & Advisory Services

- Design Consultancy in respect of 125 Water Resources Development projects in India and neighbouring countries.

Monitoring & Appraisal of Water Resources Projects

- Techno-economic appraisal of water resources development projects and clearance for multi-purpose/irrigation/flood control projects.
- Monitoring of 73 Major, 33 Medium and 9 ERM Projects and CAD works of 133 projects.
- Examination of proposals for release of Rs. 1884.221 crore of Central grant under AIBP programme.
- Examination of proposals under the scheme for renovation, restoration and revival of water bodies.

Flood Management

- Timely issue of 6655 flood forecasts (with 95.72% accuracy) during the monsoon period of 2006 to help effective flood management, particularly in Assam, Bihar, Maharashtra, Karnataka, Gujarat which faced severe floods.
- Techno-economic evaluation of 98 schemes of Flood Management/Master Plans for Flood Control.

(B.S. Ahuja)
CHAIRMAN
CENTRAL WATER COMMISSION

HIGHLIGHTS OF THE YEAR 2006-07

- **DESIGNS:**
  - Design units of CWC undertook detailed designs and drawings of various types of hydraulic structures for 125 water resources development projects.

- **RIVER MANAGEMENT:**
  - Carried out Hydrological Observations at 878 stations spread over the country.
  - Operated 175 flood forecasting stations (including 28 inflow forecasting stations) spread over 9 major river basins. During the flood season 2006 total 6655 flood forecasts were issued out of which 6370 (95.7%) were within prescribed limits of accuracy. Daily flood bulletins and weekly flood news letters were issued during the flood season.
  - Provided assistance to Royal Government of Bhutan for maintenance of 35 Hydro-meteorological stations in Bhutan.
  - 13 (11 in India and 2 in Nepal) Hydro Electric Projects were under investigation in North-Eastern region.
  - 57 Minor Irrigation Schemes were under investigation in Mizoram. DPR for 44 schemes has been submitted and investigation work/ preparation of reports in respect of balance 13 schemes are under process.
  - 98 Flood Management Schemes/Master Plans for Flood Control were examined/appraised during the year 2006-07 upto February 2007.
  - As a part of Working Group on Water Resources for XI Five Year Plan (2007-12), a Sub-Group on Flood Management under the leadership of Member (RM) was set up to review the physical and financial performance of the flood sector during the X Plan and suggest strategy and Plan size for the XI Plan. The Sub-Group submitted its report to the Working Group.

- **WATER PLANNING:**
  - 53 new major irrigation projects, 26 revised major irrigation projects, 50 new medium irrigation projects, 10 revised medium irrigation projects and 6 thermal power schemes were under appraisal in CWC. 38 projects were accepted for investment clearance by the Advisory Committee.
  - Monitored 115 Major, Medium and Extension/Renovation/Modernization (ERM) irrigation projects receiving CLA under AIBP and 133 CAD projects.
  - 76 important reservoirs with total live storage of 133.021 BCM were monitored on weekly basis.
  - Examination of proposals for release of Rs. 1884.221 crore of Central grant under AIBP programme.
  - Provided technical assistance to MoWR in respect of the inter-State water disputes such as Cauvery Water Disputes, Mandovi Water Disputes, Krishna Water Disputes and the Ravi-Beas Water Disputes.

- **HRM:**
  - 167 in service officers were sponsored for training, attending seminars/ workshops, etc. within the country and 27 officers participated in various programmes abroad. NWA, Pune conducted 34 training programmes and 2 workshops for 882 officers of Central / State Governments and Public sector undertakings.

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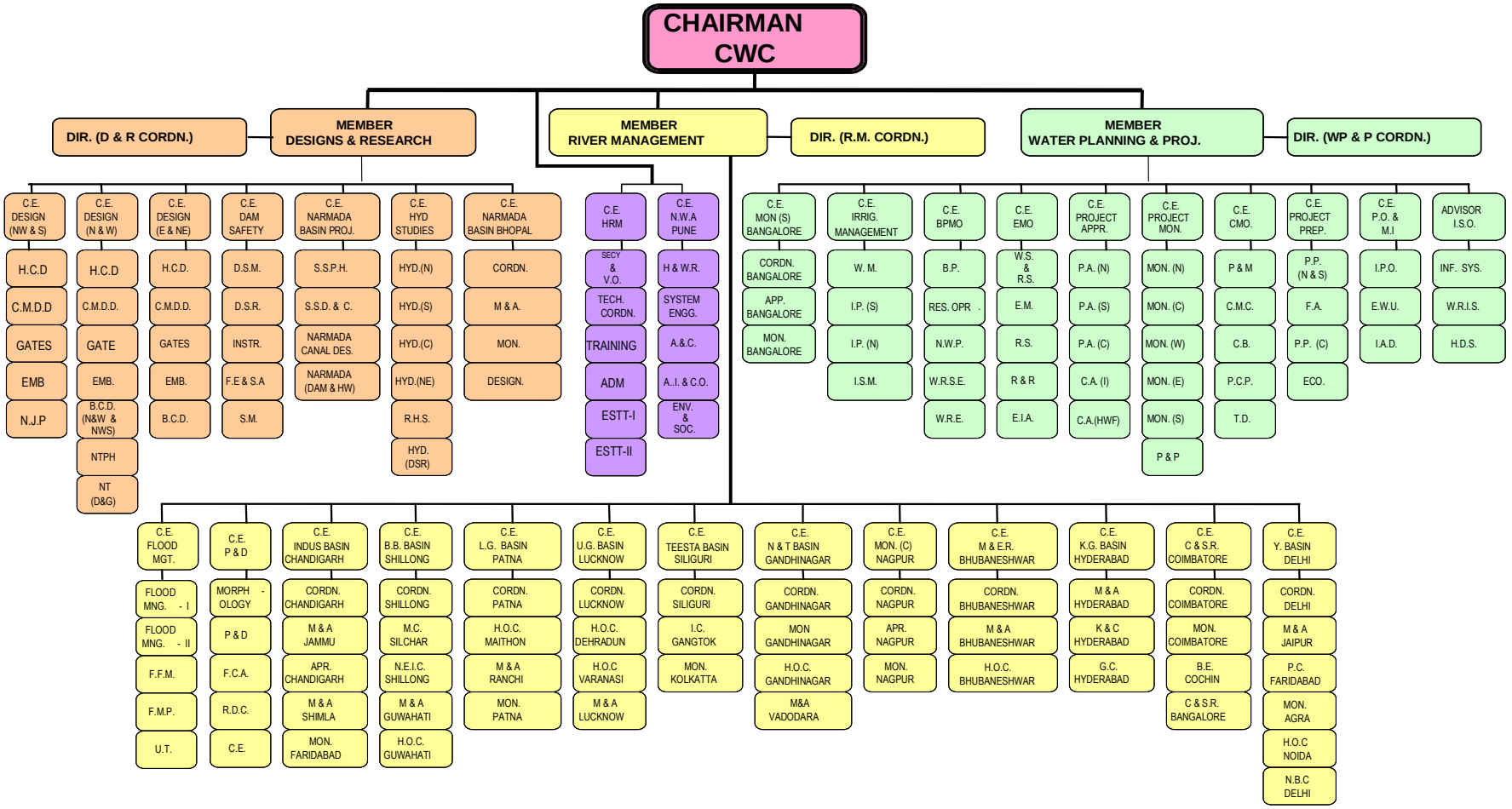
Organogram of Central Water Commission 2006-07



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CHAPTER-I

INTRODUCTION

1.1 History of CWC

Central Water Commission (CWC), an apex organization in the country in the field of Water Resources came into existence as "Central Waterways, Irrigation and Navigation Commission" vide Department of Labour Resolution No. DW 101(2) dated 5.4.1945. In the year 1951, it was renamed as "Central Water and Power Commission" (CW&PC) after its merger with the "Central Electricity Commission". Following the changes in the Ministry of Agriculture and Irrigation, in the year 1974, water wing of CW&PC was separated as "Central Water Commission", which continues till date. At present Central Water Commission functions as an "Attached Office" of the Ministry of Water Resources and is its main technical arm. It is manned by the Central Water Engineering Services (CWES) cadre, the only organised service of the Ministry of Water Resources.

1.2 Organisation

CWC is headed by a Chairman, with the status of Ex-Officio Secretary to the Government of India. The work of the Commission is divided among 3 wings namely, Designs and Research Wing (D&R), Water Planning and Projects Wing (WP&P) and River Management Wing (RM). Allied functions are grouped under respective wings and each wing is placed under the charge of a full-time Member with the status of Ex-Officio Additional Secretary to the Government of India. Each wing comprising of number of Organizations is responsible for the disposal of tasks and duties falling within the scope of functions assigned to it. In the discharge of these responsibilities, officers of the rank of Chief Engineer, Director/Superintending Engineer, Deputy Director/Executive Engineer, Assistant Director/Assistant Executive Engineer and other Engineering and Non-Engineering officers and supporting staff working in various regional and headquarter organizations, assist the Members. There is a separate Human Resources Management Unit headed by a Chief Engineer, to deal with Human Resources Management/ Development, Financial Management, Training and Administrative matters of the Central Water Commission. National Water Academy located at Pune is responsible for training of Central and State in-service engineers and it functions directly under the guidance of Chairman. Broad functional areas of Chairman and Members are:-

Chairman

Head of the Organization – Responsible for overseeing the various activities related to overall planning and development of surface water resources of the country and management of the Commission as a whole.

Member (Water Planning & Projects)

Responsible for overall planning and development of river basins, national perspective plan for water resources

development in accordance with the National Water Policy, techno-economic appraisal of Water Resources Projects and assistance to the States in the formulation and implementation of projects, monitoring of selected projects for identification of bottlenecks to achieve the targeted benefits, preparation of project reports for seeking international assistance, environmental aspects, issues related to construction machinery of projects, application of remote sensing technologies in water resources, etc.

Member (Designs & Research)

Responsible for providing guidance and support in planning, feasibility studies, standardization and designs of river valley projects in the country, safety aspects of major and medium dams, hydrological studies for the projects, coordination of research activities, etc.

Member (River Management)

Responsible for providing technical guidance in matters relating to river morphology, flood management, techno-economic evaluation of flood management schemes, collection of hydrological and hydro-meteorological data, formulation of flood forecast on all major flood prone rivers and inflow forecasts for selected important reservoirs, investigation of irrigation/hydro-electric/multipurpose projects, monitoring of major and medium projects with regard to Command Area Development, etc.

The incumbents to the posts of Chairman and Members of Central Water Commission during the year 2006-07 were:

1.	Chairman, CWC	:	Shri R. Jeyaseelan (01.4.2006 to 30.11.2006)
			Shri S. K. Das (1.12.2006 to 31.3.2007)
2.	Member (D&R)	:	Shri S. K. Das (1.4.2006 to 30.11.2006)
		:	Shri A. B. Pal * (1.12.2006 to 28.2.2007)
		:	Shri B. S. Ahuja ** (01.03.07 to 31.03.07)
3.	Member (WP&P)	:	Shri B. S. Ahuja (1.4.2006 to 31.3.2007)
4.	Member (RM)	:	Shri S. K. Agarwal (01.04.06 to 31.01.07)
		:	Shri B. P. Singh * (01.02.07 to 28.02.07)
			Shri A. B. Pal (1.3.2007 to 31.3.2007)

* Additional Charge (Current Duties)

** Additional Charge

1.3 Broad Functions

CWC is charged with the general responsibility of initiating, coordinating and furthering in consultation with the State Governments concerned, schemes for the control, conservation and utilization of water resources in the respective State for the purpose of flood management, irrigation, drinking water supply and water power generation. The Commission, if so required, can undertake the construction and execution of any

such scheme.

In exercise of the above responsibilities following are the main functions of CWC:

- To undertake necessary surveys and investigations as and when so required, to prepare designs and schemes for the development of river valleys in respect of power generation, irrigation by gravity flow or lift, flood management, environmental management, resettlement and rehabilitation, soil conservation, anti-water logging measures, reclamation of alkaline and saline soils, drainage and drinking water supply;
- To undertake construction work of any river valley development scheme on behalf of the Government of India or State Government concerned;
- To advise and assist, when so required, the State Governments (Commissions, Corporations or Boards that are set up) in the investigation, surveys and preparation of river valley and power development schemes for particular areas and regions;
- To advise the Government of India in respect of Water Resources Development, regarding rights and disputes between different States which affect any scheme for the conservation and utilization and any matter that may be referred to the Commission in connection with river valley development;
- To advise the Government of India and the concerned State Governments on the basin-wise development of water resources;
- To advise the Government of India on all matters relating to the Inter-State water disputes;
- To collect, coordinate the collection of, publish and analyse the data relating to tidal rivers, rainfall, runoff and temperature, silting of reservoirs, behaviour of hydraulic structures, environmental aspects, etc. and to act as the central bureau of information in respect of these matters;
- To collect, maintain and publish statistical data relating to water resources and its utilization including quality of water throughout India and to act as the central bureau of information relating to water resources;
- To initiate schemes and arrange for the training of Indian Engineers in India and abroad in all aspects of river valley development;
- To standardize instruments, methods of observation and record, materials for construction, design and operation of irrigation projects;
- To initiate studies on socio-agro-economic and ecological aspects of irrigation projects for the sustained development of irrigation;
- To conduct and coordinate research on the various aspects of river valley development schemes such as flood management, irrigation, navigation, water power development, etc., and the connected structural and design features;
- To promote modern data collection techniques such as remote sensing technology for water resources

development, river forecasting and development of computer software;

- To conduct studies on dam safety aspects for the existing and future dams and standardize the instruments for dam safety measures;
- To initiate morphological studies to visualise river behaviour, bank erosion/coastal erosion problems and advise the Central and State Governments on all such matters;
- To conduct experiments, research and to carry out such other activities to promote economic and optimum utilization of water resources; and
- To promote and create mass awareness in the progress and achievements made by the country in the water resources development, use and conservation.

1.4 Headquarters

There are eighteen organisations headed by a Chief Engineer at CWC headquarters, New Delhi. Out of which, nine organisations are under WP&P wing, six organisations are under D&R wing and two organisations are under RM wing. In addition, Human Resources Management (HRM) Unit headed by Chief Engineer (HRM) is also located at headquarters. The details of the organisations are given in the organogram at Annex-I.

1.5 Regional Offices

In order to achieve better results in the Water Resources Sector and have better coordination with the State Government departments, CWC has established regional offices in the major river basins. It has 13 regional offices, each headed by a Chief Engineer. The offices are located at Bangalore, Bhopal, Bhubaneswar, Chandigarh, Coimbatore, Delhi, Gandhi Nagar, Hyderabad, Lucknow, Nagpur, Patna, Shillong, and Siliguri.

1.6 Personnel Management

The staff strength of CWC in position as on 1.1.2007 was 4074 as against the sanctioned posts of 5213. The details of posts (sanctioned and filled) at the headquarters and at the Regional offices are given in Table 1.1. Summary of sanctioned and filled posts in different groups is given in Table 1.2.

Table 1.1
Staff Strength

Category	Sanctioned	Filled
Headquarters	1995	}
Regional Offices	3218	4074 }
Total	**5213**	**4074**

Table 1.2
Group-Wise Details of Posts Sanctioned and Filled

Sl. No.	Category	Sanctioned	Filled
1.	Group "A"	710	551
2.	Group "B"	480	405
	Group "B" (Non-Gazetted)	558	423
3.	Group "C"	2448	1865
4.	Group "D"	1017	830
	Total	**5213**	**4074**

1.7 Plan Schemes & Annual Budget

1.7.1 Plan Schemes

Details of the Plan Schemes under operation during the year in CWC are given below:

(Rs. Crore)

Sl. No.	Name of Scheme	X plan outlay	2006-07			Total Exp. In X Plan upto Mar, 07	Broad Objective
1	2	3	4	5	6	7	8
1.	National Water Academy	10. 00	1.77	1.79	1.64	6.59	Conducting training courses for Central and State Government officials
2.	Snow Hydrological Studies	2.00	0.54	0.45	0.39	1.65	Collection of Snowmelt run-off data and preparation of snowmelt run-off Model.
3.	Monitoring of Water Quality in rivers of India	7.50	1.4	0.73	0.51	3.99	Collection of Hydro-Meteorological data and quality of water resources from 376 hydrological observation stations
4.	Hydrological Observations on Rivers originating from Bhutan	1.5	0.06	0.06	0.12	1.57	Collection of Hydrological data for rivers flowing to India through Bhutan and communication of real time data

5.	Strengthening of Monitoring Organization	19. 00	3.94	3.5	3.30	15.73	Monitoring of major/medium/ERM irrigation schemes under AIBP/non-AIBP CAD Schemes and Renovation of Water bodies
6.	Kirthai & Other Projects in Indus Basin	7. 00	1.98	1.15	1.07	5.81	Survey & Investigation and preparation of Detailed Project Reports
7.	Estt/Maintenance of Key Hydrological Stations on rivers other than Ganga and Indus	40.00		9.28	8.74	40.44	Running & Maintenance of 111 Key HO stations and collection of Hydro-meteorological data in rivers other than Ganga and Indus
8.	Investigation for Water Resources Development in N.E States	5.28	0.44	0.51	0.47	5.94	Survey & Investigation of 57 M.I Schemes in Mizoram and Inv. of 14 H.E Projects in Arunachal Pradesh
9.	Investigation of Teesta Hydel Project, Ranjit HE Project Stage II & IV and Manas Teesta Link	9. 00	3.47	2.17	1.89	11.00	Survey & Investigation and preparation of Detailed Project Reports
10.	Flood Forecasting on rivers Common to India & Nepal	3. 00	0.12	0.00	0.00	0.12	R&M of 37 G&D and Meteorological stations in Nepal
11.	Strengthening and Modernization of FF & H.O Network in Brahmaputra & Barak Basin	14. 00	3.66	3.2	2.28	13.55	R&M of 39 HO&FF stations in Brahmaputra and Barak Basin
12.	Hydrology Project Stage - I & II	15.13	2.89	0.15	0.04	14.33	Hydrology project Stage II sanctioned in January '06
13.	Establishment & Modernization of F.F Network in India including Inflow Forecast	51.00	16.65	13.3	11.95	29.87	Modernization of 172 FF Stations by installing telemetry system, etc.
14.	Capital Outlay for Flood Control Projects	25. 00	2.89	4.4	0.00	18.86	Construction of residential & non-residential buildings for CWC field offices

15.	Pancheshwar Multipurpose Project	15. 00	2.13	1.66	1.51	11.02	Preparation of DPR of Pancheshwar Multipurpose Project, R&M of 31 HO and Meteorological stations
16.	Survey and Investigation of Kosi High Dam	30. 00	13.9	6.39	5.17	12.45	Survey & Investigation and preparation of Detailed Project Reports. Joint Project Office (JPO) opened on 17-08-04.
17.	Upgradation of facilities and skills in CWC regarding Dam Safety and Rehabilitation	8.00	2.26	1.04	0.76	2.23	Establishment of two units on dam Break Modelling and Emergency Action Plan.
18.	Upgradation and Modernisation of Computerisation/ Information System	8.00	2.1	1.01	0.75	6.68	Upgrading CWC's networking, publication unit and library, procurement of hardware and software & maintenance.
19.	Setting up of specialized units for HE Designs, Pumped Storage and Instrumentation	3.00	0.90	0.17	0.18	0.94	Setting up of instrumentation museum and training of personnel in specialised subjects.
20.	Studies on Reservoir Sedimentation and other Remote Sensing Applications	14.00	2.44	2.07	1.96	8.36	o Reservoir Sedimentation, studies and Assessment of Waterlogged, Salinity and/or Alkalinity affected areas in Irrigated Commands through out India using Remote Sensing Techniques. o . Reservoir Sedimentation studies using Hydrographic Techniques. o Morphological studies of 6 rivers.

1.7.2 Annual Budget

The plan and non-plan budget outlays and expenditure for the year 2006-07 are given in Table 1.3.

Table 1.3
Plan and Non-Plan Outlay and Expenditure on Schemes

(Rs. crore)

Sl. No.	Name of Scheme	Plan		Non-Plan	
1.	Direction & Administration	-	-	11.46	13.16
2.	Consultancy	-	-	13.77	14.82
3.	Research	-	-	1.06	0.85
4.	Training	1.77	1.64	0.53	0.46
5.	Data Collection	10.07	8.74	40.35	43.32
6.	Survey & Investigation	-	-	5.44	5.22
7.	Other - Major and Medium Irrigation	16.70	9.51	3.15	2.73
	- Flood Control	45.22	23.36	32.09	36.89

1.8 Consultancy Services

The Designs & Research Wing and the investigation circles of CWC have been providing consultancy to Central Departments, State Governments and Public Sector Organisations in planning, surveys & investigation and design of river valley projects in India and abroad.

1.9 Progressive Use of Hindi in Official Work

The official language policy is being implemented in all the offices of CWC. Continued measures were taken for improving progressive use of Hindi for official purpose. The Official Language Implementation Committee of CWC meets regularly under the Chairmanship of Member (D&R). Various measures required for progressive use of Hindi are discussed and timely action is taken on the decisions in the meetings. Following initiatives in regard to progressive use of Hindi in this year were taken.

1. Three officers were nominated for Hindi training. Four officials were deputed for Hindi typing, while 11 were nominated for Hindi stenography.

2. Regional offices located at Gandhinagar, Coimbatore and Bhopal were inspected and effective steps were taken for rectifying shortcomings noticed during the inspection.

3. To generate awareness on Hindi and to give practical knowledge of the Official Language provisions and incentive schemes, Hindi workshops were organised at CWC headquarters. Hindi workshops were also organised in the offices located at Gandhinagar, Coimbatore and Bhopal in which 98 officers participated.

4. Apart from translation of documents falling under section 3(3) of the Official Language Act, the Annual Report of CWC 2005-06 and Central

Guidelines for Water Audit and water conservation and other routine materials were translated into Hindi.

5. To achieve the targets of annual programme 2006-07 and to generate awareness about Hindi. Departmental Terminology has been prepared and is being circulated.

6. CWC has won the Rajbhasha Vaijayanthi shield (1st prize) of the MoWR for the year 2004-05 for doing maximum work in Hindi. The shield was awarded in a function held at MoWR, New Delhi on 10.10.2006

7. Hindi fortnight was organised in September 2006. Various competitions like Hindi noting/drafting, essay writing, extempore speech, *Kavya Spardha*, technical article writing were organised and winners were awarded prizes. Raj Bhasha Chal Shields for the year 2005-06 were awarded for doing their maximum work in Hindi during the year to the CWC offices situated at region A,B,C viz. Planning Circle, Faridabad, Monitoring Directorate, Chandigarh and North East Investigation Circle and Coordination Section and Dam Safety & Rehabilitation Directorate at headquarters.

8. Meeting of the Hindi Salahakar Samiti was held on 16.11.2006 under the chairmanship of Hon'ble Minister of Water Resources at New Delhi. Chairman, CWC and Member (D&R) participated.

9. To monitor the progress of Hindi the 2nd sub-committee of the Parliamentary Committee on Official Language visited South Western Rivers Sub-division, Mangalore on 27.04.2006, and Beach Erosion Directorate, Kochi on 12.10.2006. The Members of the Committee expressed satisfaction about the progress of Hindi in CWC offices.

1.10 Reservation for SC, ST & OBC

The representation of SC, ST & OBC officials in different grades is given in Table 1.4.

Table 1.4
Representation of SC & ST Officials in Different Grades

(as on 1-1-2007)

Category	No. of Filled posts	No. of SCs	No. of STs	No. of OBCs
Group A	521	59	19	9
Group B	598	101	12	5
Group C	1596	201	39	60
Group D	829	233	82	11
Total	**3544**	**598**	**152**	**85**

Note:- The above figures do not include figures pertaining to CSS, CSSS and CSCS Cadres which are controlled by the Ministry of Water Resources and for the cadre controlled by Deptt. of Economic Affairs & Deptt. of Statistics.

1.11 Status of Filling up of Vacancies Reserved for Disabled Persons

In pursuance of Section 33 of Persons with Disabilities (Equal Opportunities Protection of Rights and Full participation) Act, 1995 posts for disabled persons have been identified and the position of Disabled Persons in position as on 1.1.2007 is given in Table 1.5. Efforts are being made to fill up the backlog vacancies.

Table 1.5
Number of Disabled Persons in Position

(as on 1.1.2007)

GROUP	OH	VH	HH	TOTAL
'A'	2	-	-	3
'B'	3	-	1	4
'C'	5	-	-	5
'D'	2	4	1	7
Total	**13**	**4**	**2**	**19**

OH – Orthopaedic Handicapped VH – Visually Handicapped HH – Hearing Handicapped

Note:- The above figures do not include figures pertaining to CSS, CSSS and CSCS Cadres which are controlled by the Ministry of Water Resources and for the cadre controlled by Deptt. of Economic Affairs & Deptt. of Statistics.

1.12 Welfare Measures and Incentives

The different welfare measures and incentives that are in existence are given under.

1.12.1 Benevolent Fund

The Central Water Commission Benevolent Fund set up in 1966 aims at providing prompt financial assistance to the deserving members to take care of damages at the time of natural calamities or to meet expenses of medical treatment for their own prolonged illness such as Cancer, TB,, etc. and surviving family members of those who died while in service. The financial assistance is provided in two ways:

- Immediate Relief upto Rs. 10,000/-
- Long Term Relief upto Rs. 8,000/- payable in eight monthly instalments.

The administration of the fund vests in the Governing Body, which comprises of a Chairman, one Honorary Secretary, one Treasurer and 8 Members. The audited accounts are placed before the General Body in the Annual General Body meeting. The existing subscription rate is Rs. 5/- (Five) per month. During the year 2006-07 there were six cases of immediate relief and four cases of long term relief approved by the Governing Body of the Benevolent Fund.

1.12.2 Co-Operative Thrift And Credit Society

Department of Irrigation Co-operative Thrift & Credit Society Ltd., has been functioning with its registered office at

West Block – I, R.K. Puram, New Delhi since March 1959 for the welfare and benefit of the officers and staff of the Ministry of Water Resources, Central Water Commission, Central Soil & Materials Research Station, Department of Power, Central Electricity Authority, Principal Pay & Accounts Office of the Ministry of Water Resources and Pay & Accounts Office, Central Water Commission. It provides its member loans to the extent of Rs. 90,000/- and emergency loan of Rs. 10,000/-, recoverable in 60 and 10 monthly instalments respectively at a rate of interest of 9% per annum. The Society pays gratuity for retiring members and writes off outstanding loans against deceased members from the members' welfare fund.

1.12.3 Sports and Cultural Activities

Number of CWC officials and staff participated in the inter-ministry athletics and sports events and distinguished themselves with excellent performances. CWC officials had outstanding performance in inter-ministry athletics, Delhi State Masters Athletics Championship and Asia Masters Athletics Championship-2006 with first position in four events, second position in two events and third position in one event. CWC Hockey Team won the inter-ministry Hockey tournament and *Best Player* award.

1.12.4 Setting Up of Liaison Cell for SC/ST/OBC/Handicapped Persons

A Liaison Cell for SC/ST/OBC /Handicapped Persons has been set up in CWC to look after their welfare.

1.13 Restructuring of Central Water Commission

The National Commission for Integrated Water Resources Development Plan (NCIWRDP) set up under the Chairmanship of Dr. S.R. Hashim, the then Member, Planning Commission, to study the development and management of National Water Resources in a professional manner, in its report has, inter-alia, recommended that the "entire question of restructuring of the Central Water Commission may be got studied in detail by appointing competent consultants."

Accordingly, the Ministry of Water Resources had awarded the Consultancy for the above studies to the Administrative Staff College of India, Hyderabad on 12th September, 2001. The terms of reference of the study include (i) the evaluation of present status of Central Water Commission and its functions; (ii) future projections in the Water Sector for 2025; (iii) Mission for Central Water Commission in respect of the future projections for 2025; and the organizational structure and related issues in respect of CWC to enable it in achieving the Mission.

The draft report was submitted by ASCI in September, 2002. Thereafter interactive work shops were held with CWC officers to finalise the recommendations of the study as per the terms of reference. The final report from ASCI is awaited.

1.14 Citizen's Charter for CWC

As per the guidelines issued by Department of Administrative Reforms & Public Grievances (AR&PG), a Task Force under

the Chairmanship of Member (WP&P), CWC and Chief Engineer (BPMO), CWC as Member-Secretary & Nodal Officer was constituted for formulating Citizen's Charter for CWC. The Citizen's Charter was finalised with the concurrence of MoWR and has been published on CWC website.

1.15 Right to Information Act

The Right to Information Act enacted by Parliament on 15th June, 2005 came into force on the 12th October, 2005 (120th day of its enactment). CWC has implemented the provisions of the Act. Information in respect of Central Water Commission in compliance of Right to Information Act ' 2005 has been put in public domain through its official website at http://cwc.gov.in

During 2006-07, 119 requests were received for information under RTI Act. Information was provided in all the cases.

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CHAPTER-II

WATER RESOURCES DEVELOPMENT

2.1 Water Resources in India

Central Water Commission (CWC) has been making periodic assessment of the Country's water resources. The water resources potential of the country, which occurs as a natural runoff in the rivers is about 1869 Billion Cubic Metres (BCM). It constitutes a little over 4% of the total river flows of the world. However, due to various constraints of topography and uneven distribution over space and time, only about 1123 BCM of the total annual water potential can be put to beneficial use. This can be achieved through 690 BCM of utilizable surface water and 433 BCM through ground water.

While water for drinking purpose has been accorded topmost priority in water use, irrigation is the major consumer of water. Ultimate irrigation potential which can be created making use of the utilizable surface water resources through major, medium and minor projects would be about 75.9 m ha. Irrigation potential making use of ground water has now been assessed as 64 m ha. Thus the total irrigation potential from surface and ground water sources would be about 139.9 m ha. Besides this, an additional irrigation potential of about 35 m ha can be created by taking up long distance inter basin transfer of water from surplus to deficit basins. Water resources potential in the major river basins is given in *CWC Publication – Handbook on Water and Related Information, Jan, 2005.* In order to appropriately address the present and future water and food grain requirements of the society within the available financial resources, following thrust/priority areas for water resources related issues have been identified by the Governments:

- Improving water utilization efficiency;
- Command area development and participatory irrigation management;
- Flood management and erosion control;
- Protection of costal erosion;
- Dam safety and rehabilitation;
- Revival and restoration of existing water bodies;
- Appropriate regulation and management of ground water;
- Ground water recharge;
- Pursue the agenda for Inter-linking of rivers, starting with the south-bound rivers;
- Rural drinking water supply and sanitation;

Central Water Commission is directly and indirectly contributing in achieving the objectives of these thrust/priority areas.

2.2 Highlights of Water Resources Sector

As the variability of rainfall over the country is well known, the development of water resources for irrigated agriculture received high priority in the different Plan

periods. Expansion of irrigation facilities, along with consolidation of the existing systems, has been the main strategy for increasing production of food grains.

Irrigation support is provided through major, medium and minor irrigation projects and command area development.

2.2.1 Irrigation Potential: Major & Medium Irrigation Sector

The ultimate irrigation potential of the country is estimated as 140 m ha. Of which irrigation potential from major and medium irrigation projects is assessed as 58.5 mha. Irrigation potential created in the country from major and medium irrigation projects, which stood at 9.7 mha. in 1951, has risen to 36.98 mha. till the end of IX Plan. The target for Tenth Plan is to achieve a cumulative irrigation potential upto 42.28 mha. The cumulative figures of potential created in the successive plan periods are given in Figure 2.1

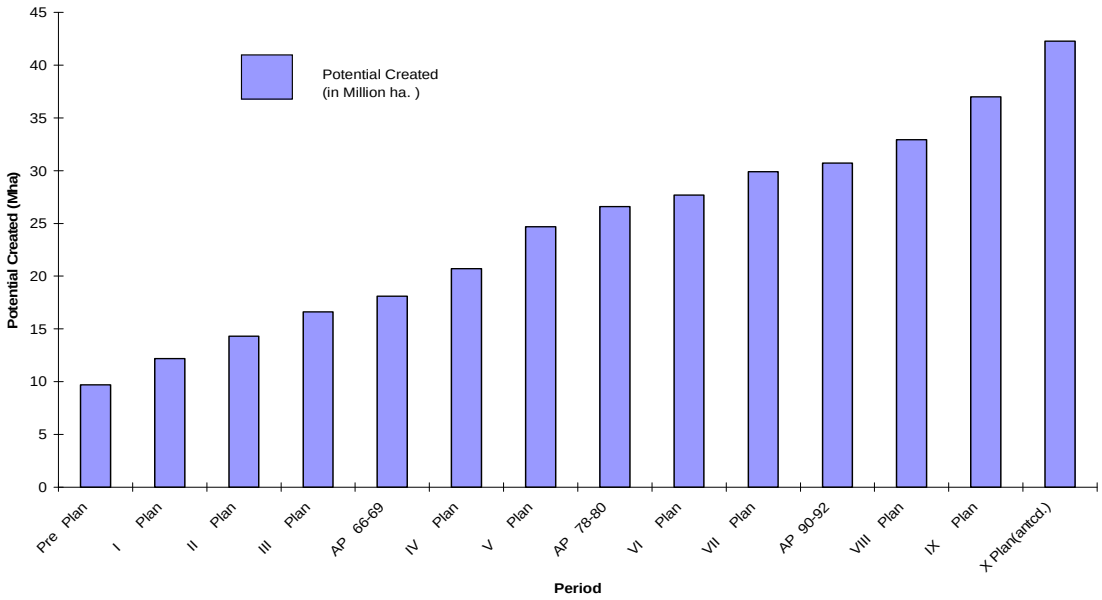


Fig 2.1 Growth of Irrigation Potential Created During Pre-Plan and Plan Period (Cumulative) (Major And Medium Irrigation Sector)

2.2.2 Major and Medium Irrigation Projects

In 1951, during launching of the First Five Year Plan, there were 74 major and 143 medium irrigation projects in the country. During the plan period since 1951 to end of X plan in 2007, as per available information, total No. of projects taken up are 368 major, 1087 medium and 215 ERM schemes out of which 202 major, 865 medium and 126 ERM projects have been anticipated to be completed by end of X Plan as given below in table 2.1. The cumulative irrigation potential created till the end of IX Plan was 36.98 mha and original target kept for X Plan was 9.93 mha, which was revised to 6.50 m ha during mid term appraisal. State wise cumulative potential created through major and medium projects upto end of IX Plan and likely cumulative

achievement upto X Plan are given in Table 2.2. Growth of irrigation potential created through major and medium irrigation projects and corresponding outlays/ expenditure in various plan periods is given in Table. 2.3.

Table 2.1

Number of Major, Medium & ERM Projects taken up and completed upto X Plan

Category	Projects Taken Up			Projects likely to be completed			Spill over into XI Plan
	Pre-plan	Plan	Total	Pre-plan	Plan	Total	
Major	74	368	442	74	202	276	166
Medium	143	1087	1230	143	865	1008	222
ERM	-	215	215	-	126	126	89
Total	217	1670	1887	217	1193	1410	477

Source: *Report of the Working Group on Water Resources for XI Five Year Plan (2007-12)*

Table 2.2

State wise Creation of Irrigation Potential through Major & Medium Irrigation Sector

(Thousand ha.)

Sl. No.	State	Ultimate Irrigation Potential	Potential created upto IX Plan (1997-2002)	Target of Potential creation during X Plan	Potential created upto X Plan
1	Andhra Pradesh	5000.00	3303.22	3051.59	3742.66
2	Arunachal Pradesh	0.00	0.00	0.00	1.20
3	Assam	970.00	243.92	174.37	312.90
4	Bihar	5223.50	2680.00	1714.83	2959.00
5	Jharkhand	1276.50	354.47	230.45	603.97
6	Goa	62.00	21.17	15.33	37.65
7	Gujarat	3000.00	1430.37	1300.83	2218.50
8	Haryana	3000.00	2099.49	1849.97	2191.36
9	Himachal Pradesh	50.00	13.35	7.51	15.45
10	Jammu & Kashmir	250.00	179.69	168.75	203.30
11	Karnataka	2500.00	2121.12	1844.82	2127.75
12	Kerala	1000.00	609.49	558.87	1090.47
13	Madhya Pradesh	4853.07	1386.90	875.63	1451.90
14	Chattisgarh	1146.93	922.50	760.74	1810.68

15	Maharashtra	4100.00	3239.00	2147.24	3494.15
16	Manipur	135.00	91.15	72.91	103.05
17	Meghalaya	20.00	0.00	0.00	0.00
18	Mizoram	0.00	0.00	0.00	0.00
19	Nagaland	10.00	0.00	0.00	1.00
20	Orissa	3600.00	1826.56	1794.17	1989.97
21	Punjab	3000.00	2542.48	2485.99	2604.67
22	Rajasthan	2750.00	2482.15	2313.87	2890.35
23	Sikkim	20.00	0.00	0.00	0.00
24	Tamil Nadu	1500.00	1549.31	1549.29	1561.06
25	Tripura	100.00	4.90	4.50	18.70
26	Uttar Pradesh	12154.00	7910.09	6334.00	8781.35
27	Uttranchal	346.00	280.30	185.41	289.65
28	West Bengal	2300.00	1683.29	1527.12	1769.81
29	UTs	98.00	6.51	3.94	6.51
	Total States+U.Ts.	**58465.00***	**36981.43**	**30972.13**	**42277.06**

Source : Planning Commission

Table 2.3

Plan wise Outlays and Cumulative Growth in Creation of Irrigation Potential (Major & Medium Projects)

Period	Outlay/ Expenditure (Rs. Crore)	Cumulative Expenditure (Rs. Crore)	Potential created (m ha)		Potential Utilized (m ha)
			During	Cumulative	
Pre-plan period	--		9.70	9.70	9.70
I Plan (1951-56	376	376	2.50	12.20	12.98
II Plan (1956-61)	380	756	2.13	14.33	13.05
III Plan (1961-66)	576	1332	2.24	16.57	15.77
Annual Plan (1966-69)	430	1762	1.53	18.10	16.75
IV Plan (1969-74)	1242	3004	2.60	20.70	18.69
V Plan (1974-78)	2516	5521	4.02	24.72	21.16
Annual Plans (1978-80)	2079	7599	1.89	26.61	22.62
VI Plan (1980-85)	7369	14968	1.09	27.70	23.57
VII Plan (1985-90)	11107	26075	2.22	29.92	25.47
Annual Plans (1990-92)	5459	31534	0.82	30.74	26.32

VIII Plan (1992-97)	21072	52606	2.21	32.95	28.44
IX Plan (1997-2002)	49289	101895	4.03	36.98	31.03
X Plan (2002-2007) *	71213	173108	5.30	42.28	34.38

***Provisional** **Source:** Planning Commission

Number of Major, Medium and ERM projects taken up and completed in the pre plan and plan period are shown in Fig 2.2, 2.3 and 2.4 respectively.

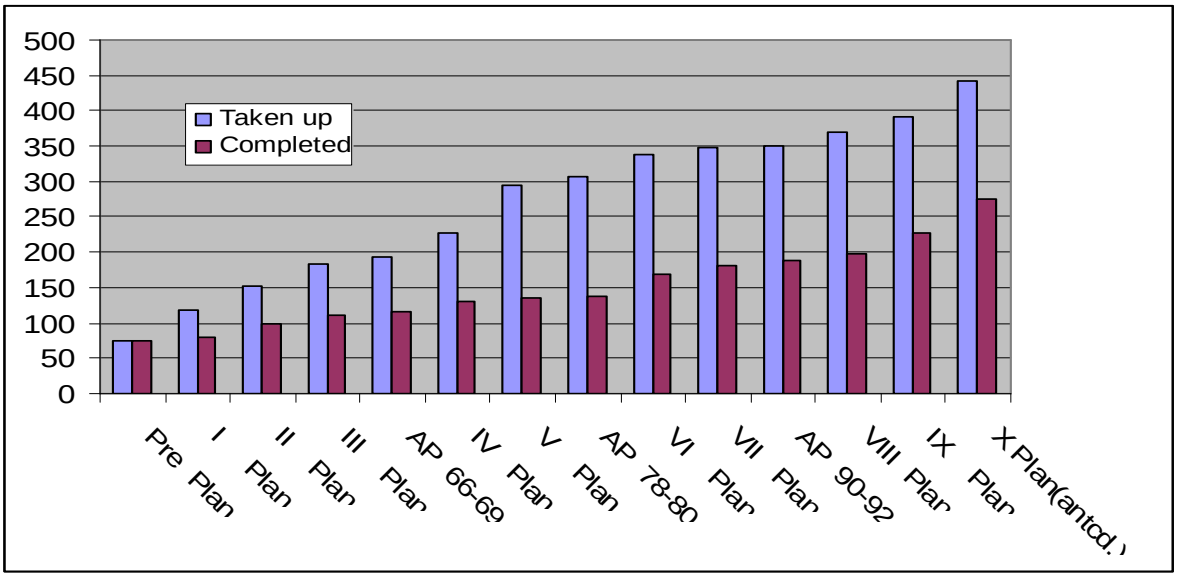


Fig 2.2 MAJOR Irrigation projects
Taken up and completed during pre-plan and plan period (Cumulative)

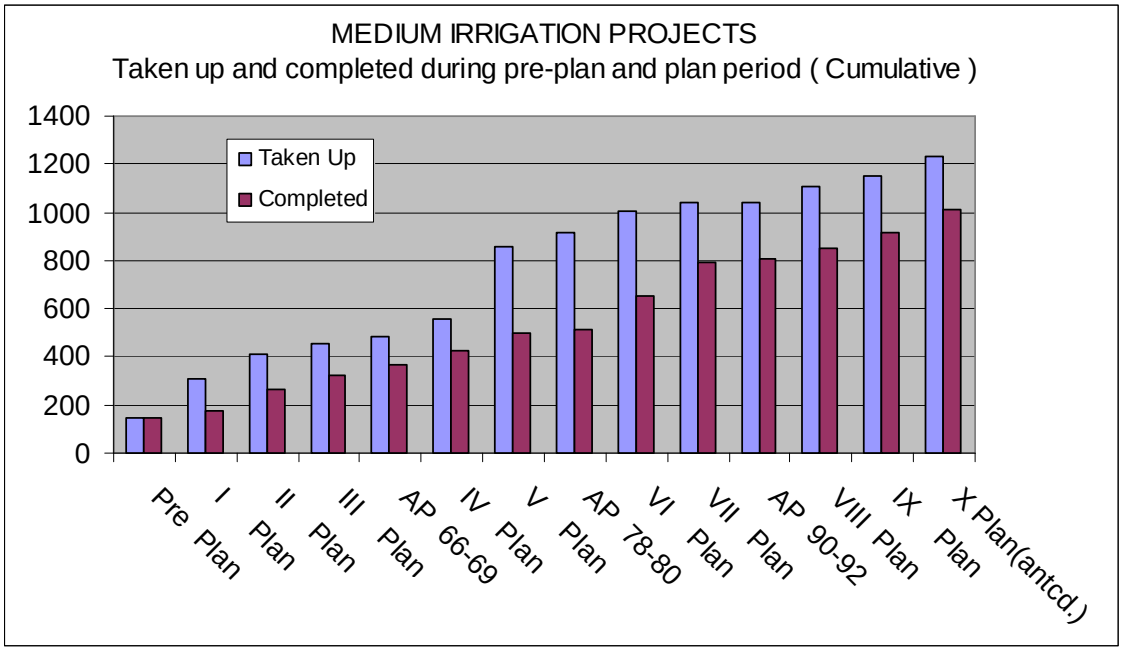


Fig 2.3 Medium Irrigation projects
Taken up and completed during pre-plan and plan period (Cumulative)

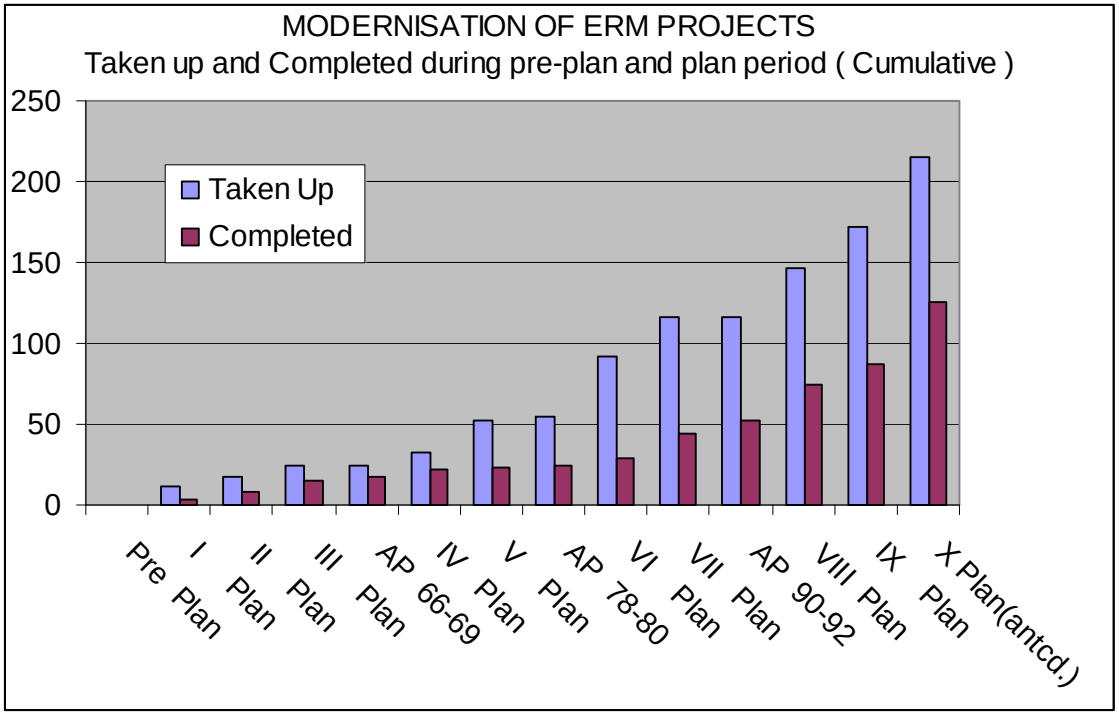


Fig 2.4 Modernisation of ERM Projects
Taken up and Completed during pre-plan and plan period (Cumulative)

2.2.3 Irrigation Development under Tribal Sub-Plan districts

A Tribal Cell was originally sanctioned in March 1979 as part of the strengthening of the Irrigation Dte. One of the functions entrusted to Tribal Cell is "Preparation of Annual Status Report on irrigation development in TSP areas in respect of all the given States having major/medium irrigation projects for the benefit of ST&SCs". The report on the status of irrigation projects benefiting TSP is prepared every year. The report for the year 2005-06 was prepared.

3

CHAPTER-III

RIVER MANAGEMENT

3.1 Systematic Collection and Storage of Hydrological Data

Central Water Commission at present operates National Network of 878 Hydrological Observation Stations. Out of these 878 stations, 288 are Gauge Stations, 194 are Gauge and Discharge Stations, 120 are Gauge Discharge and Water Quality Stations, 35 are Gauge Discharge and Silt Stations, while the remaining 241 are Gauge Discharge Silt and Water Quality Stations. The basin-wise distribution of these stations is detailed below in Table 3.1.

Table 3.1
Basin-wise number of Hydrological Observation Stations

1	Indus	37
2	Ganga, Brahmaputra, Meghna/Barak	443
3.	Godavari	64
4.	Krishna	68
5.	Cauvery	34
6.	Subarnrekha	12
7.	Brahmani – Baitarni	13
8.	Mahanadi	41
9.	Pennar	8
10.	Mahi	13
11.	Sabarmati	13
12.	Narmada	25
13.	Tapi	18
14.	West Flowing rivers from Tapi to Tadri	16
15.	West Flowing rivers from Tadri to Kanyakumari	29
16.	East Flowing rivers between Mahanadi and Pennar	12
17.	East Flowing rivers between Pennar and Kanyakumari	17
18.	West Flowing rivers of Kuchh and Saurashtra including Luni	15
	Total:	**878**

The basic data collected by field units is processed and validated at the Sub-Division, Division and Circle level and the authenticated data in the form of Water Year Books and Water Quality Year Books is published and then transmitted to CWC (HQ) for storage, updating, retrieval etc. The dissemination of data to bonafide users is processed as per the request for data received in Regional offices of CWC as well as at the Headquarters by the Planning & Development (P&D) Organisation and Information System Organisation.

P&D Organisation is maintaining hydrological data pertaining to Ganga, Brahmaputra and Barak Basins in computerized format. The data of these basins being of classified nature is provided to the bonafide users on request following a set procedure and guidelines for release of classified data. Wherever required, the approval of MoWR is sought for release of such data. Computerised data is now available for other regions also after the implementation of the Hydrology Project.

3.1.1 Hydrology Project

Central Water Commission has implemented Hydrology Project Phase-I spread over the 9 peninsular States of India with the World Bank assistance. Under the project, Hydrological Information System (HIS) has been established to provide reliable data sets for long term planning, design and management of water resources and water use systems and for research activities in the related aspects together with improvement in the infrastructure for data collection.

Central Water Commission has got developed software (WISDOM) for all surface and ground water participating agencies for data storage and dissemination in respect of hydrological and meteorological data under the Hydrology Project. A combined catalogue containing Meta Data (information about availability of data) of various data storage centres have been hosted on the web (India- water.com). The Catalogue provides on-line information to the data users regarding type of data available with each agency and period and frequency for which it is available and the user can generate a Data Request File (DRF). The DRF, so generated, is automatically e-mailed to all the concerned data storage centres and these data storage centres after authenticating the eligibility of the data user may supply the same.

As follow up of Hydrology Project-I, Hydrology Project-II has been launched. It envisages establishment of Hydrological Information System on the pattern of HP - I in four more States/UTs namely Punjab, Himachal Pradesh, Goa and Pondicherry and vertical extension in existing nine States and central agencies for utilization of data.

Central Water Commission's component for Hydrology Project Phase-II consists of two major components viz. Institutional Strengthening and Vertical Extension. The estimated cost of the proposal is Rs. 2489.76 lakh without contingencies and Rs. 2962.98 lakh with contingencies.

I. Institutional Strengthening:

Under this component it is proposed to consolidate the gains made under HP-I by way of strengthening of capacities through

training, upgradation/replacement of hardwares/softwares acquired during HP-I, maintenance of web site; data dissemination and knowledge sharing, workshop/seminars/study tours, etc.

It is proposed to enhance the computing capabilities in the realm of data processing, organisation and management and getting the software developed indigenously to obviate the AMC related problems. Upgradation of the data storage centre software (WISDOM) is also envisaged to integrate the additional data such as water use, socio-economic status etc.

National Water Academy (NWA), Pune will organise various training courses for all the participating agencies under horizontal and vertical extension component of the project. Provision has been made for creating additional infrastructural facilities at NWA.

II. Vertical Extension:

Development of Hydrological Design Aids

The Hydrological analysis in the formulation of various water resources projects by different State agencies are not uniform and even today some of these projects are being formulated using empirical formulae which are no longer in use. The hydrologic analysis is carried out in a limited way exploring various alternatives under the various data scenario condition. Under HP-II it is proposed to develop tools for making use of the state of art technology for rational design and analysis and carry out integrated water resources analysis including study of hydrology of the complete water system.

Following activities are proposed under the project:

- Comprehensive software for hydrological analysis and report writing.
- Development of standard practices of hydrological analysis as an important input to integrated water resources management
- Development of better technology in snow hydrology
- Design aids for un-gauged catchments
- Design aids for agricultural drainage schemes.

Status of HP-II

The project was cleared by the CCEA in October, 2005 and the agreement for the project between the Government of India and the World Bank was signed on 19th January, 2006. Status of major activities of CWC is as given under:-

- TOR and EOL for the development of Hydrologic on Design Aids (Surface Water) have been sent to MoWR for approval in November, 2006. The two meetings of the Committee for HDA were held.
- Bid document for the development of Hydrological Data Processing Software is ready.
- Estimates for providing the additional facilities at NWA, Pune have been submitted to MoWR.

3.2 Flood Forecasting & Warning Services

Structural flood management measures wherever planned and executed in our country, for techno-economic reasons, have been only against floods of certain magnitude, while floods of higher magnitude do occur and create havoc. Accordingly, flood forecasting and warning system has been planned parallel to structural measures of flood management, as advance knowledge of incoming floods plays an important role in reducing flood damage and better planning of rescue/relief operations. Flood forecast (level forecast and inflow forecast) also helps in optimum regulations of (multipurpose) reservoirs with or without flood cushion.

Flood forecasting activities in India in a scientific manner made a beginning in 1958 when the erstwhile Central Water and Power Commission (CW&PC) set up a Flood Forecasting Unit for issuing flood warnings in the Yamuna at the National Capital, Delhi. This service has since been expanded by CWC to cover almost all major flood prone inter-State river basins of India. At present there are 175 flood forecasting stations, of which 147 are level forecasting and 28 are inflow forecasting stations on major dams/barrages. It covers 9 major river basins in the country, including 71 river sub-basins in 15 States.

On an average, over 6000 forecasts are being issued every year by Central Water Commission during flood season. Normally, these forecasts are issued 12 to 48 hours in advance, depending upon the river terrain, the locations of the flood forecasting stations and base stations. For the purpose of flood forecasting, hydrological data observed at more than 850 Gauge and Discharge stations, and hydro-meteorological data over 500 rain gauge stations are communicated through a network of about 550 wireless stations. Synoptic weather situations, weather forecast/heavy rainfall warnings, etc. are also being collected from IMD

3.2.1 Flood Forecasting Performance during 2006

During the flood season 2006 (May to Oct.) 6655 flood forecasts (5070 level forecasts and 1585 inflow forecasts) were issued out of which 6370 (95.7%) forecasts were within accuracy limit). Similarly, out of 1585 inflow forecasts issued, 1543 (97.4%) at 26 stations were within permissible limits of accuracy. The performance of flood forecasting is shown in Fig 3.1.

Out of 147 level forecasting stations, unprecedented flood situations, where the highest flood level attained during the flood season exceeded their respective previous HFL, were witnessed at 6 flood forecasting stations viz. Tapi at Surat, Sabarmati at Ahmedabad, Mahi at Wanakbori Weir, Godavari at Nanded, Bhima at Deogaon Bridge and Kushiyara at Karimganj.

High flood situation i.e. where peak level was attained within 0.5m of previous HFL, were experienced at 8 forecasting stations viz; Khatakhal at Matizuri, Subarnarekha at Rajghat, Wardha at Balharsha, Godavari at Gangakhed, Ghaghra at Ayodhya, Bagmati at Benibad, Mundeshwari at Harinkhola and Kosi at Basua.

Due to very high and longer duration of rainfall activity at a number of reaches in the basins of Godavari, Krishna, Mahi, Sabarmati and Tapi, the inflows and subsequent outflows from various reservoirs (where inflow forecasts issued) were quite large for longer duration. It is quite likely that at many places, the instantaneous flow (in cumecs) might have crossed the previous records. The floods at Surat are one of the examples, where releases from Ukai Dam created unprecedented floods.

Hourly level data of over 200 stations in few basins (most of them are Base stations) were also monitored, collected and analysed and used for inferring long range forecasts (advisory nature) of flood situation along major rivers like Godavari, Yamuna, Brahmaputra, Ganga, etc. This was achieved by implementation of a web-enabled software which connected each Divisional Data Centre with Central Control Room of CWC at New Delhi. Most of these vital information were disseminated to National Disaster Management Authority (NDMA) on real time basis, in addition to various user agencies.

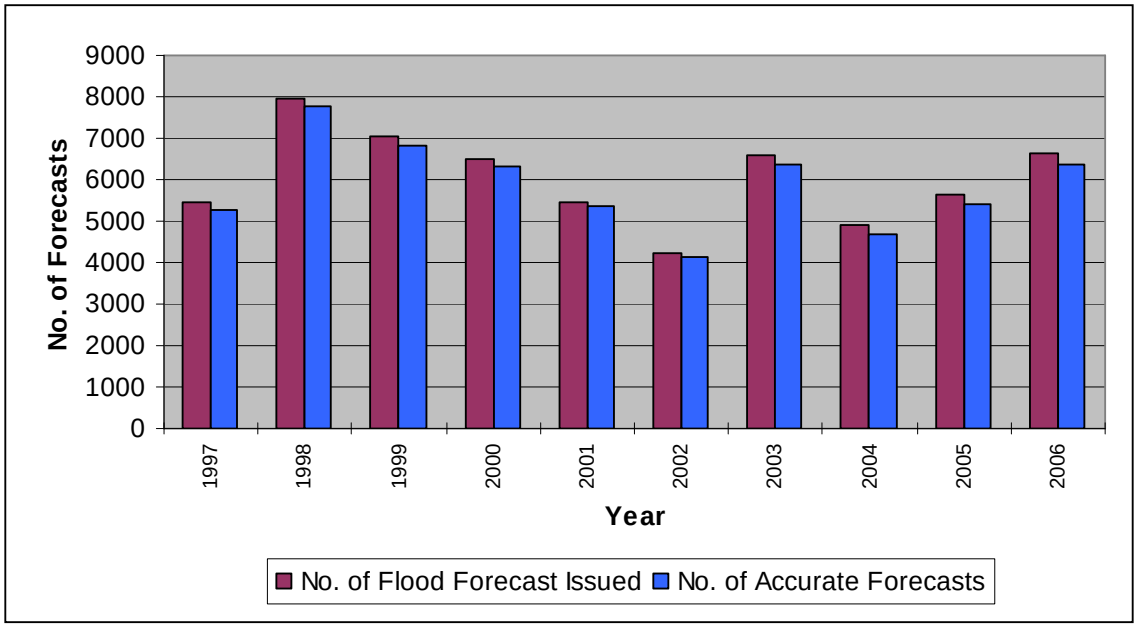


Fig 3.1 - Flood Forecasting Performance (1997-2006)

3.2.2 Modernisation of Flood Forecasting Services

The Central Water Commission has been making a constant endeavor in updating and modernizing the flood forecasting services to make it more accurate, effective and timely. The forecasting of flood involves a number of stages namely, data observation, collection, transmission, compilation and analysis, formulation of forecasts and their dissemination.

During 10th Plan, modernization of inflow

forecasting services in Mahanadi and Chambal basins was taken up with a view to improve the quality and accuracy of the forecasts through (i) automated data collection and transmission, (ii) use of Satellite based communication system through VSAT and (iii) Improvement of forecasts formulation techniques using computer based catchment models. This scheme proved to be of immense help at various dam sites and flood prone cities so that they can take advance action for suitable reservoir regulation for ensuring safety of the dam as well as property and livestock. During 11th Plan it is proposed to extend this system to Brahmaputra, Barak, Damodar, Krishna, Godavari, Yamuna, Ghaghra, Rapti and Sutlej. The additional 168 telemetry stations in the river basins are as follows.

River Basin	Telemetry Station
Godavari basin	63
Krishna basin	41
Brahmaputra basin	21
Damodar basin	20
Yamuna basin	15
Mahanadi basin	8

Under USAID assisted Disaster Management Project of Ministry of Home Affairs-Climate Forecasting, proposal for development of decision support system for flood forecasting and inundation forecast model of Mahanadi basin and issue of flash flood forecasting for Sutlej basin are under consideration of the Ministry. Another proposal for developing real time flood forecasting system for Brahmaputra and Barak Basins (joint project with Department of Information and Technology) is also under consideration.

3.3 Flood Situation Assessment and Flood Damages

As per the information received from the flood-forecasting stations, there were floods of varying magnitudes reported in the States of Maharashtra, Gujarat, Orissa, Karnataka, parts of Uttar Pradesh, Rajasthan, and West Bengal. The data on Flood damages compiled is as given in table 3.1.

Table 3.1: Damage due to floods during last 10 years

Year	Area affected (m.ha)	Population affected (million)	Total damages (Rs. crore)
1997	4.569	29.663	2831.181
1998	10.845	47.435	8860.721
1999	7.765	27.993	3612.760
2000	5.382	45.013	8864.544
2001	6.175	26.463	7109.416
2002	7.090	26.323	2574.543
2003	6.503	34.466	4434.354
2004	8.031	34.215	336.591
2005	3.376	29.684	2822.155
2006	0.437	28.015	662.095

3.3.1 Flood Bulletins

Central Water Commission has been issuing Daily Flood Bulletins and Special Flood Bulletins during the flood season based on the information collected from affected State Governments and its own field formations. During the year, 48 nos of Special Bulletins (combining Unprecedented as well as High flood situations) were issued, mostly on 3 hourly basis, when Unprecedented Flood situation

occurred, as per Standard Operating Procedure (SOP) issued by NDMA. In addition 158 ordinary bulletins were issued, (daily once) which included both level and inflow forecasts information.

3.4 Flood Management Works

The Rashtriya Barh Ayog (1980) assessed 40 m. ha area (1/8th of total geographical area of 329 m. ha) as flood prone out of which 32 m.ha (80%) of flood prone area is protectable. Upto March 2006 an area of about 16.7436 M ha has been provided with reasonable degree of protection. The protection has been offered by means of construction of embankments (34398 km), drainage channels (51318 km.), town protection works (2432 Nos.) and by raising of villages (4984 Nos.). The cumulative expenditure done under flood control upto March, 2007 is to the tune of Rs.14405.74 crores including anticipated expenditure for 2006-07.

3.5 Flood Plain Zoning

The proposal for updating and digitization of existing flood plain zoning maps has been approved by MoWR. The work should be done at an estimate cost of Rs. 1.79 crore by Survey of India on 1:15000 scale covering an area of 54,700 sq.km in the States of Assam, Bihar, UP, Delhi, West Bengal, Haryana, Punjab and Jammu and Kashmir by incorporating the latest information by way of physical ground verification. The MoU has been signed between Survey of India and Central Water Commission. The payment of Rs. 70.00 lakh has been released by MoWR as demanded by Survey of India. Survey of India has started the work of updating and digitization of flood plain zoning maps and 53 maps (33 maps of Assam State and 20 of U.P.) have been completed

3.6 River Morphology

During the Tenth Five Year Plan morphological studies of six flood prone rivers viz. Kosi, Gandak, Brahmaputra, Ghaghra, Sutlej and Ganga in a reach form Allahabad to Buxar was carried out using Remote Sensing Techniques.

Final draft modified reports on rivers Ghaghra and Sutlej are under preparation by NIH, Roorkee. The draft morphological report on river Gandak is under progress in CW&PRS, Pune. The morphological study on river Ganga from Allahabad to Baxur and river Brahmaputra are on conceptual stage. Based on the proposal sent to MoWR for constitution of the Standing Committee on Morphological studies of all Himalayan Rivers, MoWR constituted a "Standing Committee for Morphological Studies of Himalayan Rivers of India" in June, 2006 in supersession of earlier constituted Committees for morphological studies of rivers Kosi and Brahmaputra. The 1st meeting of the committee was held under the chairmanship of Member (RM), CWC on 13th December, 2006 at New Delhi. During the meeting it was decided to include 10 more rivers viz. Mahananda, Mahanadi, Yamuna, Tapi, Krishna, Tungbhadra, Sharda, Rapti, Bagmati & its tributaries and Subansiri & Pagladia Tributaries of Brahmaputra in XIth five year plan in addition to the continuation of the studies of 6 flood prone Himalayan rivers considered in the Xth Plan. Follow up actions on the minutes of the meeting are being taken up. The draft morphological

study report on river Kosi prepared by NIH Roorkee is under consideration of the Standing Committee. Morphological studies of rivers Kosi, Ghaghra, Sutlej and Ganga will spillover to XIth Five Year Plan.

3.7 Water Quality Monitoring

Central Water Commission is monitoring water quality at 371 key locations covering all the major river basins of India with a three-tier laboratory system for analysis of the parameters. The level-I laboratories are located at 258 field water quality monitoring stations on major rivers of India where physical parameters such as temperature, colour, odour, sp. conductivity, total dissolved solids, pH and dissolved oxygen of river water are observed. There are 24 level-II laboratories located at selected Divisional Headquarters to analyse 25 nos. physico-chemical characteristics and bacteriological parameters of river water. 4 Level-III/II+ laboratories are functioning at Varanasi, Delhi, Hyderabad and Coimbatore where 41 parameters including heavy elements/toxic parameters and pesticides are analysed periodically. The data generated are computerized in the data base system and disseminated in the form of Hydrological Year Book, Status Reports and Bulletins. Water Quality Year books are published and WQ Bulletins are issued regularly.

Ministry of Environment and Forests laid emphasis on water quality monitoring in an integrated manner by constituting the Water Quality Assessment Authority (WQAA) at national level under the provision of Environmental Protection Act in June, 2001 for coordinated effort in maintaining the quality of work of national water resources. The Chief Engineers/ Superintending Engineers of CWC are the Member Secretaries of most of State Level Water Quality Review Committee (WQRC).

The Working Group to advise WQAA on the minimum flows in the rivers to conserve eco system headed by Member (RM), has submitted the recommendations to WQAA. WQAA has also constituted a Standing Group-II, headed by Member (RM), CWC to draw scheme(s) for imposition of restriction in water abstraction and discharge of treated sewage/trade effluent on land, river and other water bodies with a view to mitigate crisis of water quality. Three meetings of the Group were held during 2006-07 and Terms of Reference for appointment of Consultants for abatement of pollutants in selected hotspots in the river reaches was prepared and submitted to WQAA.

3.8 Coastal Erosion

A vast portion of the Indian coastline is facing constant erosion due to various reasons, natural as well as man-made. As per National Hydrographic Office, Dehradun, the Indian coastline is extending to a length of about 7516.60 km. Almost all the maritime States/UTs are facing coastal erosion problem in various magnitudes.

In order to assist maritime States/UTs in protection of vulnerable coastal areas from sea erosion, there are two schemes as under.

3.8.1 Centrally Sponsored Scheme

A Centrally Sponsored Scheme namely

"Critical anti erosion works in coastal and other than Ganga basin States", estimated to cost Rs. 20.64 crore, for implementation during X Plan, was approved in March 2004. The proposals for coastal protection works of the States of Karnataka, Kerala, Maharashtra, Orissa, Puducherry, Tamil Nadu and Pilot project on beach nourishment and preparation of Coastal Atlas were included in the scheme. The scheme has now been transferred to State Sector. Subsequently, the scheme was revised to Rs. 46.17 crore keeping in vew of the following points:-

1. The anti erosion scheme, "Drainage improvement and enhancing flood channel capacity at critical reaches of Jhelum, Chenab and Tawi rivers in J&K (estimated cost-Rs. 23 crore)" were included in the State Sector Scheme, "Critical anti-erosion works in coastal and other than Ganga basin states" under implementation during X Plan.
2. The estimated cost of the anti sea erosion scheme of Karnataka State has been increased from Rs. 3.21 crore to Rs. 5.74 crore, thereby, enhancing the total cost of the State Sector scheme by Rs. 2.53 crore.

Out of estimated cost of Rs. 46.17 crore, central share is Rs. 38.57 crore and State share is Rs. 7.60 crore. Central share of Rs. 8.52 crore have been released upto FY 2006-07. First installment of Rs. 15.50 crore (central share) has been recommended for release as an advance to Government of J & K during the financial year 2006-07 for "Drainage improvement and enhancing flood channel capacity at critical reaches of Jhelum, Chenab and Tawi rivers in J & K".

3.8.2 National Coastal Protection Project

The National Coastal Protection Project for protection of coastal areas of maritime States / UTs from sea erosion is under formulation with a view to explore possibilities of funding through external resources or other domestic resources. The proposal of Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu, West Bengal and UT of Puducherry have been found acceptable for inclusion in the Project, while the compliance of CWC comments is awaited from the coastal States of Andhra Pradesh, Goa, Gujarat abd UT of Lakshadweep. The UT of Andaman & Nicobar Islands has so far not submitted any proposal.

3.8.3 Coastal Protection and Development Advisory Committee

With the objective of development in the protected coastal zone, the Beach Erosion Board constituted earlier, was reconstituted and renamed as Coastal Protection and Development Advisory Committee (CPDAC) by the Ministry of Water Resources, Government of India in April 1995 under the Chairmanship of Member (RM) and representatives of all coastal States and related Central Departments. The CPDAC has so far held 10 meetings, the last meeting was held at Visakhapatnam during 18-19th January, 2007.

3.9 North East Water Resources Authority

There was a proposal to constitute a cohesive, self – contained entity namely

North East Water Resources Authority after consultation with concerned State Governments for water resources development in the North East Region. The Government of Arunachal Pradesh was not in agreement with the proposal of setting up the proposed Authority and expressed reservations about the necessity of such an Authority specially in view of the existing organizations such as CWC, CEA, etc. which can take into account the concerns of flood management while developing the water resources projects in the N.E Region. After considering these views, the State Government was requested to reconsider their decision.

Thereafter in a meeting taken by Secretary (WR) in March, 2006 matters regarding additional benefits, which could be extended to Arunachal Pradesh considering submergence due to hydropower projects, development of related infrastructure & rehabilitation package and provision of empowerment of the proposed Authority for projects etc. were discussed.

A High Level Group (HLG) for holding discussions and developing a consensus on utilizing the hydropower potential of Arunachal Pradesh and integrated development of the region through the setting up of North East Water Resources Authority (NEWRA) have been constituted. The HLG consists of the following:

1. Prof. Saifuddin Soz, Hon`ble Minister for Water Resources - Chairman

2. Dr. Montek Singh Ahluwalia, Hon`ble Deputy Chairman Planning Commission - Member

3. Shri Gegong Apang, Hon`ble Chief Minister, Arunacchal Pradesh- Member

4. Shri Tarun Gogoi, Hon`ble Chief Minister, Assam - Member

5. Dr. Kirit S. Parikh, Hon`ble Member (Water Resources – and Energy), Planning Commission - convener.

4

CHAPTER-IV

BASIN PLANNING

4.1 National Water Planning

The uneven distribution of water in time and space and the recurring occurrence of floods and droughts in various parts of the country have underscored the need for a national perspective in water resources development involving participation of all concerned. Planning of water resources development and utilisation is a multi-level process involving Central and State Governments, Non-Governmental Organisations and beneficiaries with intense interaction among them.

4.2 National Water Resources Council

National Water Resources Council (NWRC) was set up in March, 1983 as a National apex body with the Hon`ble Prime Minister as Chairman. The composition of the Council is shown in Fig. 4.1. The council has held five meetings so far.

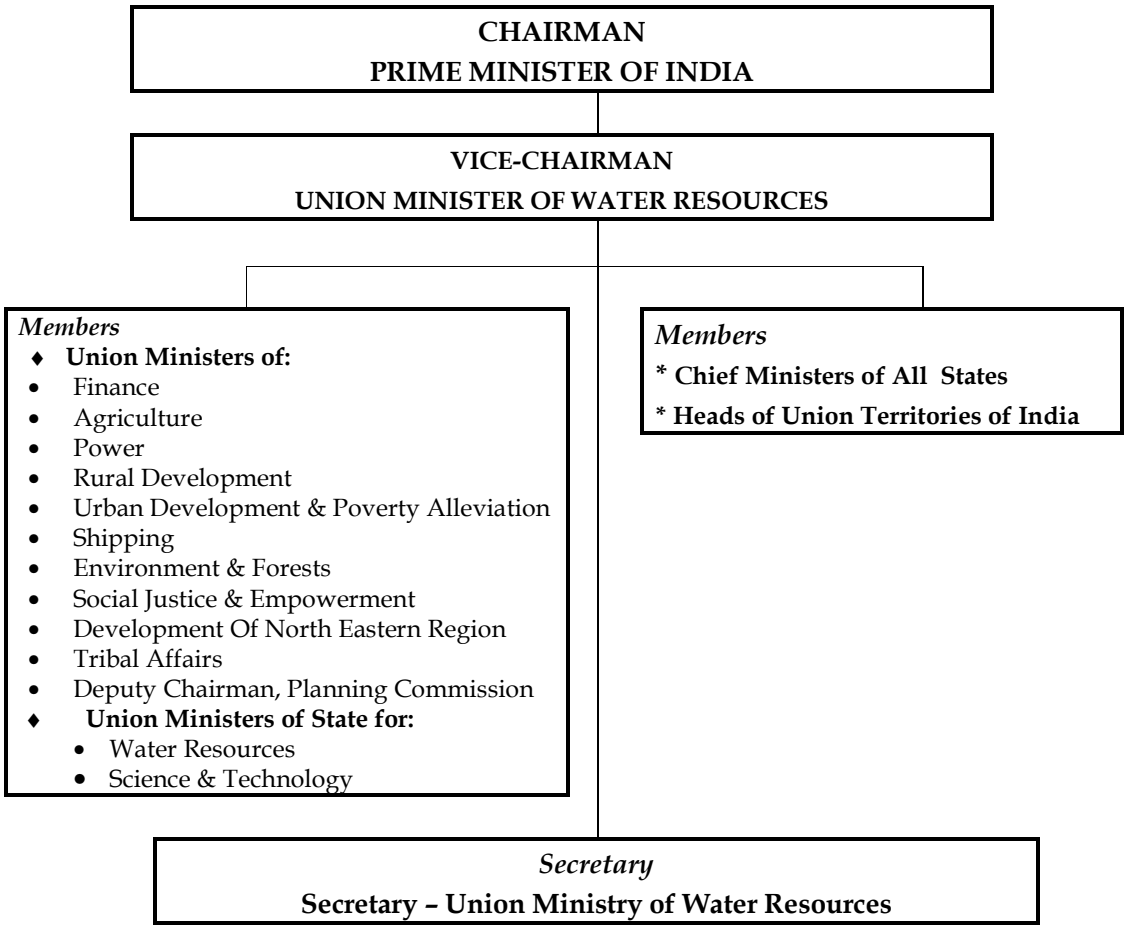


Fig. 4.1 – Composition of National Water Resources Council

After deliberations and subsequent emergence of consensus in the 5th meeting of the National Water Resources Council held on 1st April, 2002, the National Water Policy (NWP), 2002 was adopted by the Council which directed for its circulation among all concerned. The policy is titled as "National Water Policy – 2002".

4.3 National Water Board

To review the progress achieved in implementation of the National Water Policy and to report the progress to the National Water Resources Council from time to time, the Government of India has constituted a National Water Board in September, 1990 under the Chairmanship of Secretary (WR). Secretaries of the concerned Union Ministries, Chairman (CWC) and Chief Secretaries of State / Union Territories are its Members and Member (WP&P), CWC is the Member-Secretary. The organizational structure of Board is shown in Fig.4.2.

The Board has so far held twelve regular and two special meetings. In the 12th meeting of the Board held on 5th January 2007, the following agenda items were discussed.

- Follow up Action on the decisions taken in the Eleventh Meeting of the National Water Board

a) Report in respect of State Water Policies.

b) Report of the Committee Constituted under the Chairmanship of Additional Secretary (Water Resources) for recommending appropriate model of River Basin Organisations

- Implementation of Irrigation Projects in the Time Bound Manner
- Ground Water Management
- Participatory Irrigation Management
- Need for Regulatory Mechanism to ensure Sustainability of the Resources and Facilities created

The summary records of the meeting and recommendations of the Board were circulated among the members.

4.3.1 River Basin Organisation

National Water Board formed a Committee on River Basin Organisation (RBO), under the Chairmanship of Additional Secretary, MoWR with Commissioner (PP), MoWR as the Member-Secretary. The representatives from eight states namely Maharashtra, Tamil Nadu, Uttar Pradesh, Jharkhand, Madhya Pradesh, Gujarat, West Bengal and Orissa were its members. The Committee was to deliberate upon the mechanism for working out in detail, the model(s) of RBOs appropriate for meeting the objectives of sustainable and optimal development of water resources of the country. The Committee held four meetings for working out model framework of establishing RBOs. A national seminar on RBOs was organised jointly by NWA, MoWR and IWRS at Pune in July, 2003 and another one on the same subject on 27 - 28th January, 2004 at New Delhi. The report of the Committee finalized in its fourth meeting held in June 2004, was subsequently discussed in 12th NWB meeting. The Members agreed to examine the report and send their comments/views.

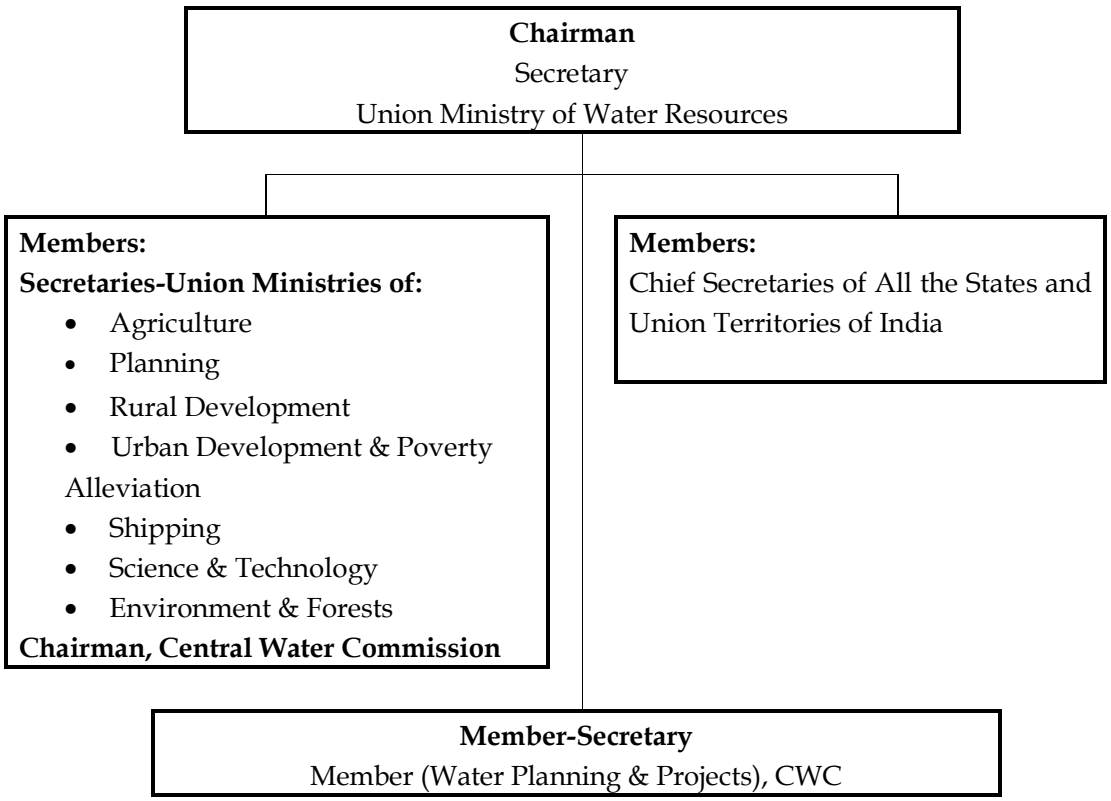


Fig. 4.2 - National Water Board

4.4 Inter – Basin Transfer of Water & Interaction with NWDA

The National Water Development Agency (NWDA) is engaged in carrying out water balance studies, link canal studies for diversion of surplus waters to water deficit areas including inter-basin transfers and field surveys and investigations for preparation of feasibility reports of the link canals for water resources development with a national perspective. Chairman, CWC, Member (WP&P) and Member (D&R) are Members of the Society and the Governing Body of NWDA.

4.4.1 Technical Advisory Committee (TAC) of NWDA

Chairman, CWC is the Chairman of the Technical Advisory Committee (TAC) of NWDA and Member (D&R), CWC and Member (WP&P), CWC are members of the TAC of NWDA.

35th meeting of the TAC was held on 22nd September, 2006 and the technical aspects of the following reports were discussed:

(i) Preliminary water balance study of Tapi basin upto Ukai dam.

(ii) Feasibility report of Par- Tapi-Narmada link project

(iii) Feasibility report of Parbati-Kalisind-Chambal link project

(iv) Feasibility report of a link system of Mahanadi-Godavari-Krishna-Pennar-Cauvery-Vaigai-Gundar linkage

(v) Feasibility report of Daman Ganga-Pinjal link project

(vi) Status of studies pertaining to Himalayan rivers Development Component of NPP

(vii) Prefeasibility report of Jogighope-Teesta- Farakka link project

4.4.2 Consensus Group

In pursuance of the decision taken in the 42nd meeting of the Governing Body of NWDA, a Consensus Group has been constituted under the Chairman, CWC to discuss and expedite the process of arriving at consensus amongst the States regarding the sharing of surplus water as well as issues of preparation of detailed project report of schemes regarding interlinking of rivers.

The Consensus Group has, so far, held eight meetings. The 7th and 8th meeting of the, Consensus Group were held on 12th May, 2006 and 1st February, 2007 respectively to discuss the Damanganga-Pinjal and Par-Tapi-Narmada links.

4.4.3 Committee for expediting work of Inter Linking of Rivers

MOWR has constituted the following committees to expedite work of Ken Betwa Link Project.

1) Committee of Environmentalists & Social sectors under Secretary, Water Resources. Chairman, CWC is a member of the Committee. The Committee held 3 meetings on 18.1.2005, 28.10.2005 & 4.09.2006 and has finalised terms of reference for Environmental Impact Assessment studies of Ken Betwa Link Project.

2) Ken-Betwa Link Detailed Project Report (DPR) Monitoring Committee under the Chairmanship of Chairman CWC to monitor and supervise the overall work of preparation of Detailed Project Report (DPR) of Ken-Betwa link project. The 2nd and 3rd meeting of the Committee were held on 1st August, 2006 and 9th January, 2007. The present status of various works for preparation of detailed Project Report of Ken-Betwa Link project and PERT/CPM charts were reviewed.

3) Steering Committee of Ken-Betwa Link under Chairmanship of Secretary (WR). Chairman CWC, is a Member of the Committee. In the first meeting of steering Committee held on 2nd February, 2007 progress of the preparation of DPR of Ken-Betwa link and enhancement of financial powers to DG, NWDA were discussed.

4.5 PODIUM Model

PODIUM, a policy dialogue model, has been developed by International Water Management Institute, Colombo, Sri Lanka and subsequently modified for Indian conditions with technical inputs from Central Water Commission. The model's main objective is to create various scenarios of food grain requirements, water requirement and water balance situations based upon various assumptions e.g. if population growth rate comes down to 1.8% then what will be the surface water situation in 2025, if the irrigated area is increased by about 20% then what will be the situation, if yield increases with the help of biotechnology then what will happen. The user can also carry out sensitivity analysis by exploring various available

options. In the model the unit for analysis is a sub-basin or a basin, even though analysis can be done based on administrative boundaries i.e. State-wise.

The study of Brahmani, a water surplus basin at east coast and Sabarmati, a water deficit basin at west coast were completed using PODIUM model under Country Policy Support Programme launched by International Commission on Irrigation and Draining. During the year, the report of the study was finalised and is under printing.

4.6 Operation and Maintenance of Irrigation Projects

A committee to collect, compile, process and analyse the information on staffing costs and suggest norms for establishment components in "Operation and Maintenance of Irrigation Projects" was constituted by MoWR during under the chairmanship of Member (WP&P), CWC with Director (NWP), CWC as Member-Secretary. The terms of reference of the committee are as under:

- To identify and review the sources for collection and compilation of data
- To analyse expenditure on staff for different functions at different tiers in the Operation and Maintenance of the Irrigation Projects.
- To work out norms for establishment component in Operation and Maintenance of Irrigation Projects.

The committee held four meetings during 2004 and 2005 and has come out with a set of recommendations. The report of the committee has been submitted to MoWR in December, 2005.

4.7 Reservoir Operation Manual

4.7.1 Tehri Dam Project

The authority for preparation of Tehri reservoir operation manual is contained in the Memorandum of Understanding (MoU) dated 15th October- 2001 signed between THDC and CWC. The work was taken up in Reservoir Operation Directorate in 2003. Based on the simulation study of 69 years of data and detailed discussion with Tehri authorities, the Reservoir Operation Manual for Tehri Project has been prepared and circulated to THDC after incorporating the comments of THDC on the draft manual earlier prepared.

4.7.2 Bansagar Project

Bansagar Dam Reservoir Regulation Committee under the chairmanship of Chairman (CWC) was constituted by MoWR, vide resolution dt. 8th March, 2002 with representation from the three co-basin States (UP, MP and Bihar) and CWC with Secretary, Bansagar Control Board as Secretary to inter-alia formulate rules for regulation of filling and use of Bansagar reservoir with a view to meet the requirement of member States within the provisions of the agreement on Bansagar Project.

During the first meeting of Bansagar Dam Reservoir Regulation Committee held on 16th July, 2003, the task of preparing Bansagar Reservoir Operation Manual was assigned CWC. The regulation of Bansagar reservoir has been studied using the simulation techniques (iterative process) for evaluating the performance of the reservoir and arriving at the reservoir regulation

policy i.e. Rule Curve Levels. Reservoir Operation Guidelines were prepared and circulated during to the co-basin States of Madhya Pradesh, Bihar, and Uttar Pradesh through Member Secretary (Bansagar Dam Reservoir Regulation Committee) with the request to obtain comments of the States as well as the input on various chapters e.g. flood forecasting network, initial filling schedule, disaster management plan, etc.

4.8 Integrated River Basin Planning Development And Management

As per National Water Policy 2002, "Water is a scarce and precious national resource to be planned, developed, conserved and managed as such, and on an integrated and environmentally sound basis, keeping in view the socio-economic aspects and needs of the States. Efforts to develop, conserve, utilise and manage this important resource in a sustainable manner, have to be guided by the national perspective". In consonance with this objective, following activities were undertaken :-

- A committee constituted under the Chairmanship of Additional Secretary (WR) on the request of Govt. of Jammu & Kashmir to work out an action plan for utilizing the potential of the western rivers as permissible under the Indus Waters Treaty; in its first meeting held on 18th January 2006 constituted a Sub-Group with Chief Engineer (BPMO), CWC as group leader to make a prospective plan for the Indus, Chenab and Jhelum basins.

- The Basin Planning directorate actively assisted the Sub-group in preparation of the basin plan for Jhelum, Chenab and Indus river basins and the same were deliberated in the 3rd meeting of the Committee held on 22nd February, 2007. The report comprehensively covers several aspects including basin features, surface water resources, status of basin development in regards to irrigation, hydropower, domestic sector, flood management, development of additional ICA through releases as per Indus Waters Treaty, various programmes under which the projects are funded, the prioritization of ongoing schemes and the future development scenario.

- A Comprehensive System Studies (CSS) of Damodar Barakar basin have been completed and circulated to co-basin states and Damodar Valley Corporation through Member – Secretary, DVRRC.

- The Guidelines for Preparation of River Basin Master Plan, 2007 is under finalization.

4.9 Working Group of Sub-Committee of National Development Council on Agriculture and related issues on irrigation including minor irrigation

In pursuance of the decision taken in the Ist meeting of the "Sub Committee of the National Development Council (NDC) on Agriculture and Related Issues" held on 04.10.2005, the Planning Commission constituted in November, 2005 the Working Group under the chairmanship of Shri. Vilasrao Deshmukh, Hon'ble Chief Minister of Maharashtra, with Member (WP&P), CWC as its Member Convener.

Central Water Commission was allocated to prepare a chapter on ToR (i) i.e.

"Assessment of availability of surface and ground water potential". Based on the information available in Central Water Commission, various inputs from the States and the recommendations made in the brainstorming session, the Basin Planning Directorate prepared the chapter on ToR (i) and submitted it to the Working Group.

4.10 Water Year 2007

The Union cabinet has declared the year 2007 as "Water Year" with the focus on developing consensus on appropriate measure including legislation on better management of the water sector, timely completion of irrigation projects, maintenance of existing projects to ensure water availability to farmers, awareness programmes for the masses, organization of conferences, workshops on important development and management issues. The theme for this year's Water Resources Day has been chosen as `people's participation in conservation of water resources and preservation of its quality'.

On the occasion of the World Water Day, 22nd March, 2007, Chairman, CWC made a detailed presentation on the theme.

5

CHAPTER–V

DESIGN & CONSULTANCY

5.1 General

Designs and Research wing of CWC plays a pivotal role in providing design and consultancy of water resources projects. Apart from technical appraisal of water resources development projects prepared by different agencies, various units of the wing are actively associated with Design Consultancy, Technical Studies and Research & Development activities in the water resources sector and river valley projects.

5.2 Design of Hydraulic Structures

D&R wing is actively involved in the design of almost all the major water resources projects either through consultancy or during the process of technical appraisal. Following four design units cater to specific requirements and attend to special design related problems of different regions.

1. Design (North & West) unit
2. Design (North - West & South) unit
3. Design (East & North East) unit
4. Design (Narmada Basin)

5.2.1 Detailed Design and Preparation of Drawings

Design units carried out designs in respect of 125 projects during the year 2006-2007 as follows:

Sr No.	Category	
1.	Projects at construction stage	69
2.	Projects at investigation and planning stage (for which detailed project reports are being prepared)	41
3.	Projects with special problems	15
	Total	125

The break up of all the 125 projects is shown in Fig. 5.1 and list of projects is given in Annexure 5.1.

Some of the prestigious/important projects, which are presently being designed/handled in D&R wing, are as follows:

i) Pancheshwar Multipurpose Project & Poornagiri Re-regulating Dam (Indo – Nepal)

Under the Indo-Nepal bilateral co-operation, the scope of Pancheshwar multipurpose project is under active discussion and defined to enable finalisation of the Detailed Project Report. The treaty between the Government of Nepal and Government of India signed in 1996 lays down the framework for integrated development of the Mahakali River including Pancheshwar Project, Sarda Barrage Project and Tanakpur Barrage Project. Several meetings of the Joint Group of Experts took place subsequently. DPR Chapters and Drawings have already been prepared.

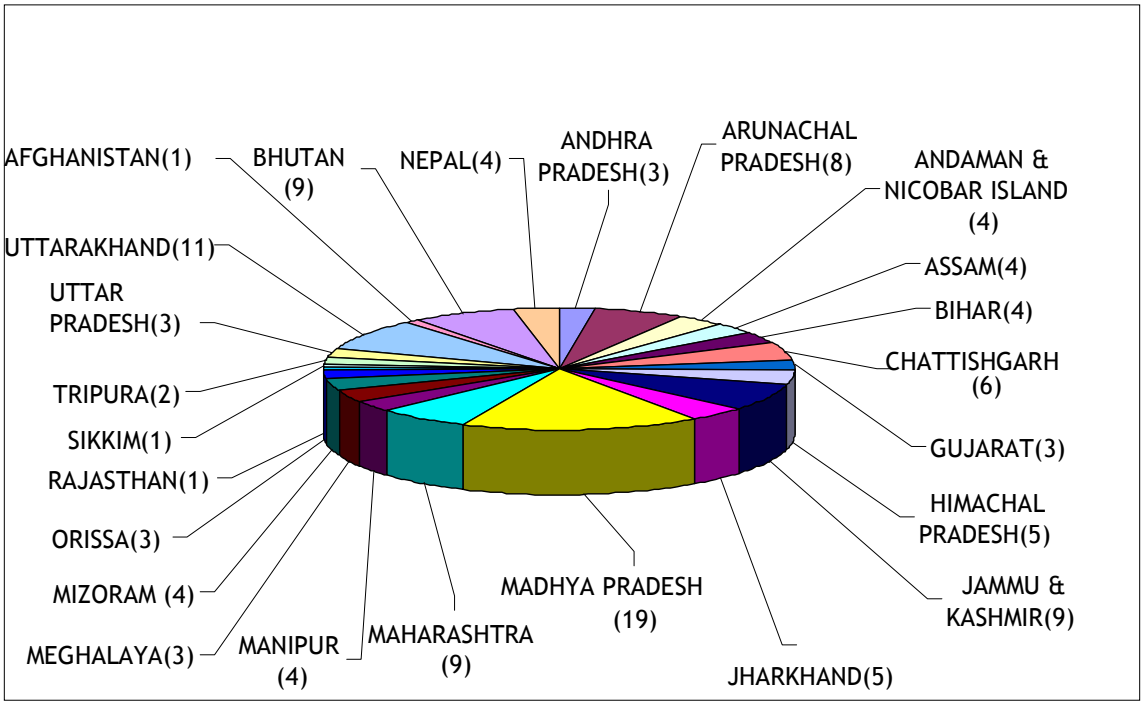


Fig.5.1: Consultancy projects dealt in D&R wing during 2006 - 07

The proposed project envisages a 293 m high rock fill dam, downstream of the confluence of the Mahakali and Sarju river, with central clay core and top of dam at EL 695 m having a live storage capacity of 9.24 BCM and a dead storage capacity of 2.15 BCM. In the project area, the river forms the border between India and Nepal, dividing the Far Western Development Region of Nepal from the state of Uttar Pradesh in India.

The Pancheshwar project also envisages a re-regulating dam for which two alternatives at Poornagiri (1020 MW) and Rupaligad (500 MW) were considered. In the DPR prepared by Nepal, the Re-regulating Project has been proposed at Rupaligad, which was not favoured by Indian side initially. Instead, the Indian side had proposed Poornagiri as the Re-regulating Project. This has been reviewed in the Ministry of Water Resources and it has been decided to consider both the alternatives. Geo-physical investigations for Rupaligad Project are being carried out and the DPR will be prepared after receipt of the results of geo-physical investigations. However, draft DPR has already been prepared taking Re-regulating dam at Poornagiri.

ii) Tala Hydro-electric Project (Bhutan)

The Tala H.E. Project envisages construction of a 91m high and 130 m long concrete gravity diversion dam across river Wangchu near Honka 3 km downstream of the existing Chukha H.E. Project to divert 142.5 cumec of water into 22.4 km long head race tunnel to generate 1020 MW (6 x 170 MW) power under a design head of 820 m from the underground power house located near Tala. Central Water Commission had been appointed as the

design consultant for specification/ construction stage works. The project has been fully commissioned during this year.

iii) Tehri Dam Project (Uttarakhand)

Tehri Dam Project is the first multi-purpose river valley project, which is taken up for construction on the river Bhagirathi to tap its vast potential and is being executed by Tehri Hydro Development Corporation (THDC). A 260.5 m high earth and rock fill dam has been constructed, which is the fourth highest dam in the world. The design engineering and consultancy including construction drawings for dam and appurtenant structures, such as Chute Spillways, Shaft Spillways, Intermediate Level Outlets, etc. are being handled in D&R wing. An inspection gallery has been provided in the core of rock fill dam joining left and right abutments, which is a unique feature for rock fill dam undertaken for the first time in India. Controlled filling of the reservoir had started on 29th October, 2005 and the project was set for generation mode by 22nd September, 2006 for 1st unit of 250 MW.

Member (D & R), CWC is a Member of the Board of Directors of THDC. CWC has been advising THDC and Ministry of Power on safety aspects of Tehri Dam particularly seismic related issues and on the first filling of the reservoir.

iv) Koteshwar Hydro-electric Project (Uttarakhand)

Koteshwar HE project is an integrated part of Tehri Power Complex comprising of Tehri Hydro Power Plant (1000MW), Tehri Pumped Storage Plant (1000MW) and Koteshwar Hydro Electric Project (400 MW) to develop the hydro-electric potential of river Bhagirathi. The project envisages construction of a 97.5m high concrete gravity dam across river Bhagirathi and a dam-toe surface power house on the right bank with an installed capacity of 4x100 MW at Koteshwar near village Pindaras of Tehri District, about 20 Km downstream of Tehri Dam site. The reservoir which will be created by Koteshwar dam shall also act as a lower reservoir for Tehri pumped storage scheme as well as balancing reservoir for Koteshwar Hydel scheme. This will facilitate the functioning of Tehri Power complex as a major peaking station in Northern grid, having a total installed capacity of 2400 MW.

As per a Memorandum of Understanding (MoU) signed between Central Water Commission and Tehri Hydro Development Corporation, the D&R wing is providing design consultancy services for Koteshwar dam, spillway, powerhouse, intake and tail race including instrumentation. The excavation and construction of all civil components of the project are in full swing. Necessary designs and drawings for the same are being issued in time as per requirements of the project authorities. The project is likely to be commissioned in 2008.

v) Sardar Sarovar Project (Gujarat)

Sardar Sarovar project envisages construction of 163 m high & 1210 m long concrete gravity dam across the river Narmada and two power houses with total installed capacity of 1450 MW. It also envisages construction of 458 km long Main Canal for irrigation of 17.92 lakh ha and for

drinking water to 8215 villages and 135 urban centers. Consultancy for complete planning, design and construction drawings for 6x200 MW Right Bank Power House(RBPH) and 5x50 MW Canal Head Power Houses(CHPH) under Sardar Sarovar Project, Gujarat is being provided. The spillway has been raised upto El.121.92 m (crest level) by virtue of which all units (5 units of 50 MW each) of CHPH and 6 units of RBPH of 200 MW each have been commissioned in June, 2006. Central Water Commission is involved in identifying bottlenecks and suggesting remedial measures and advice to Sardar Sarovar Construction Advisory Committee, Dam Safety Panel, Project Review Panel, Narmada Control Authority. CWC is also involved in the design related issues pertaining to rising of dam height in phases.

vi) Lohari Nagpala and Tapovan Vishnugad Hydro-electric Project (Uttarakhand)

A MoU for complete design engineering including pre-award engineering & assistance during construction for technical and site related issues for the 600 MW Lohari Nagpala and 520 MW Tapovan Vishnugad H.E. Projects had been signed between NTPC and CWC during the year 2004. CWC had issued complete tender stage drawings of different components of both the projects during the year 2005-06. Specification drawings for fabrication and erection of pressure shaft and construction drawings for Dabrani adit and portal have been issued for Lohari Nagpala Project during the year 2006-07.

vii) Sapta Kosi High Dam Multipurpose Project (Indo-Nepal)

The Sapta Kosi High Dam Multipurpose Project, as per the preliminary studies carried out, envisages construction of a 269 m high dam to divert river waters through a dam toe power house with an installed capacity of 3000 MW (at 50 % load factor) and irrigation of 15.22 lakh ha gross command area through construction of a barrage 1 km downstream of the dam. An additional capacity of 300 MW is further contemplated by construction of three canal type power houses along the canal system. Field investigation studies and preparation of DPR for Sapta Kosi High dam Multipurpose Project and Sun Kosi Storage cum Diversion Scheme have been taken up jointly by Govt. of India and HMG Nepal. A Joint Project Office (JPO) has already been set up in Nepal for investigation of the project. CWC has provided assistance to JPO in identifying the investigations to be carried out. DPR stage design engineering for this project will be provided by Central Water Commission after completion of investigations.

5.2.2 Water Resources Development Projects in North Eastern Region

CWC has a dedicated design unit for East and North Eastern region to undertake design and consultancy for Multipurpose, Irrigation, Water Supply and Hydro Electric Projects. The scope of work also includes preparation of pre-feasibility and detailed project reports for schemes investigated by the field offices of CWC in North East or projects undertaken by Brahmaputra Board, NEEPCO, State Govt. departments, etc.

Technical appraisal of PFRs and DPRs are also being carried out.

At present, there are 10 projects at construction stage for which design consultancy is being provided by D&R wing of CWC. In addition, there are 13 projects for which DPRs are under preparation.

Detailed hydrological studies and design works in respect of the following projects are in progress in D&R wing:

Sl. No.	State/Project	Status
	Arunachal Pradesh	
1.	Lohit Dam Project	DPR stage
2.	Jiadhal Multipurpose Project	DPR stage
3.	H.E. Projects on Nuranang Chu River	DPR stage
4.	H.E. Projects on Tawang Chu River	DPR stage
5.	Nyukcharong Chu H.E. Project	DPR stage
	Assam	
6.	Karbi Langpi HE Project	Construction stage
7.	Pagladia Dam Project	Construction stage
8.	Bharbhag Drainage Dev. Scheme- Sluice Regulator	Construction stage
9.	Amjur Drainage Dev. Scheme	Construction stage
	Manipur	
10.	Khuga Multipurpose Project	Construction stage
11.	Thoubal Multipurpose Project	Construction stage
12.	Dholaithabi Barrage Project	Construction stage
13.	Irang H.E. Project	DPR stage
	Meghalaya	
14.	Myntdu HE Project	Construction stage
15.	Jadukata Dam Project	DPR stage
16.	Kulsi Multipurpose Project	DPR stage
	Mizoram	
17.	Kolodyne H.E. Project Stage – II	DPR stage
18.	Tuirini H.E. Project	DPR stage
19.	Tuivawl H.E. Project	DPR stage
20.	Tuichang H.E. Project	DPR stage
	Sikkim	
21.	Rangit H.E. Project Stage –IV	DPR stage
	Tripura	
22.	Kalasi Barrage	Construction stage
23.	Manu Medium Irrigation Project	Construction stage

5.3 Hydrological Studies

The Hydrological Studies Organisation (HSO), a specialized unit under D&R Wing, carries out hydrological studies in respect of most of the projects in the country. During the year 2006-07 HSO has dealt with 128 projects from hydrological point of view, wherein 19 projects were for consultancy, 101 projects were for technical examination/study of hydrology and 8 projects were for review of replies of State Government. In addition to above, HSO unit is also carrying out other specialized work related to hydrology as detailed below.

5.3.1 Flood estimation model for ungauged catchment

The economy and time constraints do not allow the water resources planner to collect hydro-meteorological data at all locations. The small and medium catchments, where cross drainage structures, roads & railway bridges, minor hydraulic structures are planned, need estimation of design flood. HSO has come up with Indian version of regional models for rational estimation of design flood. The country has been divided into 7 zones and further 26 hydro-meteorologically homogeneous sub-zones. So far 21 flood estimation reports covering 24 sub-zones have been published. Out of the remaining 2 sub-zones, Andaman and Nicobar sub-zone (No. 6) could not be taken up as the rainfall and run-off data are not available for the development of the regional model.

The revised Flood estimation report of Lower Narmada river basins sub-zone 3(b) is under printing and the flood estimation report for Barak river basin sub-zone 2(c) has been finalized.

5.3.2 Generalised Probable Maximum Precipitation (PMP) Atlas

Design precipitation estimates, which are basic inputs in computing design flood magnitudes are presently calculated on a case –by-case of new dams under planning and design, but is cumbersome for the reassessment of large number of existing dams. Estimation of design storm depths has been found to be a major bottleneck in design flood studies since necessary data and expertise is available with only a few organizations like IMD and CWC. To overcome this, it was decided to publish generalized PMP Atlases covering the whole country to give a first estimate of design storm depths. The Generalised PMP Atlases have been prepared and published for river basins, viz, Cauvery and other east flowing rivers, south of Krishna, Godavari and adjoining river basins, Mahanadi, Brahmini, Baitarani, Subernarekha and other adjoining rivers, Sone, Betwa, Chambal, Mahi, Narmada, Tapi, Sabarmati, Luni and other adjoining rivers and west flowing rivers of western ghats area. During 2006-07 PMP atlases have been prepared for Krishna and Indus basins.

5.4 Review and Planning of Safety Aspects of Dams

Dam Safety Organization is looking after following issues related to Dam Safety:-

- Instrumentation in Dams and Power House Caverns, besides other hydraulic structures.

- Special Analysis like Dam Break Modelling and foundation problems.
- Computer Aided Design.
- Monitoring and Rehabilitation of Large dams.

5.4.1. Dam Rehabilitation & Improvement Project

Based on the performance and benefits obtained from the Dam Safety Assurance and Rehabilitation Project, which was assisted by the World Bank, it was proposed to extend the dam safety activities to the other States owning significant number of large dams. On the basis of details received from the 13 participating States namely, Andhra Pradesh, Bihar, Chattisgarh, Gujarat, Jharkhand, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh, Uttrakhand and West Bengal, a scheme Dam Safety Assurance, Rehabilitation & Disaster Management Project "DSARDMP" now renamed as Dam Rehabilitation & Improvement Project (DRIP), has been framed.

The project aims to improve the safety and optimum sustainable performance of selected existing dams and associated appurtenances by setting up a Dam Safety and Improvement Fund (DRIF). For smooth co-ordination amongst participating State Governments and the Central Government in respect of various activities of DRIP, MoWR constituted the following two committees:

i) National Level Steering Committee (NSLC) under the Chairmanship of the Secretary, MoWR
ii) Technical Committee under the Chairmanship of Member (D&R), CWC

During the year 2006-07, the 3rd meeting of National Level Steering Committee was held on 15th November, 2006 to discuss various issues related to the project, including comments received from States on DRIF. Environment and Social Assessment Studies of some projects have been proposed in this regard by engaging consultants.

This scheme would be a new scheme to operate at the Centre under the proposed World Bank aided scheme called Dam Rehabilitation and Improvement Project (DRIP) under XI Plan.

The total expenditure envisaged under this Plan towards State component is Rs. 2019.73 crore. The funds would come from the World Bank through International Development Association (IDA) loan, the States have been requesting for grant from the Centre. In order to operationalise the scheme at the States, a grant of 25% of the amount of Rs. 2000 crore could be considered as grant, i.e. Rs. 500 crore in the Central component.

In this regard CWC has sent material for preparing a Cabinet Note proposing to allocate Rs. 500 crore to MoWR, for passing on to 13 participating State Governments as Grant for implementation of the proposed scheme.

The following three Plan Schemes have been approved by MoWR and are in operation under DSO:

i) "Upgradation of facilities & skills in CWC regarding Dam Safety & Rehabilitation in India", for Rs. 8.00 crore. Expenditure incurred during the year

2006-07 under this scheme is Rs. 0.74 crore.

ii) "Setting up of specialized units in (a) H.E. Designs, (b) Pumped Storage and (c) Instrumentation Directorate" for Rs. 2.99 crore. Expenditure incurred during the year 2006-07 under this scheme is Rs. 0.14 crore.

iii) In continuation of the IX Plan scheme, on computerization in CWC, a continued scheme "Up gradation & Modernization of Computerization/ Information System", at an outlay of Rs. 8.00 crore has been implemented during X Plan. Expenditure incurred during the Year 2006-07 under this scheme is Rs. 0.74 crore.

In addition to above,

- An SFC memo for a new scheme titled "Dam Safety Studies & Planning" at an estimated cost of Rs. 10.00 crore has been submitted to MoWR for approval under XI Five year Plan. This scheme envisages to continue the present dam safety activities and to improve the technical expertise of dam safety in CWC.
- A new scheme titled "Up-gradation and Modernisation of Information System in CWC" under XI Five Year Plan with an outlay of Rs. 6.50 crore, incorporating activities that are in natural progression to the activities initiated under the X Plan, has been submitted to MoWR for approval.

5.4.2 Dam Safety Act

The draft Dam Safety Act had been circulated to various State Governments in 2002 for enactment. The Government of Bihar has already enacted the Dam Safety Act, 2006 and Govt. of Kerala has passed the Kerala Irrigation & Water Conservation Act, 2003 which has been further amended through an Act of 2006. A number of States such as Andhra Pradesh, Madhya Pradesh & Maharashtra have informed that the Act is under consideration of the respective Governments.

5.4.3 National Committee on Dam Safety

The National Committee on Dam Safety (NCDS) was constituted by the Government of India in October 1987 by broad basing the then existing Standing Committee to include all the States having significant number of large dams. The National Committee was reconstituted three times i.e. first in December 1989, again in July 1993 and in November 1997 to include States/Agencies having significant number of dams.

The Committee oversees dam safety activities in various States/Organisations and suggests improvements to bring these in line with the latest procedures consistent with the Indian conditions. It acts as a forum for exchange of views on techniques adopted for remedial measures to old dams in distress and provides guidance to dam owning States/Agencies. Chairman, CWC is the Chairman of this Committee. There was no meeting of the committee during the year.

5.4.4 Technical examination of projects for seismic and foundation aspects

Detailed Project Reports of 24 river valley projects in various states namely Uttrakhand, Jammu & Kahmir, Arunachal Pradesh, Sikkim, Uttar Pradesh, West Bengal, Andhra Pradesh, Nagaland, Karnataka, Tamil Nadu and Manipur were studied for techno- economical appraisal with respect to foundation engineering and seismic aspects.

5.4.5 Instrumentation in Hydraulic Structures

During the year, Planning and preparation of Instrumentation drawings have been completed for Kutni Feeder Reservoir Project, (M.P)., Koteshwar H.E. Project, (Uttrakhand) and Myntdu H.E. Project, (Meghalaya).

In addition to above, technical examination of Project Report of Polavaram (Indira Sagar), (Andhra Pradesh) and Instrumentation System of Teesta H.E. Project, (Stage – III and IV), (Sikkim), Gundia H.E. Project, (Karnataka), Lower Jurala H.E. Project, (Andhra Pradesh), Loktak Downstream H.E. Project, (Manipur), Kundah Pumped Storage H.E. Project, (Tamil Nadu) and Panan H.E. Project, (Sikkim) have been carried out .

5.4.6 National Committee on Seismic Design Parameters

National Committee on Seismic Design Parameters (NCSDP), earlier known as "Standing Committee to suggest Design Seismic Coefficient of Hydraulic Structures in River Valley Projects" was formed by the then Ministry of Irrigation, Govt. of India in June, 1969 comprising of experts from the different technical institutions and Govt. Organisations. The same was renamed and reconstituted as "National Committee on Seismic Design Parameters (NCSDP)" in October, 1991. Member (D&R), CWC is the Chairman of this Committee. The meetings of this Committee are convened normally once a year to finalise the seismic design parameters for the various river valley projects referred to the NCSDP.

The XVII meeting of NCSDP was held on 6.03.2007 at CWC, New Delhi in which design seismic parameters for sixteen projects were discussed and the seismic design parameters for 9 projects were finalized. With a view to standardize the procedure, the "Draft Guidelines for Site Specific Seismic Study for River Valley Projects" have been prepared which is likely to be discussed in the next meeting.

5.5 Special Studies

Dam Break Analysis is carried out to prepare the inundation map and disaster management plan in the unlikely event of a dam failure. It estimates the maximum water level at the downstream locations of the dam in the event of a hypothetical failure of the dam. The dam break analysis is being carried out in CWC on consultancy basis using one dimensional mathematical model MIKE 11 developed by Danish Hydraulic Institute (DHI), Denmark. During the year, the dam break study for Ranjit Sagar Dam (Punjab), the revised dam break study of Almatti Dam (Karnataka), Glacier Lake Outburst Flood Studies for Punatsangchhu H.E. Project

(Bhutan), Flood Propagation Studies and Back Water Studies of Baglihar H.E. (J&K) Project have been completed.

5.4.6 Central Water Commission Library

Library and Information Bureau, CWC is one of the most prestigious technical reference library on the subject of Water Resources Engineering and other related allied subjects with huge collection of over 1.25 lakh books including reports of various organizations in the field of water resources and 4 lakh journals and other publications including bulletins, newspapers and periodicals, etc.

The Library has subscribed to more than 67 Nos. of National and International Journals related to Civil Engg., Environment and Water Resources. During the year, 162 technical books/reports in the field of Water Resources Sector and 100 books in Hindi were purchased for the Library. About 3200 Officers of CWC, Ministry of Water Resources, State Govt. and students from various educational institutions visited the Library during the year 2006-07. 1628 books were also issued to CWC Officers during the year 2006-07.

In order to improve the facilities available to the users a new library building has been constructed, having basement, ground and 3 floors with a covered area of 4610 Sq.m. The new building has adequate provision for display, reading rooms and stack rooms along with an auditorium and space for seminar/meetings etc. The civil and electrical works have already been completed Furnishing of auditorium is under progress..

Annexure – 5.1

List of Active Consultancy Projects in D&R Wing during 2006-07

Sl. No.	State/ Name of projects
	Andhra Pradesh
1	SRBC Owk Reservoir Complex
2	NSRS(Srisailam) Project
3	Nagarjunsagar Tail Pond
	Arunachal Pradesh
4	Lohit Dam Project
5	Nyukcharong Chu H.E. Project
6	H.E. Projects on Nuranang Chu River
7	H.E. Projects on Tawang Chu River
8	Jiadhal M.P. Project
9	Dikrang H.E. Project
10	Nuranangchu Cascade Dev. Project
11	Tawang H.E. Project
	Andaman & Nicobar Island
12	Indira Nalla Water Supply Scheme
13	Chouldhary Nalla Project
14	Kamsrat Water Supply Scheme
15	Dhanikhari Dam
	Assam
16	Pagladia M.P. Project
17	Karbi Langpi H.E. Project
18	Barbhag Drainage Dev. Scheme-Sluice Regulator
19	Amjur Drainage Dev. Scheme
	Bihar
20	Durgavati Reservoir Project
21	Tenughat Bokaro (Konar I.P.)
22	Western Kosi Main Canal
23	Sone Western-Eastern Link Canal
	Chattisgarh
24	Mongra Irrigation Project
25	Sukha Nalla Barrage
26	Karra Nalla Barrage
27	Ghumaraiya Nalla Barrage
28	Sutiapat Medium Irrigation Project
29	Kelo Irrigation Project
	Gujarat
30	Sardar Sarovar Project
31	Garudehwar Weir
32	Tapi Basin Project
	Himachal Pradesh
33	Shahnahar Irrigation Project
34	Seli H.E. Project
35	Raoli H.E. Project
36	Rampur H.E. Project
	Jammu & Kashmir
37	Parnai Hydel Project
38	Tulbal Navigation Lock Project
39	Baglihar H.E. Project
40	Ujh Level Crossing
41	Kirthai H.E. Project- Stage - II
42	Sawalkot H.E. Project
	Jharkhand
43	Amanat Barrage
44	Gumani Barrage
45	Garhi Reservoir Project
46	Punasi Reservoir Project
47	TenughatDam Radial Crest Gates (Automation)
	Madhya Pradesh
48	Ban Sagar Project
49	Jobat Project
50	Mahi Main Dam
51	Mahi Subsidiary Dam
52	Man Project
53	Sindh (Phase –II) Project
54	Kutni Feeder Reservoir Dam
55	Kushalpura M.P. Project
56	Raj Ghat Dam Project
57	Chambal Basin Projects
58	Gulab Sagar (Mahan) Project
59	Malanjkhand Tailing Dam
60	Upper Beda Project
61	Ken- Betwa Link Project
62	Pench Diversion Project
63	Lower Goi Project
64	Indira Sagar Project
65	Samoha Pick-up Wier

66 Sanjay Sagar (BAH) Project

Maharashtra

67 Koyna H.E. Project
68 Ulhas Basin Project
69 Bhatnagar Project
70 Vazkhede Lhonde Project
71 Sapan Medium Irrigation Project
72 Lower Pedhi Project

Manipur

73 Khuga M. P. Project
74 Thoubal M.P. Project
75 Dholaithabi Barrage Project
76 Irang H.E. Project

Meghalaya

77 Myntdu H.E. Project
78 Jadukata Dam Project
79 Kulsi M.P. Project

Mizoram

80 KolodyneH.E. Project(Stage - II)
81 Tuirini H.E. Project
82 Tuivawl H.E. Project
83 Tuichang H.E. Project

Orissa

84 Anandpur Barrage Project
85 Naraj Barrage Project
86 Control Structures across Jouranalla & Indravati Rivers

Rajasthan

87 Water Supply Project for Bharatpur & Dholpur Distt.

Sikkim

88 Rangit H.E. Project(Stage – IV)

Tripura

89 Kalasi Barrage Project
90 Manu Medium Irrigation Project

Uttar Pradesh

91 Study Matatila Dam

Uttarakhand

92 Tehri Dam Project
93 Koteshwar H.E. Project
94 Tehri pumped Storage Plant
95 Tapovan Vishnugad H.E. Project
96 Lohari Nagpala H.E. Project

Foreign Projects

Afghanistan

97 Salma Dam Project

Bhutan

98 Tala H.E. Project
99 Chenary Mini Hydel Scheme
100 Gyesta (Chumey)Mini Hydel Project
101 Khalanzi Mini Hydel Scheme
102 Khaling Mini Hydel Scheme
103 Lhuntshi Mini Hydel Scheme
104 Thimpu Mini Hydel Scheme
105 Wangdi Mini Hydel Scheme
106 Punatsangchu H.E. Project

Nepal

107 Kamla Dam Project
108 Sapta Kosi High Dam M.P. Project
109 Sun Kosi Storage-cum-Diversion Scheme
110 Pancheshwar M.P. Project

Projects with special problems

Himachal Pradesh

111 Nathpa Jhakri H.E. Project

Jammu & Kashmir

112 Upper Sindh H.E. Project (Stage-II)
113 Pakal Dul Project
114 Kiru H.E. Project

Maharashtra

115 Bembla River Project
116 Khandakpurna Irrigation Project
117 Pentakali Project

Uttar Pradesh

118 Rihand Dam & Power House
119 Badaun Irrigation Scheme

Uttranchal

120 Kotlibhel H.E. Project (Stage -IA)
121 Kotlibhel H.E. Project (Stage -IB)
122 Kotlibhel H.E. Project (Stage -II)
123 Vyasi H.E. Project
124 Vishnugarh Pipalkoti H.E. Project
125 Jamarani Dam M.P. Project

6

CHAPTER-VI

WATER MANAGEMENT, RESERVOIR SEDIMENTATION AND POST PROJECT EVALUATION

6.1 Monitoring of Reservoir Storage

During the water year 2006-07, CWC monitored storages of 76 important reservoirs of the country having total live storage capacity of 133.021 BCM as indicated in Table 6.1.

Table 6.1

Storage status of current year vis-à-vis previous year

(Storage in BCM)

Description		Water Year	
		2005-06 (upto March, 31)	2006-07 (upto March, 31)
Number of Reservoirs monitored		76	76
Total designed live storage at FRL		133.021	133.021
As on June, 1 *(Start of water year)*	Storage	17.003	29.265
	Storage as percentage at FRL	13	22
	Storage as percentage of 10 years average storage	91	160
As on September, 30 (*End of Monsoon Period*)	Storage	109.773	120.747
	Storage as percentage at FRL	83	91
	Storage as percentage of 10 years average storage	120	129
As on March, 31	Storage	88.129	88.576
	Storage as percentage at FRL	66	67
	Storage as percentage of 10 years average storage	124	125

Additional 49 reservoirs have been identified for monitoring. This will raise the number of projects under monitoring to 125 and storage capacity of 133.021 BCM to 156.69 BCM i.e. about 74% of the total capacity of 213 BCM created so far. Efforts are being made to collect the information from State/project authorities and to include these projects in the monitoring system of CWC.

A bulletin on the status of reservoir storages was issued every week. The weekly bulletin contains current storage position vis-à-vis storage status on the corresponding period of the previous year and average of last 10 years on the corresponding period. The information presented in the bulletin is being used by the Crop Weather Watch Group constituted by the Ministry of Agriculture for

reviewing the crop planning strategy based on the availability of water in the reservoirs.

6.2 Cauvery Water Bulletin

Weekly storage position of five important reservoirs in the Cauvery basin is also monitored and a bulletin is issued every week. This bulletin incorporates the designed live storage capacity, live storage of current year, last year and average of last 10 years of the respective week in four reservoirs of the state of Karnataka (Kabini, Hemavathy, Harangi, Krishnaraja Sagar) and one reservoir in the State of Tamil Nadu (Mettur). Bar Charts (i) indicating Monthly / Weekly flow as per Cauvery Water Dispute Tribunal's (CWDT) award, observed flow at Billigundulu G&D site of CWC upstream of Mettur reservoir and inflow in Mettur reservoir and (ii) Combined storage position of four reservoirs in the State of Karnataka and that of Tamil Nadu are also supplemented in the bulletin. Four such bulletins were issued every month. Special bulletins were also prepared at the time of meeting of the Cauvery Monitoring Committee which is headed by the Secretary (WR).

6.3 Watershed Management and Reservoir Sedimentation

6.3.1 Hydrographic Survey of Important Reservoirs

Capacity Survey of reservoirs is a continuing scheme hitherto known as "Hydrographic Survey of 30 Important Reservoirs initiated during VIII Plan and continued through IX Plan. Upto the end of IX Plan, a total of 19 reservoirs were covered under the scheme at a total cost of Rs 426.59lakh.

An SFC Memo for covering 15 more reservoirs under Capacity Survey was under implementation during X Plan at an estimated cost of Rs. 329.00 lakh. Till date, survey of 3 reservoirs has been completed in all respects and surveys of 4 reservoirs are in progress.

6.3.2 Status Report on Watershed Management and Water Harvesting

Work on second Status Report on Watershed Management and Water Harvesting is in progress and is likely to be published during 2007-08.

6.4 Remote Sensing in Water Resources Development and Management

The plan scheme "Studies on Reservoir Sedimentation, River Morphology and other Remote Sensing Applications" has been sanctioned as a continuing scheme of IX plan during X plan at an estimated cost of Rs 1383.80 lakh. The scheme comprises of four components and Remote Sensing Directorate is executing one of the components namely, "Remote Sensing applications in Water Resources Development and Management". The progress for the year 2006-07 is as under:

- Satellite Remote Sensing based Reservoir Sedimentation Assessment studies - Out of 10 reservoirs awarded to NRSA Hyderabad during 2005, Final Report of four (04) feasible reservoirs have been prepared and

circulated to the project authorities and concerned offices of CWC. Out of 10 reservoirs awarded to MERI Nasik during 2005-06, Final Report of eight (08) feasible reservoirs have been prepared and circulated to the project authorities and concerned offices of CWC. Draft reports of 5 reservoirs (in-house) have been prepared and put up for perusal. Out of 14 reservoirs awarded to MERI Nasik during 2006-07, the work is under progress for 11 feasible reservoirs.

- Two training programmes on "Image processing and GIS fundamentals including Applications for Water Resources Development" were organized during July'2006 at IIRS Dehradun and during Aug'2006 at NWA, Pune respectively.
- A report of Group of Officers for "Generation of Digital Database for Water Resources Information System in the country" has been prepared and circulated to the members of the Group.
- As recommended by the Working Group for National Action plan for Reservoir Sedimentation Assessment using Satellite Remote Sensing for covering all the reservoirs in the country. 100 New reservoirs have been identified and are proposed to be taken up during the 11th Plan period.
- The work "Assessment of Irrigation Potential created in AIBP funded irrigation projects in India upto March, 2007 using Cartosat-I satellite data for 53 No. of projects in 18 States" has been awarded to NRSA, Hyderabad.

6.5 Identification of Waterlogged, Salinity/Alkalinity Affected Areas Using Remote Sensing Technique

In order to update the Status of Water logging, Salinity & Alkalinity, a study on "Assessment of Waterlogged and Salinity and/or Alkalinity affected areas in irrigated Commands of all Major and Medium Projects throughout India using Remote Sensing Technique" has been taken up by Central Water Commission in collaboration with Regional Remote Sensing Service Centre (RRSSC), Jodhpur in four phases since 2003. In the first phase of the study, study reports in respect of Rajasthan, Karnataka, Goa, Bihar, Jharkhand and Haryana have been prepared during 2003-06. These reports have been circulated to the concerned State Govts. for taking up remedial measures for reclaiming affected areas. In the second phase, studies in respect of Chhattisgarh, Madhya Pradesh, Maharashtra, Gujarat and Punjab have been completed during the period 2006-2007 and the reports are being circulated to the concerned States. The reports in respect of remaining 12 States are expected to be completed by December, 2007.

6.6 Performance Evaluation Studies

CWC is entrusted with Post Project Performance Evaluation Studies covering System Performance, Agro-Economic, Socio-Economic and Environmental Impact Assessment Studies of completed Major & Medium Irrigation Projects through consultants. During X Plan, Performance Evaluation Studies in respect of nine

projects viz. Samrat Ashok Sagar (Madhya Pradesh), Kanchi Weir (Jharkhand), Salki (Orissa), Sukla (Assam), Chandan Reservoir (Bihar), Itiadoh (Maharashtra), Kodayar (Tamil Nadu) were taken up. Studies of all these projects were continued during 2006-07. Final Reports of Kanchi Weir & Samrat Ashok Sagar, Draft Final Reports of Sukla and Salki and Inception Reports of Chandan Reservoir, Itiadoh, Kodayar, Loktak Lift and Nanak Sagar have been received. TAC meetings on Performance Evaluation Studies of seven projects were held during 2006-07. Seven other irrigation projects are proposed to be evaluated during XI Plan out of which three studies are planned to be awarded during 2007-08.

6.7 Benchmarking of Irrigation Projects

Benchmarking of irrigation projects is in use in developed countries for quite some time. In order to guide, facilitate and coordinate the activities regarding Benchmarking process and assist the States in Benchmarking of irrigation systems, a Central Core Group for Benchmarking of Irrigation Systems in India has been set up by MOWR on 15.04.2002. State Level Core Groups are also being set up to carry out Benchmarking activities.

During 2006-07, eight State Level Core Groups have been formed. 12 Workshops on Benchmarking of Irrigation Projects have been conducted so far. During 2006-07, one Project Level Workshop on "Benchmarking of Irrigation Systems in India" was organized at Bhopal, Madhya Pradesh. Three workshops are proposed to be conducted during 2007-08.

6.8 Study of Water Use Efficiencies

Irrigation Sector is the biggest consumer of fresh water (about 83%) and any improvement in irrigation project efficiency will be like creating a new source of water supply which can be gainfully utilized in various competing demands of water. Water use efficiencies are generally low and there is a need to improve the same.

The studies cover the following aspects:

i) Reservoir Filling Efficiencies (Inflow and release pattern)
ii) Delivery System / Conveyance Efficiency
iii) On farm Application Efficiency
iv) Drainage Efficiency
v) Irrigation Potential Created and Utilised.

43 Major and Medium Irrigation Projects across the country have been taken up for aforesaid studies through Water and Land Management Institutes / Irrigation Management & Training Institutes / NERIWALM etc. and other private consultants. Studies of 43 projects continued during 2006-07. Draft Final Reports of 13 Projects and Inception Reports of all the Projects have been received.

6.9 Socio / Agro Economic & Environmental Impact Studies of Completed Irrigation Projects

Performance evaluation studies of irrigation projects in the country were taken up in seventies. Since then, performance evaluation studies in respect of more than 100 irrigation projects located in different

parts of the country have been carried out by various central, State and other agencies.

Performance evaluation studies of completed irrigation projects are now being carried out by Central Water Commission departmentally as well as through consultants (WALMIs, IMTIs, WAPCOS, CWRDM and NERIWALM) and reports of the studies are provided to Water Resources/ Irrigation Departments of concerned States and other related Organisations for implementation of the recommendations. The consultants have carried out 14 such studies, which cover (a) System Performance (b) Agro-economic (c) Socio-economic and (d) Environmental Impacts. In addition, six studies have been carried out departmentally, which mainly deal with system performance of the irrigation projects.

Performance evaluation studies in respect of ten irrigation projects located in various regions in the country were targeted to be accomplished, through consultants, during the Tenth Five Year Plan. The inception reports in respect of four projects, viz. Kanchi Weir (Jharkhand), Samrat Ashok Sagar Irrigation Project (M.P.), Salki Irrigation Project (Orissa) and Sukla Irrigation Project (Assam) have been received during from the consultants.

6.10 Water Audit and Water Conservation

"General Guidelines for Water Audit and Water Conservation" have been prepared in November, 2006 to generate awareness among the people towards the importance of water saving. These Guidelines have been placed on CWC website. During 2006-07, CWC in collaboration with FICCI was associated with the research scheme entitled "Industrial Water Auditing – A Case Study of Ghaziabad Industries, Ghaziabad district, U.P" being carried out under R&D Scheme of MoWR. The study report is likely to be completed during 2007-08.

7

CHAPTER-VII

APPRAISAL OF PROJECTS

7.1 Project Appraisal

One of the important activities assigned to CWC is techno-economic appraisal of irrigation, flood control and multipurpose projects proposed by the State Governments. This task is performed and coordinated by the Project Appraisal Organisation (PAO). After establishment of techno-economic feasibility of a project, the Advisory Committee of Ministry of Water Resources (MoWR) on Irrigation, Flood Control and Multipurpose Projects headed by the Secretary, MoWR considers the project for acceptance and thereafter recommends the same to accord investment clearance to the Planning Commission. Besides these, the Hydro-power projects proposed by State Electricity Boards / Private Sector Organisations are also scrutinised in CWC from the view point of hydrology, civil design, inter-State issues and cost angles and thermal projects are scrutinized for establishing water availability for cooling and other purposes. Central Electricity Authority (CEA) accords the techno economic clearance for these power projects. Technical aspects of water supply schemes are also appraised when referred by the State Governments /Ministry of Urban Development.

The Project Preparation Organisation (PPO) under a Chief Engineer in respect of Major and Medium Irrigation and Water Resources Consolidation Projects, which are posed for external assistance, discharge a similar function.

7.2 Appraisal of Major Irrigation Projects

Major irrigation projects with culturable command area (CCA) of more than 10,000 hectare are examined for various aspects in specialised directorates in CWC and in the Ministries of Water Resources, Agriculture, Environment & Forests and Tribal Affairs. In case of multipurpose projects, examination in Central Electricity Authority is also done for power component. The existing procedure for scrutiny and examination of irrigation and multipurpose projects by CWC and acceptance by the Planning Commission for inclusion in the State Development Plan has been revised and simplified. Now Preliminary Report, prepared in brief, covering basic planning aspects are examined first and 'In Principle' consent of CWC for DPR preparation is communicated on the basis of soundness of proposals. Clearances for Environment, R&R plans and concurrence of State Finance, etc. are to be obtained and submitted along with DPR so that once cleared by the Advisory Committee of MoWR, the investment clearance of the Planning Commission would follow and the project could be started. The revised two stage clearance procedure is applicable from October, 2001.

During the year 2006-2007, 53 new major and 26 revised major irrigation projects were under appraisal in PAO. In principle consent of CWC for DPR preparation was

communicated in respect of 4 major irrigation proposals. Fig. 7.1 shows state-wise distribution of new major irrigation projects.

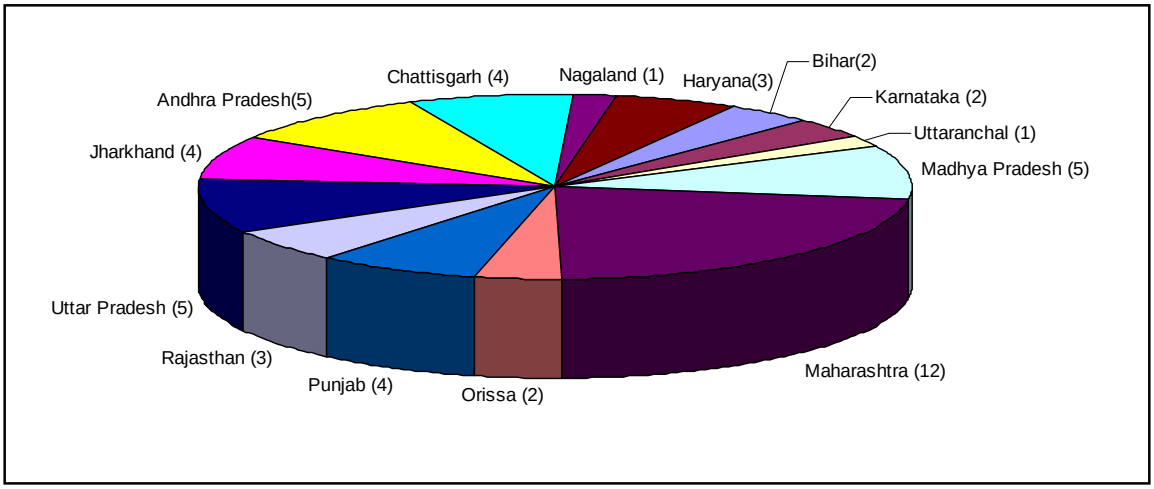


Fig. 7.1 State wise distribution of New Major Irrigation Projects under Appraisal (as on 31.03.2007)

7.3 Appraisal of Medium Irrigation Projects

For medium irrigation projects (CCA 2,000 to 10,000 ha) in inter-States river basins, State Governments are required to submit only a proforma report to the Appraisal and Monitoring Units of the CWC's field formations. During the year 2006-07, 58 new medium irrigation projects were under appraisal in various Regional Offices for which necessary assistance was provided by PAO, CWC. After appraisal, projects are put up by the PAO to the Advisory Committee for consideration and acceptance. The Fig. 7.2 shows the State-wise distribution of new medium irrigation projects under appraisal.

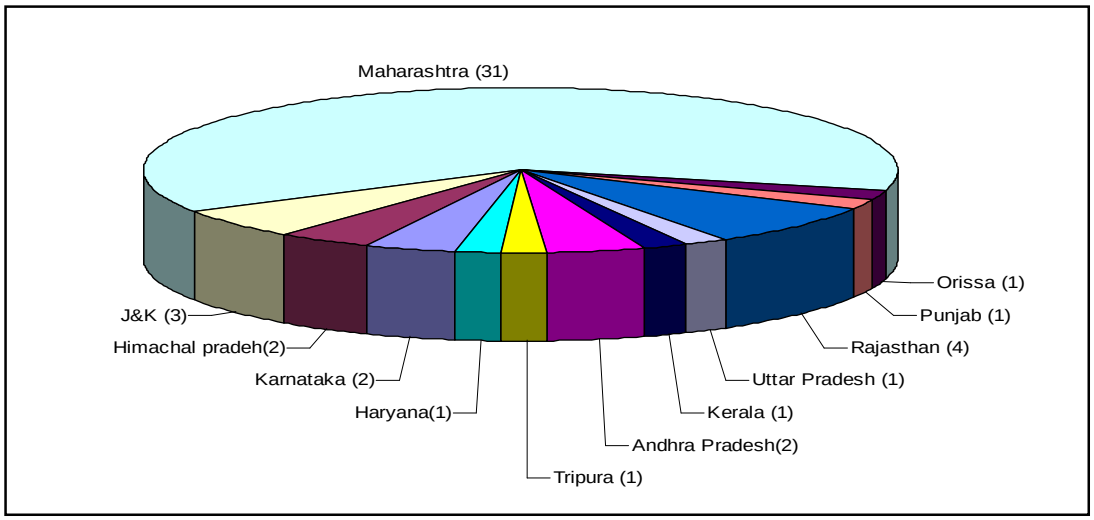


FIG. 7.2 State wise distribution of New Medium Irrigation Projects under Appraisal (As On 31.03.2007)

7.4 Interaction with State/Project Authorities

To expedite the appraisal process, CWC officers interact regularly with the State Govt. Engineers and inter-State review meetings are convened to resolve issues having a bearing on project clearance. The State Governments have also been advised to process the projects through State's Central Design Organisation and to set up State Level Multidisciplinary Committees so that the extent of scrutiny at the Centre can be minimized.

7.5 Meeting of the Advisory Committee

In November 1987, MoWR reconstituted the Advisory Committee for Irrigation, Multipurpose and Flood Control Projects with the Secretary, MoWR as the Chairman and the Chief Engineer (PAO), CWC as the Member Secretary. The Committee is entrusted with the function of examining proposals scrutinized in the CWC and conveying the decision on the techno-economic viability of the projects. During the year 2006-2007 the Advisory Committee met on 02.06.2006, 17.11.2006 and 02.03.2007 under the Chairmanship of Secretary (WR) and considered 43 projects out of which 5 medium projects were deferred and 38 projects were accepted comprising 13 major, 20 medium irrigation and 5 flood control projects. Out of these 38 accepted projects 33 are irrigation projects which will provide additional annual irrigation benefits of 13,10,608 hectare in the States of Andhra Pradesh, Himachal Pradesh, Jammu & Kashmir, Manipur, Maharashtra, Orissa, Punjab & Rajasthan. 5 Flood Control Scheme in the States of J&K and Uttar Pradesh will provide protection of an area of 22,962.56 hectare thereby saving on an average of about Rs. 111.205 crore annually. The details of the projects are given in Table 7.1

7.6 Appraisal of Power Projects

Techno-economic appraisal of 32 numbers of hydroelectric power projects was carried out up to March-2007, out of which 10 numbers of hydel projects having total installed capacity of 4855 MW were finally cleared by CEA. During the year 2006-2007, 6 number of Thermal Power Schemes were received from various State Govts/Public Sector undertakings and are under appraisal.

7.7 Appraisal and Clearance of Flood Management Projects

The Flood Management Organisation under River Management Wing is responsible for the examination of proposals formulated and submitted by State Govts. concerning major, medium and minor flood management schemes and multi purpose projects having flood control aspects to establish their techno-economic feasibility. The above projects are examined techno-economically before they are sent to the Advisory Committee for acceptance.

FMO is ably assisted by Finance Wing of MoWR, Construction Machinery Consultancy Directorate and Cost Engineering Hydro Directorate of Central Water Commission for establishing the cost aspects, construction machinery and cost and rate aspects of the project respectively in respect of flood management schemes (costing more than Rs 7.5 crore but less than

Rs. 15 crore) such as flood control, anti-erosion for river bank protection and drainage development of drainage congested areas in the flood prone States.

Flood management Schemes (costing Rs. 7.5 crore or less) are sanctioned by the State Government after they are duly approved by the State Flood Control Board on the recommendation of the State Technical Advisory Committee for their inclusion in the Annual Plan and Five Year Plan of the State Government. In the year 2006-07 about 98 number of flood management scheme/master plan have been examined/appraised till March 2007.

Table 7.1 Details of Projects Accepted by Advisory Committee

Sl. No	Name of Project	Name of State	Category of project	Estimated cost (Rs. cr.)	Benefits (ha)
I.	**86th meeting held on 2.6.2006**				
1.	Modernisation of Babu Canal	J&K	Medium	12.3362	3,077
2.	Master Plan of Chenab River	J&K	Flood Protection	25.45	-
3.	Master Plan of Tawi River	J&K	Flood Protection	27.82	-
4.	Construction of Jewar-Tappal Marginal bund	UP	Flood Protection	71.3711	-
5.	Takli Irrigation Cum Drinking Water Project	Rajasthan	Medium	51.81	4,791
6.	Narmada Canal Project	Rajasthan	Major	1541.357	1,51,072
7.	Pedavagu diversion scheme	AP	Medium	124.64	6,000
8.	Rallivagu Reservoir Project	AP	Medium	33.30	2,430
9.	Mathadivagu Reservoir Project	AP	Medium	50.40	3,440
10.	Gagrin Irrigation Project	Rajasthan	Medium	80.12	9,675
11.	Modernization of Ahji Canal	J&K	Medium	20.5149	8,315.90
12.	Golavagu Reservoir Project	AP	Medium	84.08	3,845
13.	Manjore Irrigation Project	Orissa	Medium	99.53	10,433
14.	Piplad Irrigation Project	Rajasthan	Medium	33.64	3,549
15.	Modernization of Dadi Canal	J&K	Medium	49.95	4,650.13
16.	Rafiabad high Lift Irrigation Scheme	J&K	Medium	63.62	2,932
17.	Pushkara Lift Irrigation Scheme	AP	Major	379.503	75,235
18.	Tadipudi Lift Irrigation Scheme	AP	Major	376.96	83,599
II.	**87th meeting held on 17.11.06**				
1.	Kachnoda Dam Project	U.P	Major	88.79	10,850
2.	1st Patiala Feeder & Kotla Branch	Punjab	Major	123.30	68,624
3.	Nilwai Reservoir Project	A.P	Medium	90.50	5,260

4.	Kandi Canal Project	J&K	Medium	53.70	3,229
5.	Balh Valliey (Left Bank)	H.P	Medium	62.25	4,354
6.	Widening, strengthing and providing 10m wide road way on Alipur Bund on left Bank of river Yamuna	U.P	Flood Protection	42.20	-
7.	Improving Irrigation intensity of Hardoi Branch system	U.P	Major	105.2997	3,06,055
III	**88th meeting held on 2.3.2007**				
1.	Alisagar Lift Irrigation Scheme.	A.P.	Major	227.90	21,770
2.	Gutpha Lift Irrigation Scheme	A.P.	Major	171.91	15,699
3.	Godavari Lift Irrigation	A.P.	Major	6016.00	2,86,000
4.	Bimbla River Project	Maharashtra	Major	1276.87	70,756
5.	Khadakpurna River Project	Maharashtra	Major	578.56	24,864
6.	Arunavati River Project	Maharashtra	Major	225.22	25,155
7.	Lal Nalla Irrigation Project	Maharashtra	Medium	103.49	7,320
8.	Kar Irrigation Project	Maharashtra	Medium	170.04	6,744
9.	Lower Wardha Irrigation Scheme	Maharashtra	Major	857.70	51,655
10.	Musurumilli Reservoir Project	A.P.	Medium	207.00	15,676
11.	Lhasi Irrigation Project	Rajasthan	Medium	44.73	6,008
12.	Const. of Marginal Embankment on R/B ofRiver Ghaghra & Left Bank of River Sarda	Uttar Pradesh	Flood Protection	46.52	
13.	Dolaithabi Barrage Project	Manipur	Medium	98.37	7,545

8

CHAPTER - VIII

MONITORING OF PROJECTS

8.1 MONITORING OF MAJOR AND MEDIUM IRRIGATION PROJECTS

A three tier system of monitoring at Centre, State and Project level was introduced for monitoring of major and medium irrigation projects in 1975. At Central level, this work was entrusted to CWC. The main objective of monitoring is to ensure the achievement of physical and financial targets and achieve the targets of creation of irrigation potential. Monitoring is also expected to contribute in identification of the inputs required, analysis of the reasons for any shortfalls/bottlenecks and suggest remedial measures, etc., with a view to complete the projects in a time bound manner.

As per the present arrangement in CWC, Inter-State, Externally Assisted and Centrally Sponsored irrigation projects are being monitored by monitoring units at Headquarters (HQ) and the other projects by the respective Regional Offices. During 2006-07, a total of 115 irrigation projects were monitored by CWC (Table 8.1). The list of monitored Projects is reviewed on yearly basis.

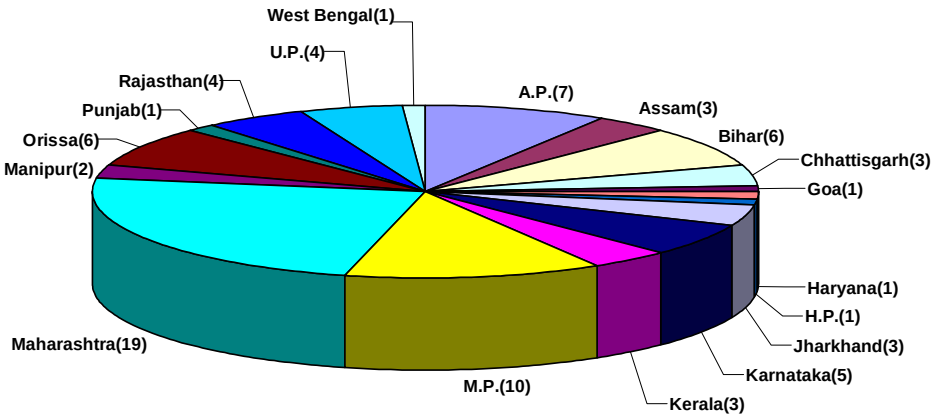
Out of 115 major, medium and ERM projects taken up for monitoring 15 projects (9 major & 6 ERM) were monitored from HQ and the remaining 100 projects (64 Major, 33 Medium and 3 ERM) were monitored by the Regional offices.

In the year 2003-04, 30 Major pre-Fifth / Fifth Plan ongoing projects were identified for completion by the end of X Plan and were put on vigorous monitoring by requiring more than one visit in a year. Out of these 30 projects, 9 projects were completed by the end of 2005-06 and remaining 21 projects were included in the list of 115 projects which were monitored during 2006-07.

All the projects identified for monitoring are visited by CWC officers once a year. Thereafter, based on field visit to the project and discussions with the State Govt Officials, a detailed status report is prepared highlighting various constraints impeding construction & suggestions for remedial measures, etc. for attention of the State Govts. to expedite progress for early completion of the project. The state-wise distribution of ongoing Major, Medium and ERM projects monitored by CWC Headquarters or Regional offices are given in Figures 8.1, 8.2, & 8.3.

TABLE 8.1 – State-wise Number of Projects Monitored by CWC (2006-07)

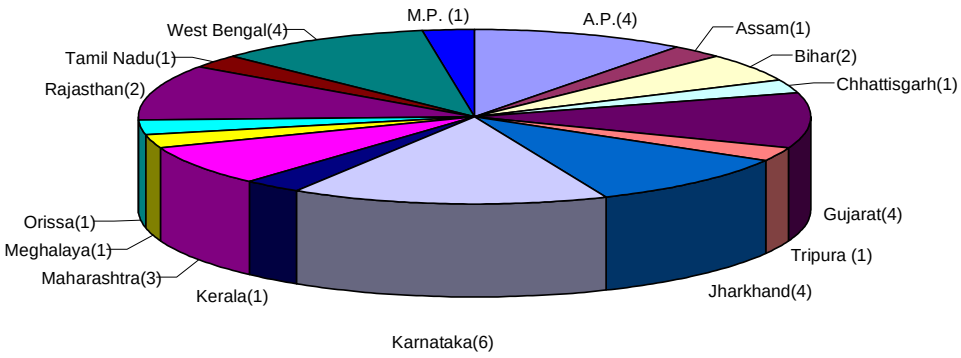
		No. of Projects Monitored by CWC								
		Major			Medium			ERM		
S No	State	HQ	RO	Total	HQ	RO	Total	HQ	RO	Total
1	Andhra Pradesh	1	5	6	-	2	2	1	-	1
2	Assam	-	3	3	-	1	1	-	-	-
3	Bihar	-	5	5	-	1	1	-	1	1
4	Chhattisgarh	-	3	3	-	1	1	-	-	-
5	Goa	-	2	2	-	-	-	-	-	-
6	Gujarat	-	-	-	-	4	4	1	-	1
7	Haryana	-	1	1	-	-	-	-	-	-
8	Himachal Pradesh	1	-	1	-	-	-	-	-	-
9	Jammu & Kashmir	-	-	-	-	-	-	-	-	-
10	Jharkhand	1	2	3	-	3	3	-	-	-
11	Karnataka	-	6	6	-	7	7	-	1	1
12	Kerala	-	2	2	-	1	1	-	-	-
13	Madhya Pradesh	1	9	10	-	1	1	-	-	-
14	Maharashtra	2	13	15	-	3	3	1	-	1
15	Manipur	-	2	2	-	-	-	-	-	-
16	Meghalaya	-	-	-	-	1	1	-	-	-
17	Orissa	1	4	5	-	1	1	1	-	1
18	Punjab	-	-	-	-	-	-	-	1	1
19	Rajasthan	1	3	4	-	1	1	1	-	1
20	Tamil Nadu	-	-	-	-	1	1	-	-	-
21	Tripura	-	-	-	-	1	1	-	-	-
22	Uttar Pradesh	1	3	4	-	-	-	1	-	1
23	West Bengal	-	1	1	-	4	4	-	-	-
	Total	**9**	**64**	**73**	**-**	**33**	**33**	**6**	**3**	**9**
	Grand Total	**73 (Major) + 33 (Medium) + 9 (ERM) = 115**								



Total Projects - 73

Monitored From HQ - 9 Monitored by Regional Office- 64

Fig 8.1 Major Projects monitored by Regional Offices & HQ



Total Projects - 33

Fig 8.2 Medium Projects monitored by Regional Offices

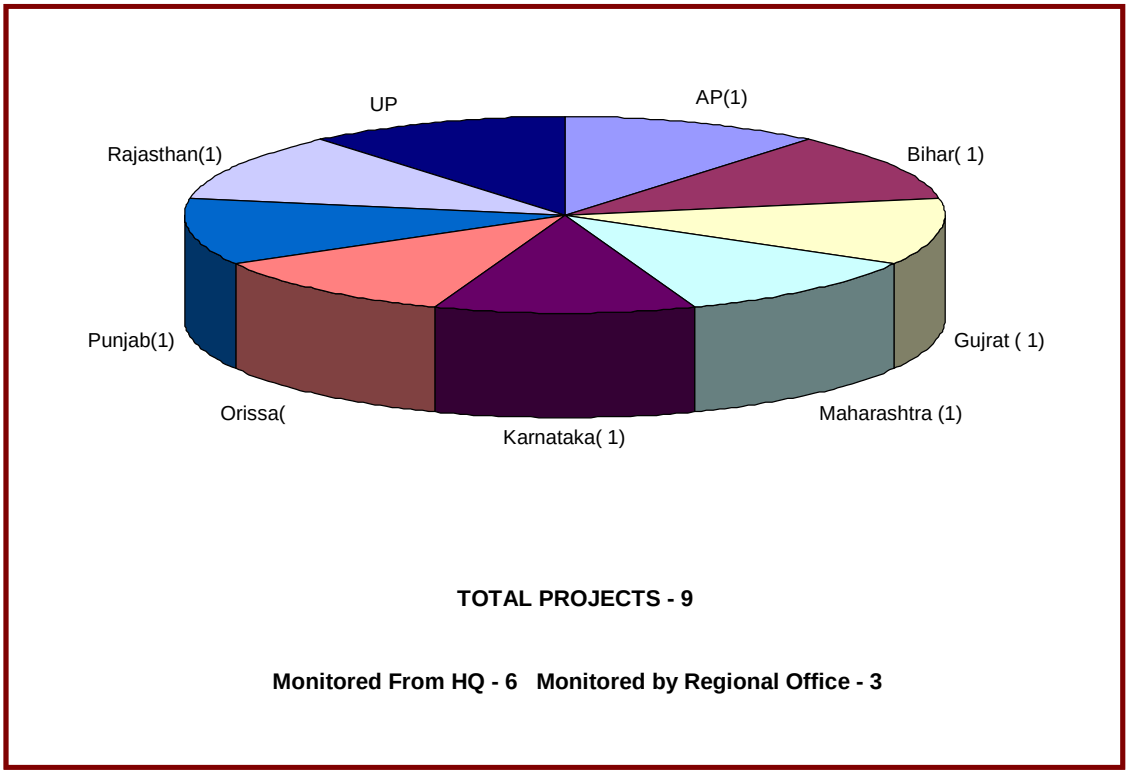


Fig 8.3 ERM Projects monitored by Regional Office & HQ

8.2 Assessment of Utilization of Irrigation Potential

To supplement the existing Monitoring mechanism by providing authentic and objective data base on existing irrigation infrastructure it was felt necessary to utilize the Remote Sensing Technique for the assessment of irrigation potential creation in AIBP assisted projects. At the instance of Planning Commission, pilot studies of two projects i.e. Upper Krishna (Karnataka) and Teesta Barrage (West Bengal) were carried out successfully using Satellite Data by NRSA, Hyderabad. The study results of both the assessment were satisfactory and compared well with ground realities.

In view of importance and utility of results arising out of pilot study, it was decided by Planning Commission to take the projects on a National Scale covering about 10 mha of irrigation potential spread across different states in India. At first phase, the assessment of irrigation potential creation through mapping of irrigation infrastructures to monitor the progress has been assigned to NRSA, Hyderabad in respect of 53 ongoing AIBP assisted projects during 2007-08. It not only provides the potential created but also gives critical gap areas for further effective monitoring.

For determining the irrigation potential utilization, guidelines have been issued to all the Regional Chief Engineers to cover the same during monitoring.

8.3 Monitoring of Externally Assisted Projects

World Bank through its soft lending affiliate, International Development Association (IDA) & International Bank of

Rural Development (IBRD) has been providing credit assistance to major/medium irrigation projects since long. Japan Bank for International Co-operation (JBIC) has also been funding few major/medium irrigation projects. While these projects are executed by the States, monitoring of all externally aided irrigation projects has been entrusted to CWC in order to evaluate achievements of construction and investment targets as per the criteria laid down by the external funding agencies and to remove bottlenecks, if any, encountered during construction.

Monitoring of two "Water Resources Consolidation Projects (WRCP)" in Orissa and Tamil Nadu and two "Water Sector Restructuring Project" in Rajasthan & Uttar Pradesh which comprise of several major and medium projects covering issues interdisciplinary in nature was done by CWC during 2006-07.

8.4 Accelerated Irrigation Benefits Programme

Central Govt., during 96-97, launched the Accelerated Irrigation Benefits Programme (AIBP) to provide Central Loan Assistance (CLA) to major/medium irrigation projects in the country, with the objective to accelerate the implementation of those projects which are beyond resource capability of the States or are in an advanced stage of completion. While selecting the projects, special emphasis are given to Pre-fifth and Fifth Plan projects. Priorities are also given to those projects which are benefiting Tribal and Drought Prone Areas. However, under the revised Guidelines from the year 1999-2000 onwards, Central Loan Assistance under AIBP can also be extended to minor surface under irrigation projects of special category states (N.E. States & Hilly States of H. P., Sikkim, Jammu & Kashmir, Uttarakhand and projects benefiting KBK districts of Orissa). However, later w.e.f. 1.4.2005, non-special category states could also include minor surface irrigation schemes with potential of more than 100 ha with preference to tribal areas and drought prone areas which fully benefit dalits and adivasis. Grant component was introduced under the programme during 2004-05 and Centre provided both loan portion and grant component of Central assistance. However, as per the present policy, Centre is providing the grant component only from 2006-07 and the States are authorised to raise loan component by market borrowing.

The Government has further relaxed the criteria for Central assistance under the AIBP since Dec, 2006. The earlier guidelines stipulating completion of an ongoing project under AIBP for including a new project under AIBP has been relaxed for projects benefiting a) drought prone areas, b) tribal areas, c) States with lower irrigation development as compared to National average, and d) districts identified under the PM's Package for agrarian distress districts.

Figure 8.4 gives details of state wise Major, Medium & ERM projects presnently under AIBP. Table 8.3 gives State wise list of Major & Medium projects completed under AIBP.

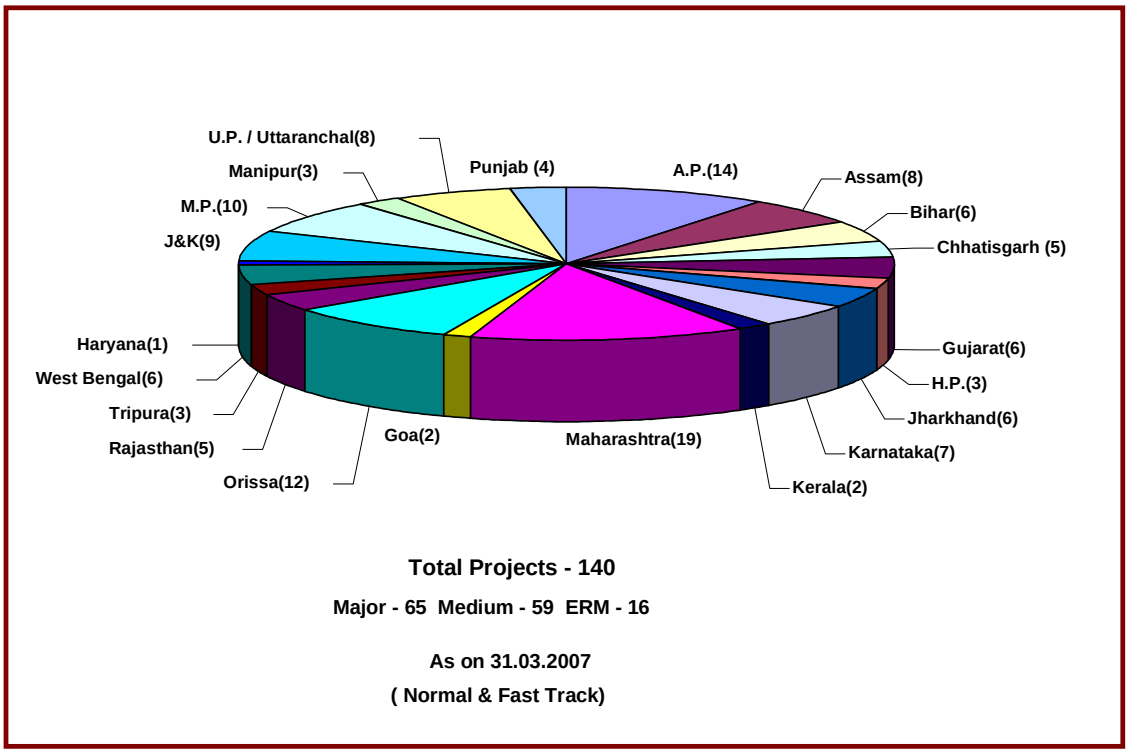


Fig 8.4 Major, Medium & ERM Projects Under AIBP

Table 8.3 – State wise Major & Medium projects completed under AIBP

Sl. No.	State	Project	Sl. No.	State	Project
1	Andhra Pradesh	Cheyyeru (Annamaya)	16	Gujarat	Damanganga
2		Nagarjunsagar	17		Deo
3		Sriramsagar St.I	18		Harnav-II
4		Madduvalasa	19		Jhuj
5		Priyadarshini Jurala	20		Karjan
6	Assam	Bordikarai	21		Sipu
7		Rupahi	22		Sukhi
8		Hawaipur lift	23		Umaria
9	Bihar	Bilasi	24		Watrak
10		Orni Reservoir	25	Haryana	Gurgaon Canal
11		Upper Kiul	26	Jharkhand	Latratu
12	Chhattisgarh	Shivnath Div.	27		Tapkara Res.
13		Hasdeo Bango	28	Jammu & Kashmir	Mod. of Zaingir Canal
14		Jonk Diversion	29	Karnataka	Maskinallah
15	Goa	Salauli	30	Kerala	Kallada

31	Madhya Pradesh	Banjar	46		Sason Canal
32		Upper Wainganga	47		Salki Irrigation
33		Urmil	48	Punjab	Ranjit Sagar
34	Maharashtra	Jawalgaon	49	Rajasthan	Gambhiri Mod.
35		Jayakwadi Stage-II	50		Jaisamand Mod.
36		Kadvi	51		Chhapi
37		Kasari	52		Panchana
38		Kasarsai	53	Uttar Pradesh	Gunta Nala
39		Khadakwasla	54		Gyanpur Pump Canal
40		Upper Tapi	55		Madhya Ganga and Upper Ganga Mod.
41		Wan	56		Rajghat Dam
42		Vishnupuri (Works)	57		Sarda Sahayak
43		Bahula	58		Providing Kharif Channel in H.K. Doab
44	Orissa	Upper Kolab	59	West Bengal	Kangsabati
45		Potteru			

A grant of Rs. 1884.221 crore has been released to 104 major / medium irrigation projects under AIBP during 2006-07. In addition, a grant of Rs 1352.49 Cr. is also released to major / medium projects during 2007-08 against proposals of 2006-07 upto 15.4.2007. The cumulative total Central Loan Assistance / Grant provided to States is Rs. 22066.753 crore (Rs. 20303.24 crore under Normal AIBP & Rs. 1763.513 crore under Fast Track AIBP) since inception of the programme till 15.4.2007 to 229 projects (Details given in Table 8.4 and Figure 8.5).

TABLE 8.4 : Year wise CLA Disbursement under Normal and Fast Track AIBP for major/medium irrigation projects

(Rs. crore)

Year	CLA disbursed		
	Normal AIBP	FTP	Total
1996-97	500.000		500.000
1997-98	952.190		952.190
1998-99	1119.180		1119.180
1999-2000	1392.065		1392.065
2000-01	1791.605		1791.605
2001-02	2081.366	472.860	2554.226
2002-03	2628.283	386.855	3015.138
2003-04	2529.904	493.380	3023.284
2004-05	2574.574	198.555	2773.129
2005-06	1497.362	211.863	1709.225
2006-07	1884.221	0.0	1884.221
2007-08*	1352.490	0.0	1352.490
Total	**20303.24**	**1763.513**	**22066.753**

(* For Proposals received during 2006-07)

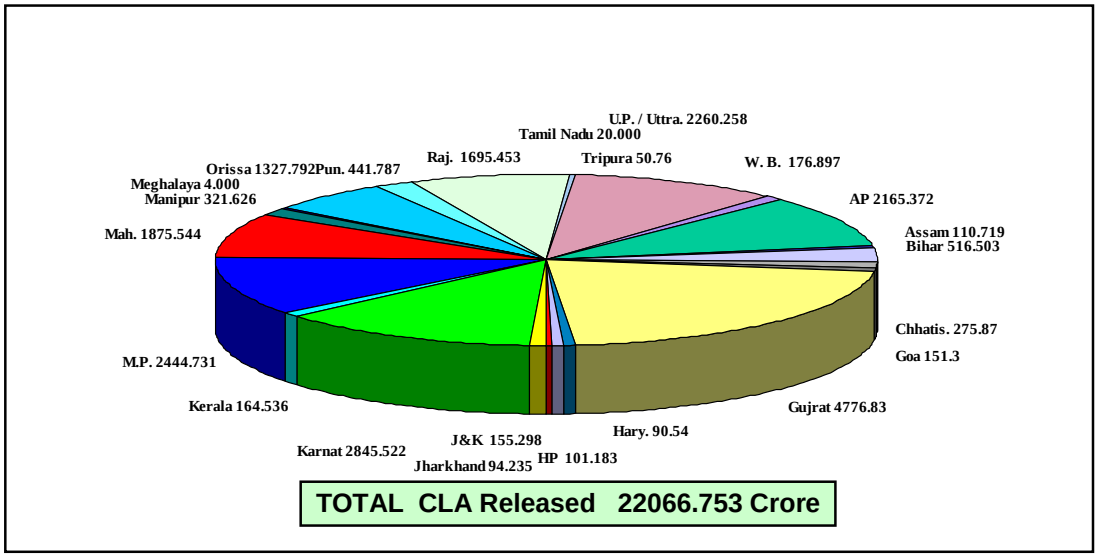


Fig 8.5 Statewise cumulative CLA released under AIBP (Upto 15th April 2007)

The number of States benefited from the programme is 24 till 31.03.2007. A total of 210 projects under Normal AIBP and 42 projects under Fast Track AIBP received the benefit of this programme. Considering 23 common projects between Normal AIBP and Fast Track AIBP, the net number of beneficiary projects is 229 upto 31st March, 2007. Out of 229 projects, 59 projects have been completed upto 31st March, 2007 as a

result of AIBP. As reported by the State Govts. 3.83 million hectare of additional irrigation potential has been created under AIBP since the start of the scheme till March, 2006.

The Accelerated Irrigation Benefits Programme is being implemented by MoWR. Central Water Commission has been assigned the responsibility to comprehensively monitor the projects receiving CLA/Grant. Presently, there are 159 ongoing projects under AIBP which are getting grant and are being monitored by CWC. The projects under AIBP are monitored twice a year by CWC officers and thereafter the status reports are prepared and issued to all concerned.

Comparing the scenario of investment made in AIBP and the corresponding benefits accrued in terms of the cost per ha of potential creation, it is seen that the results are quite encouraging. The cost per ha of potential creation comes to around Rs. 50000/-, which is a reasonable cost of development.

8.5 Statewise Status Reports of Irrigation Development

The Project Monitoring Organisation prepares State-wise yearly status reports bringing out the irrigation development through major and medium projects in the State. These reports give an overview of the surface water resources of the State, ultimate irrigation potential, plan-wise irrigation development in terms of potential created / potential utilised & expenditure incurred, land use classification, projects benefiting drought prone and tribal areas, inter-State/externally aided/centrally aided projects, major projects monitored by CWC alongwith critical issues requiring attention of the State Govt. and other related aspects.

8.6 Management Information System

CWC maintains information / data received through quarterly progress reports, which are furnished by the State/Project authorities for monitored projects and by the regional units of CWC for projects under AIBP. This ensures continuous interaction with the implementing agencies to monitor the follow- up action taken by them on the critical activities of construction as highlighted in the CWC monitoring status reports such as construction planning, project staffing, land acquisition problems, quality control aspects, etc. However, an elaborate Management Information System is still to be developed.

8.7 Monitoring of CAD Projects

The co-ordination and other related works of monitoring of CAD Programme in respect of 133 projects and monitoring status reports received from the Regional offices were also examined and observations / comments were communicated wherever necessary. The Regional offices have monitored almost all projects allotted to CWC. During the year 2006-07, 51 nos. half yearly status reports were received from the Regional offices and these reports were examined and comments / observations were made wherever necessary.

8.8 Repair, Renovation and Restoration of Water Bodies

India has a large number of water bodies spread through out the country, which are age-old and their utility is either reduced drastically or they have become defunct over a period. With a view to restore and augment storage capacities of traditional water bodies and to recover the lost irrigation potential of these existing water bodies having original irrigable culturable area of 40 ha to 2000 ha, which are at present in disuse, Government of India has approved a Pilot Scheme "National Project for Repair, Renovation and Restoration of Water Bodies directly linked to Agriculture" for an estimated amount of Rs.300 crore for implementation during the balance period of the X Five Year Plan. The scheme was launched by the Hon`ble Prime Minister in April, 2005. The funding pattern is 3:1 (Centre: State). Water bodies of 24 districts in the states of Andhra Pradesh (2), Karnaka (2), Jharkhand (2), Chhattisgarh (1), Orissa (2), Rajasthan (2), West Bengal (2), Tamil Nadu (2), Madhya Pradesh (2), Himachal Pradesh (1), Jammu & Kashmir(1), Kerala(2), Gujarat(2) and Maharashtra(1) with an estimated cost of Rs. 299.7925 crore have been sanctioned by MoWR. Funds were released to some States for the year 2006-07 on the basis of approved projects for the States. Proposal received from the State Govt. were examined in Regional offices and consolidated proposal of the participating States was sent to MoWR for approval and inclusion in the Pilot scheme. CWC is also monitoring the implementation of the Scheme by the States.

Once the Pilot Scheme is completed and validated, it will form the basis for launching of the "National Water Resources Development Project" at a much larger scale, which may take 7-10 years for completion. Active community participation is envisaged as a necessary input to ensure optimum utilization of assets and facilities proposed to be created under the scheme and to sustain the scheme on long term basis through involvement of Panchayati Raj Institutions & Water User's Associations for building, operation, monitoring and maintaining the assets and facilities. Catchment area treatment to a limited extent will also form part of this scheme.

The co-ordination and other works related to "Repair, Renovation and Restoration of Water Bodies directly linked to Agriculture" under the Schemes of Minor Irrigation in different States have currently been entrusted to CWC. In this regard 1079 proposals of 26 districts in 15 States amounting to Rs. 299.075 crores have been sanctioned by MoWR subsequent to requisite recommendation of CWC after examination of the schemes as per the MoWR guidelines and concerned authorities of the State Governments.

9

CHAPTER-IX

CONSTRUCTION EQUIPMENT PLANNING AND MANAGEMENT

CWC is actively involved in various aspects of construction equipment planning and management which involves techno-economic appraisal of project reports from plant planning angle, consultancy in equipment planning, monitoring the equipment performance, assistance in procurement of equipment and spare parts, man power planning, contract management, costing/estimating and data processing.

9.1 Project Appraisal

During the year 48 project reports of Irrigation, Power and Multipurpose projects of various States were technically examined from plant planning angle. Out of this, 33 project reports were recommended for acceptance with provision worth Rs. 18756.09 lakh in respect of earthmoving and construction equipment. In respect of the remaining 15 project reports, the observations / comments were conveyed to the project authorities for compliance and further review.

9.2 Consultancy

- Equipment planning for Rangit H.E Project was carried out and chapter on "Construction Methodology and equipment planning" prepared by Sikkim Investigation Division, CWC for inclusion in DPR was vetted and finalized.
- The technical specifications of Dredger for control of siltation and pollution of Umani lake in Meghalaya was furnished to concerned State governments.
- Consultancy assistance rendered to Irrigation and Flood Control Department, Govt. of NCT of Delhi in procurement of equipment. The technical specifications of Crawler Dozer, 180 HP were finalized and furnished.

9.3 Monitoring Programme and Utilisation of Equipment

In order to monitor the utilisation of heavy earthmoving and construction equipment available in river valley projects, CWC collects the data on equipment performance on a quarterly basis. The data are being analysed in P&M Dte. of CMO with a view to identify reasons for low performance/utilisation of equipment. 6 No. quarterly and 1 No. annual returns were received during the year 2006-07 from Punjab State and all have been analysed.

9.4 Disposal of Surplus Equipment and spare parts in water resources sector

The Irrigation Department of Uttar Pradesh and Uttarakhand have large number of earthmoving and construction equipment and their spare parts lying as surplus /

unserviceable with various irrigation projects throughout the State. The State Governments of U.P. and Uttarakhand have constituted eleven and two Disposal Committees respectively in which an officer of Central Mechanical Organisation is a member.

During the year 2006-2007, 13 meetings of the Committees were held in which reserve prices for various unserviceable equipment / machinery valued at Rs. 144.802 lakh were fixed. Representatives from CWC attended these meetings. Assistance is also being rendered in fixation of reserve price of equipment, vehicle and other miscellaneous items of the Regional offices and head quarters of CWC for disposal. Director (P&M) visited the Farakka Barrage Project in respect of fixation of reserve price of heavy earthmoving machineries and marine equipments lying at Farakka Barrage Project (W.B.)

9.5. Manpower Planning

A special study on "Employment Generation in the Operation and Maintenance stage in Major and Medium Irrigation Projects" has been launched during the year. For collection of data for the period from 2000-01 to 2004-05, Performa along with instructions and selection of projects were finalized. Letters were sent to States/Project authorities for supply of information.

A booklet on the various studies conducted, so far, in Manpower Planning Cell to serve as a reference manual titled "Employment Generation in Major and Medium (under construction and operation and Maintenance stage) irrigation project "has also been modified and likely to be finalized.

10

INTER-STATE MATTERS

10.1 Inter-State River Water Disputes

CWC continues to provide technical assistance to MoWR to amicably settle inter-State water disputes among the States through negotiation. During the year, assistance was rendered in respect of the following:

10.1.1 Cauvery Water Disputes Tribunal

The Cauvery Water Disputes Tribunal (CWDT) was constituted by the Government of India on 2 June, 1990 to adjudicate the water dispute regarding inter-State river Cauvery and the river valley thereof. The Tribunal has submitted its report with decision on 05.02.2007. All the party States and Central Government can seek explanation and guidance from the Tribunal under Section 5(3) of the ISRWD Act, 1956 within three months from the date of decision. The report with decision is under study.

10.1.2 Ravi & Beas Water Disputes Tribunal

The Ravi & Beas Water Disputes Tribunal was constituted on 2nd April, 1986, for verification and adjudication of the matters referred in paragraphs 9.1 and 9.2 respectively of the Punjab Settlement in 1985. The Tribunal had submitted its report in January, 1987 to the Government. The Central Government as well as the party States of Punjab, Haryana and Rajasthan sought explanation and guidance on certain points from the Tribunal under Section 5(3) of the ISRWD Act, 1956. The Tribunal has not submitted its final report to the Government, so far, due to various reasons.

Meanwhile Haryana filed a suite during 1995 in the Supreme Court of India in which Government of Punjab and Union of India have been made respondents and prayer made for construction of SYL Canal in Punjab portion. On 15th January 2002, the Supreme Court directed the State of Punjab to continue the digging of SYL Canal portion and make the canal functional within one year from 15th January 2002.,

The Hon`ble Supreme Court also directed the Union Government that if within a period of one year the SYL Canal is not completed by the State of Punjab, then the Union Government gets the work done through its own agencies as expeditiously as possible. The Govt. of Punjab has filed a suit in the Hon`ble Supreme Court on 13.1.03 to seek discharge from the obligation under the Decree dated 15.1.2002 in view of the changed circumstances and other infirmities and considerations. The Supreme Court in its judgment on 4.6.2004 directed the Union Government to mobilize a Central Agency to take control of the canal works from Punjab within a month. The Court also directed the Govt. to set up an Empowered Committee to coordinate

and facilitate the implementation of the decree within a month.

The Central Govt. nominated its agency for execution of the canal and set up a Committee as directed. However, the State of Punjab enacted Punjab Termination of Agreements Act, 2004 on 12.7.2004, terminating all agreements related to Ravi-Beas Water, but protecting the existing and actual usages from the existing system. A Presidential Reference on the constitutionality of the Act made on 22.7.2004 is before the Hon`ble Supreme Court.

The Ravi-Beas Water Disputes Tribunal has heard all parties at length on an application from the State of Punjab to keep the matter before the Tribunal in abeyance until the disposal of the aforesaid Presidential Reference.

The Tribunal has requested for extension of the period by another six months beyond 5th Feb., 2006 in view of the matter of a Presidential Reference on the Constitutionality of Punjab Termination of Agreements Act, 2004, pending consideration of the Hon`ble Supreme Court the request is under process. The Tribunal held hearings in February, April and September, 2005.

10.1.3 Krishna Water Disputes Tribunal

The Krishna Water Disputes Tribunal (KWDT) was constituted on 2nd April, 2004 for adjudication of the dispute relating to sharing of waters of inter-State river Krishna and river valleys thereof.

The Tribunal has passed orders on 09.06.2006 on a set of seven interim applications filed by the basin States. Through these applications, each State had, primarily, sought to restrain other basin States from going ahead with certain projects. The Tribunal has declined to grant interim relief on the prayers of all the States. Final order of the tribunal is awaited.

10.1.4 Mandovi River Water Disputes

Mondovi is an inter-State river originating in Karnataka and after flowing in Goa drains into the Arabian Sea. A small portion of the catchment area lies in Maharashtra. The Government of Karnataka in the past prepared proposal for diversion of Mandovi water outside the basin. MoWR in April, 2002 conveyed 'in principle' clearance for diversion of 7.56 TMC of water from Mandovi basin to the adjoining Malaprabha sub-basin (Krishna basin) for drinking water purposes. In view of the strong protest from the Government of Goa, MoWR during September, 2002 kept the 'in principle' clearance in abeyance. The Government of Goa also sought for constitution of a tribunal for adjudicating the disputes.

Subsequently, Union Minister for Water Resources took an inter-State meeting in December 2002, during which it was decided that Government of Goa and CWC could make joint efforts to reconcile the discrepancies in the data and yield figures and the assessment of yield should be completed by March, 2003. Since Government of Goa wanted to scrutinize the runoff data of CWC site from original records, as a special case, MoWR during

July, 2003 permitted to give all the raw gauge data of Gangim site of CWC to Goa. Government of Goa have informed recently that they have collected data upto May, 2003 and require more time to process the raw data and to hold further discussions with CWC officers before convening any inter-State meeting on the matter.

Based on a representation received from MPs/MLCs, Hon`ble Minister (WR) desired that Secretary (WR) & Chairman, CWC to hold talks with the officials of Goa and Karnataka but no meeting could take place. Subsequently, a meeting was taken by Hon'ble Union Minister (WR) with the Chief Ministers of the basin states on 4.4.06. No negotiated settlement could be reached. The State of Goa insists on constituting Tribunal to adjudicate the dispute.

10.1.5 Vamsadhara River Water Disputes

During February, 2006, the State of Orissa had sent a complaint to the Central Government under Section 3 of the ISRWD Act, 1956 regarding water disputes between the Government of Orissa and the Government of Andhra Pradesh, pertaining to inter-State river Vamsadhara for constitution of a Tribunal for adjudication. According to the provisions of ISRWD Act, 1956, if the Central Government is of the opinion that the water dispute cannot be settled by negotiations, then it has to constitute a Tribunal within one year of receiving the request. The matter is under consideration of MoWR. To resolve the dispute Secretary (WR), convened an inter-State meeting with Secretaries of Irrigation/WR Department of Government of Andhra Pradesh and Orissa on 24.04.2006. It was agreed in the meeting that CWC will reassess the yield of Vamsadhara Basin. States of Orissa and A.P. also agreed to share the yield of the river on 50:50 basis as already agreed on 30.09.1962. It was also agreed that the aspect of shifting of river course due to construction of side weir at Katragada shall be studied by CWC/CWPRS.

10.2 Drinking water supply for Jagdalpur town in Chhattisgarh

It was reported by the Government of Madhya Pradesh (now Chhattisgarh) in 1999 that during the past years post monsoon flows in the Indravati river were progressively dwindling due to peculiar phenomenon of diversion of Indravati river through "Jauranalla" a small rivulet which joins Kolab-Sabari River and consequently causing drinking water supply problems in Jagdalpur town and downstream villages in Madhya Pradesh.

As per the provisions of the Godavari Water Disputes Tribunal (GWDT) Award vide Annex-IV under Annex-'A' i.e. Agreement dated 9.12.1975 between the States of Orissa and Madhya Pradesh, Orissa is to ensure at its border with Madhya Pradesh a flow of 45 TMC in the Indravati and its tributaries at 75% dependability for use by Madhya Pradesh. However there is no specific stipulation regarding monthly quantum to be made available.

Member (WP&P) took four inter-State meetings of Secretaries of Orissa, Chhattisgarh and Regional Chief Engineers of CWC up to the April, 2003.

An inter-State meeting at the level of Engineer-in-Chief, Water Resources Department, Governments of Chhattisgarh and Orissa was held on 24th December , 2003 at Raipur in which, among other points, the water supply problems faced by Jagdalpur Town and downstream areas was also discussed. It was decided in the meeting that CWC would be requested to take up the design work and Chhattisgarh would pay the consultancy charges to CWC. Accordingly, Director, BCD (E&NE), CWC inspected the site of proposed structures in March, 2004 and sent the inspection note to both the State Governments indicating the field and laboratory investigations to be carried out and data to be collected and supplied for taking up the design work. The required data / information are awaited from the Govt. of Orissa. The Government of Orissa is being pursued by CWC to expedite the information. A site visit was undertaken by CWPRS and CWC officers along with officers of both states in December, 2004. Data to be supplied for taking up model studies at CWPRS were listed out and given to both states. CWC has taken up the specification drawings for the proposed structures. The model studies for the proposed control structure across Indravati and Jauranalla rivers are under progress at CWPRS, Pune. However, the preliminary design /drawings work has already been taken up by CWC.

10.3 Paragodu Project on Chitravathy River of Pennar Basin

The Government of Karnataka has initiated construction of a minor project on the river Chitravathy, a tributary of the river Pennar, which is an inter-State river (Karnataka and Andhra Pradesh). The project envisages providing drinking water facility to 88 villages and 2 towns by constructing a tank. According to the Government of Andhra Pradesh, the construction of the project will adversely affect the drought-hit Anantapur District in Andhra Pradesh.

A central team led by Member (WP&P), CWC visited the project site along with the representatives of Andhra Pradesh and Karnataka in June, 2003. The matter was thereafter discussed in an inter-State meeting convened by the Chairman, CWC. Based on the discussions, revised project report was received in January, 2004, where project planning had been done for 90% dependability by the State Govt and the norms for drinking water supply specified by Central Government were not adopted. The State Govt. has been asked to revise the project planning for 95% dependability, adopting drinking water norms as per the norms of Ministry of Urban Development and Ministry of Rural Development of Government of India. The revised project report is awaited.

10.4 River Boards Act, 1956

Under Entry 56 of List-I of the Constitution, the River Boards Act, 1956 was enacted for the establishment of River Boards for the regulation and development of inter-State River and River Valleys. The Central Government can constitute a River Board under the provision of the River Boards Act, 1956 with the concurrence of the State Governments. The Central Govt. has not been able to constitute any River Board under this Act, so far. The role of the River Boards as envisaged in the said Act is only

advisory in nature. The National Committee for Integrated Water Resources Development Plan has recommended the enactment of a new Act called the "Inter State Rivers and River Valley (Integrated and Participatory Management) Act" in place of existing River Board Act, 1956.

10.5 Control Boards for Inter-State Projects

10.5.1 Bansagar Control Board

In pursuance of an inter-State agreement among the Chief Ministers of Madhya Pradesh, Uttar Pradesh and Bihar, the Bansagar Control Board was constituted vide resolution of erstwhile Ministry of Agriculture & Irrigation in January, 1976 for efficient, economical and early execution of Bansagar Dam and connected works. The headquarters of the Board is at Rewa (Madhya Pradesh).

The Union Minister of Water Resources is the Chairman of the Board and the Union Minister of Power, Union Minister of State for Water Resources, Chief Minister and Minister in charge of Irrigation and Finance of the three states and Minister-in-charge of Electricity of Madhya Pradesh are its members. Chairman, CWC is the Chairman of the Executive Committee of Bansagar control Board.

Bansagar Dam on Sone river, a joint venture of the states of Madhya Pradesh, Uttar Pradesh and Bihar is being executed by Water Resources Department, Madhya Pradesh under the directions of the Bansagar Control Board. The Execution of the canals and power systems are being carried out by the respective States independently and works of Power House is being executed by MPEB. The benefits and cost of the dam including land acquisition and rehabilitation are to be shared by Madhya Pradesh, Uttar Pradesh and Bihar in the ratio of 2:1:1.

The Executive Committee (EC) has, so far, held 71 meetings. In 71st meeting held on 18.7.06 Committee discussed the financial technical and administrative matters of the Board.

10.5.2. Betwa River Board

In accordance with the inter-State agreement of 1973 between U.P. and M.P. decision was taken to constitute a Control Board for the execution of the Rajghat Dam Project, an inter-State project of M.P and U.P. Accordingly, the Betwa River Board was constituted under the Betwa River Board Act – 1976 for efficient, economical and early execution of the project. The headquarters of the Board is at Jhansi (U.P.).

The Union Minister of Water Resources is the Chairman of the Board and Union Minister of Power, Union Minister of State for Water Resources, Chief Ministers and Minister-in-charge of Finance, Irrigation and Power of the two states are Members.

Chairman, CWC is the Chairman of Executive Committee (EC) of Betwa River Board. As per Betwa River Board Act 1976 subject to the general superintendence and control of the Board, the management affairs of the Board shall vest in the Executive Committee and the Chairman and other members of the Committee shall assist the Board in such manner as the

Board may require. Subject to the rules and the directions of the Board, the Executive Committee may exercise any power and do any act or thing which may be exercised or is done by the Board. Chairman, Executive Committee has been delegated with emergency powers to take decision on urgent proposals, subject to ratification by the Executive Committee in its next meeting.

The Executive Committee of BRB has so far, held 78 meetings. The 78th meeting of Executive Committee was held on 18.07.06. The Committee discussed financial, technical and administrative matters of the Board.

10.6 Inter-state Committees

Brief description of activities of some of the important inter-State committees is given below.

10.6.1 Joint Operation Committee on Rihand Reservoir

Rihand is a major tributary of river Sone. Rihand Hydro-electric Project (6x50 MW) was constructed by Government of Uttar Pradesh in 1962. The live storage capacity of Rihand reservoir is 5650 MCM at FRL of 268.224 m. The releases from Rihand Power House are utilized for irrigation in Bihar, through the Sone Barrage at Indrapuri. An agreement on sharing of release from Rihand Project was signed between U.P and Bihar in 1973. MoWR set up a Joint Operation Committee for Rihand reservoir in 1992 to formulate guidelines for operation of the reservoir after assessing the water availability in the reservoir, irrigation requirements in Bihar and power to be generated, with a view to meet the requirements of both the states. The Member (WP&P), CWC is the Chairman and Director (RO) is the Member-Secretary of the committee.

Every year, meeting of JOC is normally convened in the month of September to finalise the monthly release pattern from the reservoir after assessing water availability in the reservoir. The committee has, so far, held 17 meetings. The 17th meeting of Joint Operation Committee of Rihand Reservoir was held in New Delhi on 26th September, 2006 under the chairmanship of Member(WP&P) in which the actual operation of Rihand reservoir during 2005-06 was discussed and also the Operation plan for 2006-07 was finalised.

10.6.2 Ghaggar Standing Committee

The Ghaggar Standing Committee was constituted in February, 1990 to examine and coordinate irrigation, flood control and drainage works in the Ghaggar basin and to lay down priority for their implementation and to accord clearance to individual schemes in the Ghaggar basin from the inter-State angle. The Members of the Committee are from the Ministry of Water Resources, Northern Railway, Central Water Commission and Irrigation Department of the States of Punjab, Haryana and Rajasthan.

19th Meeting of Ghaggar Standing Committee was held on 11.7.2006 under the chairmanship of Member (RM). In the meeting, it was decided that Government of Haryana could go ahead with the construction of Koshallia dam across river Koshallia with features proposed in the

DPR. It was also decided that the basin States should carry out the negotiations for an agreement for sharing of Ghaggar water and proposal of Haryana for remaining two dams would be considered thereafter.

A Sub-Committee to the Ghaggar Standing Committee was constituted by MoWR on 21.12.2005 to monitor the water quality of river Ghaggar & to suggest the remedial measures to control the pollutants. The 1st meeting of Sub-committee was held on 21.2.2006 and it was decided to collect the date of pollutants entering into the river Ghaggar from the concerned States. The 2nd meeting of the Sub Committee was held on 22.9.2006 and it was decided to prepare the draft report on water quality of river Ghaggar with the data collected so far. It was also decided to visit the areas by the Sub-Committee after the submission of draft report. Preparation of draft report is under progress.

10.6.3 Yamuna Standing Committee

The Yamuna Standing Committee was constituted to study the interests of Delhi, its suburbs and the Northern Railway Bridge and to carry out other studies on the Yamuna at Delhi against undue increase in maximum flood level in Yamuna at Delhi on account of flood control works upstream, to safeguard the interest of Haryana, U.P. and Delhi against adverse effects of flood control works in any of these areas and to ensure that adequate water way is provided for any new structure built across the Yamuna river.

The Members of the Committee are from GFCC, Northern Railway, Central Water Commission, Ministry of Surface Transport and Irrigation Departments of the States of Haryana, U.P. and NCT of Delhi. 72nd meeting of Yamuna Standing Committee was held on 8.1.2007 under the chairmanship of Member (RM), CWC. The minutes of the meeting were finalized and circulated among the members of the Committee.

10.6.4 Sahibi Standing Committee

After the unprecedented flood in the Sahibi basin during 1977, affecting large areas in the States of Rajasthan and Haryana and NCT of Delhi, the CWC prepared an integrated Master Plan of Sahibi Nadi-Najafgarh Nallah drainage basin. Sahibi Standing Committee with Member (RM), CWC as Chairman and Director (FM-I) as Member-Secretary along with representatives of Haryana, Rajasthan, Delhi as members was constituted by Ministry of Agriculture and Irrigation, Department of Irrigation in 1978 to oversee the implementation of all the elements of the Master Plan of Sahibi Nadi-Najafgarh Nallah and to ensure the regulation of flows at control points for the best interest of all concerned States. There have been no major flood in the basin since 1978 and no meeting of the Committee was held during 2006-07.

10.6.5 Committee on Special Remedial Works for Flood Protection Embankments of Sutlej and Ravi.

A committee on special remedial works for the flood protection embankment of the rivers Sutlej and Ravi was constituted in December, 1989 by the Ministry of Water Resources under the chairmanship of Chief

Engineer (FM), CWC to technically examine proposals for special remedial works from Govt. of Punjab after verification of developments in the field and to monitor the utilisation of the Central Assistance by Punjab for such works by periodic inspection of ongoing and completed works. The Members of the Committee are from Ministry of Water Resources, CWPRS, Pune, Central Water Commission, Ministry of Defence and Irrigation Department of the States of Punjab. The committee was enlarged by co-opting members from BSF, CPWD and Ministry of Home in 1996.

Report of the 27th meeting of the "Committee of Special Remedial Works for Flood Protection Embankment on rivers Sutlej and Ravi" held from 4.11.2006 to 7.11.2006 under the chairmanship of Chief Engineer (FMO) was prepared and sent to all the Members of the Committee and Ministry of Water Resources and Ministry of Home Affairs.

10.7 Comprehensive System Studies of Damodar – Barakar Basin

Comprehensive System Studies of Damodar Barakar basin have been completed and circulated to co-basin States and DVC (Damodar Valley Corporation) through Member Secretary (DVRRC).

10.8 Damodar Valley Reservoir Regulation Committee

The Damodar Valley Reservoir Regulation Committee under the Chairmanship of Member (RM), CWC provides necessary directions for operation of the Damodar Valley Reservoirs. During the year, the committee held its 113th meeting on 24-6-2006 and 114th on 14-11-2006 to provide directions for the operation of the reservoirs. Instructions for day to day operations of the reservoirs are provided by the Superintending Engineer, CWC stationed at Maithon.

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CHAPTER XI

ENVIRONMENTAL MANAGEMENT OF WATER RESOURCES PROJECTS

11.1 Environmental Management

11.1.1 National Environmental Monitoring Committee for River Valley Projects (NEMCRVP)

National Environmental Monitoring Committee for River Valley Projects (NEMCRVP) was constituted in February, 1990 for monitoring the implementation of environmental safeguards of irrigation, multipurpose and flood control projects. The Committee is entrusted with the work of reviewing the mechanism established by the State Governments and project authorities, to monitor the implementation of environmental safeguards and to suggest additional compensatory measures in respect of selected 85 projects located in 21 states **(**Fig-11.1**).** Out of these 85 selected projects, 17 are under close monitoring (Fig.- 11.2).

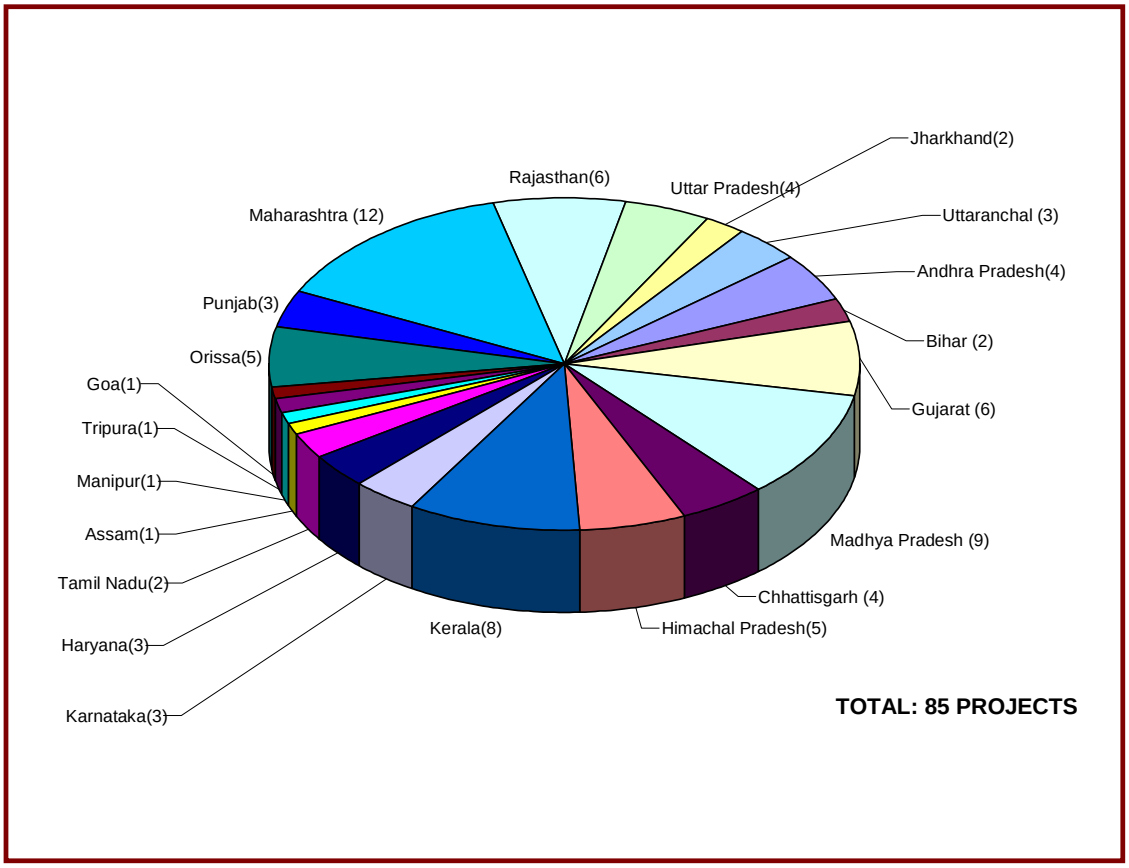

Fig 11.1 State wise Projects monitored by NEMCRVP

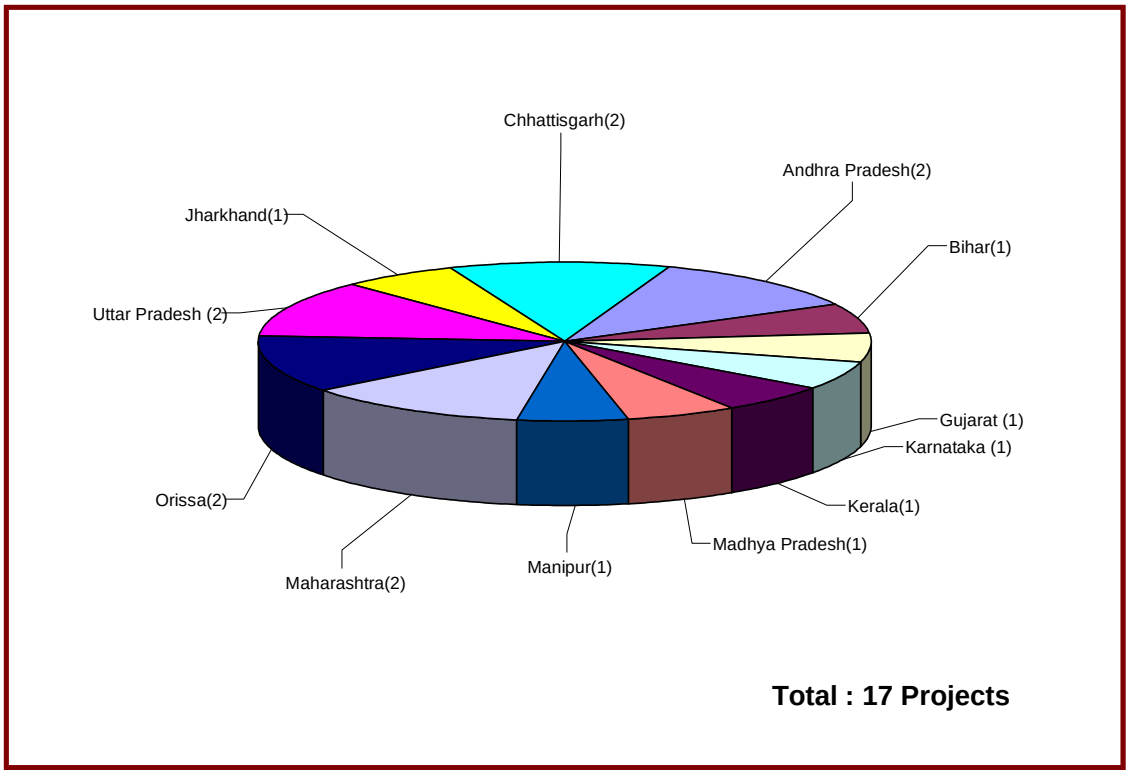

Fig 11.2 State wise Projects under close monitoring by NEMCRVP

11.1.2 Constitution of NEMCRVP

Member (WP&P), CWC is the Chairman of NEMCRVP. The representatives from Ministries of Agriculture & Cooperation, Environment & Forests, Water Resources, Tribal Welfare besides Planning Commission and CWC are members of the committee. The Chief Engineer (EMO), CWC is the Vice-Chairman and Director (EM) is the Member-Secretary. Environmental Management Directorate, CWC functions as its Secretariat.

11.1.3 Functions of the Committee

The NEMCRVP visits the projects and holds meetings with the State Governments and Project Authorities for implementation of environmental safeguards as stipulated in environmental and forest clearances. The Committee has visited 57 projects which include all the closely monitored projects during last 17 years. It has held 59 meetings since 1990. The Committee encourages constitution of State Environmental Monitoring Committees (SEMCs) and Project Environmental Management Committees (PEMCs) and monitors the activities of these committees. As a result of the above, 21 states have already constituted SEMCs under the Chairmanship of Secretary, State Water Resources/Irrigation Departments including the State of Chhattisgarh for which SEMC was recently constituted. PEMCs have been constituted for 68 out of 85 projects selected by NEMCRVP. In addition to this, 48 additional PEMCs have also been constituted for other projects. PEMCs play a vital role in the implementation of environmental safeguards stipulated while clearing the Project. Chief Engineer (EMO)/Director (EM), CWC is the

Member of the SEMCs whereas Regional Chief Engineer, CWC is the special invitee to these committees. Director (Appraisal/ Monitoring & Appraisal/ Monitoring) of Regional office represent CWC in PEMCs.

The progress achieved by the NEMCRVP is being brought out annually in the shape of Annual Reports giving details of visits and meetings. The directions given to concerned State and project authorities for implementing the environmental safeguards are highlighted in the annual report. Status Reports on environmental and related aspects is also presented in the Annual Reports.

Inter-ministerial National Environmental Monitoring Committee for River Valley Projects (NEMCRVP) visited Krishna Koyna Lift Irrigation scheme and Dudhganga Project (Maharashtra) during 07th to 10th February, 2007. During this visit, 58th and 59th meetings were held on 10th February 2007 at Kolhapur. The meeting was held to discuss measures taken for implementation of stipulated environmental safeguards under the chairmanship of Chief Engineer, (EMO) CWC.

11.2 Environmental Impact Assessment

Studies on environmental (including social) impacts of completed water resources projects have been taken up by EIA Directorate through Consultants, under an R&D Scheme of the Ministry of Water Resources. Studies on three projects viz. Jayakwadi Stage –I (Maharashtra), Barna (M.P) and Salandi (Orissa) are in progress. Studies on three more projects are proposed to be taken up shortly, for which process of bidding has already been completed.

EIA/ EMP reports of 36 projects referred to CWC by Ministry of Environment & Forests have been examined and comments forwarded to the Ministry. Nine Meetings of Expert Committee for River valley & HE projects have been held and the Committee has recommended 25 projects for environmental / prior environmental clearance. Feasibility reports/ DPRs of 9 projects have been examined from an environmental angle for grant of "In Principle" consent by CWC.

11.3 Resettlement & Rehabilitation

The Central Water Commission is actively involved in monitoring of resettlement and rehabilitation(R&R) issues of water resources development projects in various states especially Sardar Sarovar Project (Gujarat), Indra Sagar Project (MP) and Priya Darshni Jurala Project (AP).

Half yearly progress report of 17 projects on R&R programmes received from various project authorities have been examined during the year. In order to create a database on R&R, information on project affected persons of 219 existing/ongoing major/medium projects have been collected. CWC is associated with regard to Finalization of Revised Cost Estimate of LA&R Works of Bansagar Project. CWC is also associated for award, monitoring & evaluation in regard to socio-economic & environmental studies of Ken-Betwa link.

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CHAPTER-XII

EXTERNAL ASSISTANCE

12.1 External Assistance for Development of Water Resources

External assistance flows to the country in various forms; as multilateral or bilateral aid, loan, grants and commodity aid from various foreign countries and other donor agencies. The main source of external assistance in irrigation sector has been the International Bank of Reconstruction and Development (IBRD) commonly known as the World Bank and its soft lending affiliate, the International Development Association (IDA). In addition to the World Bank, other funding agencies such as International Fund for Agriculture Development (IFAD), United State's Agency for International Development (USAID), European Economic Community (EEC), UNDP and Japan Bank of International Cooperation (JBIC) have also been providing assistance for implementation of irrigation projects. Projects have also been funded through bilateral support of France, Australia, Canada, Germany and the Netherlands. The Ministry of Water Resources and its organizations assist the State Governments in tying up the external assistance from different funding agencies to fill up the resources gaps, both in terms of funds and technological update for rapid development of country's water resources.

12.1.1 Role of CWC

The important activities of CWC in externally aided projects are:-

(a) Providing assistance to the State Govts. for preparation of project proposal for getting external assistance for water sector projects.

(b) Techno-economic examination of the projects posed for external assistance and coordination with State and concerned departments/ministries such as CGWB, MoEF, etc.

(c) Monitoring of physical and financial progress of externally aided projects and fixing of arbitrators for resolving disputes in the execution of projects.

12.1.2 Techno- economic appraisal & clearance of projects

3 major projects proposed for World Bank funding and 11 medium projects for JBIC assistance were under appraisal in CWC during 2006-07. Details of the project are given in table 12.1 and 12.2.

Table 12.1 Major projects proposed for World Bank Assistance

Sl No	Name of project	Estimated cost (Rs. crore)
1.	Andhra Pradesh Water Sector Improvement Project	2250.00
2.	Master Plan for Drainage Development in Costal Belt of Orissa	856.43
3.	Mahanadi Basin Development Plan Orissa	3493.10

Table 12.2 Medium schemes proposed for JBIC assistance

Sl No.	Name of Project	Estimated Cost (Rs crore)
1.	Wyra	46.00
2.	Taliperu	13.20
3.	Sathnala at Kanpa	48.39
4.	Swarna at Jowly	14.50
5.	Lankasagar	12.00
6.	Malluruvagu	12.00
7.	Lower Sagileru	19.00
8.	Swarnamukhi Anicut System	27.55
9.	Dindi	15.00
10.	Gandipalem	29.30
11.	Gajuladinne	55.00

12.2 World Bank Assistance

The World Bank continues to be the primary source of external assistance in the water resources sector. The World Bank assistance is in the form of credit or loan. The World Bank financing policies for irrigation projects change from time to time. Initially it financed individual irrigation projects and then changed to financing composite projects in which a group of Major, Medium and Minor irrigation projects were financed under a single credit/loan agreement. It then started financing Water Resources Consolidation Projects in which irrigation sector of the whole State was involved under one credit/loan agreement. Now the policy of World Bank has shifted to finance Water Sector Restructuring Projects in which the emphasis is on irrigation sector reforms of the whole State.

12.2.1 Closed Credit/Loan Agreements

Out of 41 World Bank aided projects, 38 projects have been closed and the assistance utilised is as shown in Table 12.3

Table 12.3
Details of the Closed Agreements

Sl. No.	State	No. of Projects	Assistance in Million US Dollar	
			As per SAR	Utilised
1.	Andhra Pradesh	6	995.30	802.62
2.	Bihar	2	142.00	158.61
3.	Gujarat	7	921.50	805.82
4.	Haryana	3	519.00	505.98
5.	Karnataka	2	451.00	291.96
6.	Kerala	1	80.00	79.08
7.	Madhya Pradesh	2	360.00	318.18
8.	Maharashtra	4	453.00	480.75
9.	Orissa	5	544.90	457.55
10.	Punjab	2	294.00	290.06
11.	Tamil Nadu	3	340.90	268.36
12.	Uttar Pradesh	1	125.00	126.76
	Total	**38**	**6051.6**	**5217.33**

12.2.2 Water Resources Consolidation Projects

The Water Resources Consolidation projects (WRCPs) deal with irrigation sector in its entirety and State as a whole to realize the basic objectives postulated in the National Water Policy. The World Bank has extended credit assistance on a larger scale under separate WRCP individually to three States namely Haryana, Orissa and Tamil Nadu, who were the main participants of NWMP-1. The main objectives of WRCP are:

1. Improving institutional and technical capability of managing the State's water resources
2. Planning of water resources by river basin across all uses of water
3. Improving agricultural productivity through rehabilitation and completion of irrigation schemes and farmers' participation.
4. Assuring sustainability of infrastructure and the environment, etc.

12.2.3 Water Sector Restructuring Project

Water Sector Restructuring Project (WSRP) is the latest concept in water resources development and management and are the latest generation irrigation projects being financed by World Bank. Water Sector restructuring projects are planned with the objective to take care of water sector reform, proper implementation of State water policy, creation of apex water institutions and strengthening of multi-sector water resources and environment capacity. At present four such projects are taken up with the assistance of the World Bank in the State of Rajasthan, Madhya Pradesh and Uttar Pradesh, and Maharashtra.

The main objectives of WSRP are:-

1. To set up an enabling institutional and policy frame work for water sector reform in the State for integrated water resources management.
2. To strengthen the capacity for strategic planning and sustainable development and management of the surface and ground water resources.
3. To initiate irrigation and drainage sub-sector reforms in the State to increase the productivity of irrigated agriculture through improved surface irrigation system performance and strengthened agriculture support services involving greater participation of users and the private sector in service delivery.

12.2.4 On-going Credits / Loans Agreements

Out of seven ongoing projects, three projects viz. Tamil Nadu Water Resources Consolidation Project, Orissa Water Resources Consolidation Project, Third Andhra Pradesh Irrigation Project were closed during the year 204-05. One new project namely, Madhya Pradesh Water Sector Restructuring Project was launched in Jan, 2005. The assistance utilized is as given in Table 12.4 :-

Table 12.4 External Assistance to Projects (World Bank)

Sl. No	Name of Project	Credit No/Loan No.	Agency	Time Slice		Est. Cost (Rs. Million)		Assistance (US $ Million)	
				Starting Month	Closing Month	Total (As per SAR)	Latest	Total	Utilized ending 03/07
1	2	3	4	5	6	7	8	9	10
1	**Rajasthan** Water Sector Restructuring Project	Cr.3603-IN	IDA	22-03-2002	31-03-2008	8305.07	8305.07	**SDR 110.00 (USD 140.00)**	SDR 50.84 (USD 77.38)
2.	**Uttar Pradesh** Water Sector Restructuring Project	Cr.3602-IN	IDA	27-03-2002	31-10-2007	8351.00	8351.00	**SDR 117.00** (USD 149.20)	SDR 26.53 (USD 40.00)
3.	**Madhya Pradesh** Water Sector Restructuring Project	Ln.4750-IN	IBRD	11-01-2005	31-03-2011	20402.23	20402.23	USD 394.02	USD 30.20
4.	**Maharashtra** Water Sector Improvement Project	L4796-IN	IBRD	05-09-2005	30-09-2011	18595.58	18595.58	USD 325.00	USD 32.45
	TOTAL							**USD 853.52**	**USD180.03**

12.3 Japan Bank of International Cooperation Assistance

In water resources sector JBIC provides financial assistance to major, medium and minor Irrigation Projects in the form of loans with the objective of increasing production of agriculture by mainly funding construction of civil works in the irrigation system. The main components of these projects are as follows:-

- Construction of civil works
- Training
- Consulting Services
- Agriculture Intensification Programme
- On-farm development.

12.3.1 Closed Agreements

Out of 5 JBIC aided projects, 3 projects have been closed and assistance to the tune of ¥ M 19277.83 has been utilised against the total assistance of ¥ M 20077 provided as per agreement.

12.3.2 On-going Agreements

There are two ongoing projects under JBIC funding. The assistance utilized is given in Table 12.5

Table 12.5 External Assistance to Project (JBIC)

SL. No.	Name of Project	Loan Agreement No.	Loan period		Estimated cost		Total Assistance (M Yen)	Assistance utilized ending 3/07 (M yen)
			Starting date	Closing date	As per agreement(Rs M)	Latest ending 12/06 (Rs M)		
1	K..C.Canal Modernisation Project, Andhra Pradesh	ID-P-113 & ID-P155	26.03.96	22.3.09	10337.37	11070.00	20882.00	2118.74
2	Rengali Irrigation Project Left Bank Canal-II Phase-I, Orissa	ID-P-135 & ID-P154	05.2.98	31.12.07	4494.72	5915.45	14102.00	8832.48

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CHAPTER-XIII

INTERNATIONAL COOPERATION WITH NEIGHBOURING COUNTRIES

13.1 Cooperation between India and Nepal

- Most of the rivers, which cause floods in the States of UP and Bihar originate from Nepal. These rivers are the Ghaghra, the Sarda, the Rapti, the Gandak, the Burhi Gandak, the Bagmati, the Kamla, the Kosi and the Mahananda. In order to make flood forecasting and advance warning in the flood plains of the above rivers, a scheme namely, "Flood Forecasting and Warning system on rivers common to India and Nepal" which includes 42 meteorological / hydrometric sites in Nepal and 18 hydrological sites in India has been in operation since 1989. The data collected is helpful for formulating the flood forecasts and issue of warnings in the lower catchment. The scheme is being reviewed regularly from time to time.

- With a view to discuss important issues pertaining to cooperation in the field of Water Resources, including implementation of existing agreements and understanding, a Indo-Nepal Joint Committee on Water Resources (JCWR) headed by the Water Resources Secretaries of both the countries is functioning with the mandate to act as an Umbrella Committee of all committees and groups. CWC provides assistance to the MoWR in connection with activities of the Indo-Nepal JCWR and Joint Group of Experts (JGE).

- A treaty on Integrated Development of Mahakali (Sharda) River including Sharda Barrage, Tanakpur Barrage and Pancheshwar Multipurpose Project was signed between the Governments of India and Nepal in February 1996, which came into force in June, 1997 (Mahakali Treaty). The Treaty is valid for a period of 75 years from the date of its entry into force. Pancheshwar Multipurpose Project is the Centre piece of Mahakali Treaty. Required field investigations for the Pancheshwar Multipurpose Project having an installed capacity of 5600 MW at Pancheshwar with irrigation and incidental flood control benefits and a re-regulating structure to primarily meet the irrigation requirements downstream of Banbasa in Uttar Pradesh, have been completed. The DPR is to be finalised after mutually resolving the pending issues regarding finalisation of re-regulating dam site, cost apportionment between irrigation and power, as well as between India and Nepal.

- The Government of India has also been discussing with Nepal the taking up of joint investigation of Sapta Kosi High Dam Multipurpose Project and Sun Kosi Storage-cum-Diversion scheme. As per agreed Joint Inception Report, a Joint Project Office (JPO) to take up field investigations and preparation of Joint DPR has been opened in August, 2004

in Nepal. The preparation of Joint DPR is programmed to be completed in a period of 30 months from the date of setting up of the JPO. Besides irrigation and power benefits, the above project will also have major flood control benefits particularly for the north Bihar. Field investigations for preparation of DPR are under progress.

- In pursuance to the decisions taken on the occasion of the visit of the Prime Minister of Nepal to India, a High Level Nepal – India Technical Committee on Inundation problems on Rupandehi (Nepal)/Siddarth Nagar (India) and Banke (Nepal)/Shravasti districts (India) was constituted. The Committee is headed by Commissioner (ER) on the Indian side.

- There are number of areas of co-operation between India and Nepal and there are many issues to be pursued from both the sides as given above, however during the year 2006-07, there has been no substantial progress in the matter due to prevailing political situation in Nepal.

13.2 Cooperation between India and China

- In 2002, the Government of India had entered into a MoU with China for sharing of hydrological information on Yaluzangbu/Brahmaputra River in flood season from China to India. In accordance with the provisions contained in the MoU, the Chinese side is providing hydrological information (water level, discharge and rainfall) in respect of three stations, namely Nugesha, Yangcun and Nuxia located on river Yaluzangbu/Brahmaputra from 1st June to 15th October every year. The requisite data upto the year 2005 was received and the same was utilized in the formulation of flood forecasts by CWC.

- For hydrological information of the Sutlej/Langqen Zangbo river in flood season both the countries had signed a MoU in April, 2005 during the visit of Hon`ble Premier of China in April 2005. As per MoU, the Chinese side has agreed to provide information on any abnormal rise/fall in water level/discharge and other information, which may lead to sudden floods on the basis of existing monitoring and data collection facilities on real time basis. Further, the Chinese side agreed to build a hydrological station on the Sutlej/Langqen Zangbo River before the flood season of the year 2006 and provide the hydrological information to the Indian side. Implementation plan for exchange of data is yet to be finalized. Talks with China for establishing sites in Palanzangbu and Lohit are continuing.

- Further, After the incidence of artificial lake created and breached in 2004 on Pareechu River for monitoring the water level of Pareechu, two-sites in Tibet (China), downstream of landslide dam/lake site & upstream of lake–formed and two sites in India, one in J&K and another in Himachal Pradesh (downstream of dam) have been established for real time data transmission.

13.3 Cooperation between India and Bangladesh

Transmission of data

Under a joint action programme between India and Bangladesh, arrangements exist for the transmission of water levels, discharge and rainfall data to Bangladesh during monsoon season since 1972. These arrangements existed prior to the emergence of Bangladesh as a sovereign nation. Transmission of water level, discharge and rainfall data to Bangladesh during the monsoon season (15th May to 15th October) is continuing.

Joint Observation of Ganga Water

The Joint observation teams stationed at Farakka and Hardinge Bridge conduct joint observation from 1st January to 31st May every year as per procedure and guidelines framed by the Joint Committee on sharing of Ganga/Ganges water. During the year six CWC officers were deputed for joint observation at Hardinge Bridge, Bangladesh.

13.4 Cooperation between India and Bhutan

- A comprehensive scheme titled "Comprehensive Scheme for Establishment of Hydrometeorological and Flood Forecasting Network on rivers common to India and Bhutan" is already in operation since 1979. The network consists of 35 hydrometeorological / meteorological stations located in Bhutan maintained by Royal Government of Bhutan (RGoB) with funding from India. Central Water Commission utilizes the data received from these stations for formulating the flood forecast. A Joint Team of Experts (JTE) consisting of officials from the Government of India and Royal Government of Bhutan continuously reviews the progress and other requirements of the scheme.

- The matter relating to problem of floods created by rivers originating from Bhutan and coming to India was taken up with Royal Government of Bhutan. In this connection a Joint Group of Experts (JGE) on flood management has been constituted between India and Bhutan to discuss and assess the probable causes and effects of the recurring floods and erosion in the southern foothills of Bhutan and adjoining plains in India and recommend to both Governments appropriate and mutually acceptable remedial measures. The first meeting of JGE was held in Bhutan in November 2004. The JGE had series of discussion and also made several field visits to some of the affected areas which include the sites prone to landslides and dolomite mining areas. Based on their recommendations, the JGE felt that a more detailed technical examination is required and accordingly agreed to form a Joint Technical Team (JTT) under the Chairmanship of Member (PID), North Bengal Flood Control Commission with representatives from CWC, Geological Survey of India (GSI) and Divisional Commissioner, Jalpaiguri.

- CWC is also providing technical assistance for development of hydro power potential in Bhutan. Bhutan

Investigation Division, Phuentsholing is coordinating with RGoB and carrying out necessary field works in this respect. In the recent past, nine Mini Hydel Electric Projects executed by CWC were handed over to RGoB. Field investigations for permanent remedial measures for Chukha dam and its associated structures were completed and its design/drawings are under progress. Under the geological and foundation investigations for preparation of DPR of Punatsangchu Hydro-Electric Project 1385m drilling has been completed and balance works are under progress. Formulation and execution of strengthening of River Training Works for the Paro Airport are also under way. Design consultancy for specification/construction stage works of Tala HE Project (1020 MW) has also been provided by CWC. All major problems encountered during the construction were addressed by CWC with innovative solutions. To ensure scheduled completion of the project, CWC issued all necessary design and drawings for all the civil components in time as per site requirements

13.5 Cooperation between India and Pakistan

- Under the Indus Waters Treaty 1960, India and Pakistan have created permanent posts of Commissioners for Indus Waters, one each in India and Pakistan. Each Commissioner is representative of his Government for all matters arising out of the Treaty and serves as the regular channel of communication on all matters relating to implementation of the Treaty. The two Commissioners together form the Permanent Indus Commission.

- In fulfilment of the requirements of Indus Water Treaty, the daily data of 26 hydrological sites maintained by CWC in Jhelum and Chenab basins of Indus system was sent to Pakistan.

- Co-operation in the field of exchange of river data on a regular basis exists between India and Pakistan since 1962. India has also been communicating flood messages to Pakistan from 1st July to 10th October every year. The flow data of Akhnoor site of the Indus River System is communicated to Pakistan via priority telegrams / broadcasting / telephones.

On Pakistan's request World Bank appointed a Neutral Expert in May, 2005 for Expert Determination of Differences raised by Pakistan on the design of Baglihar HEP. India has furnished relevant documents, arranged a visit of Pakistan officers in July, 2005 and another joint visit by Neutral Expert along with the parties in October, 2005 to the project and its model. The Neutral Expert held two meetings with the Parties, the first one at Paris in June 2005 and the second one at Geneva in October, 2005 and submitted its report in February, 2007.

13.6 Visits of Foreign Delegates to CWC

13.6.1 China

A Chinese delegation of seven members, led by Vice Minister Mr. Lu Chun from the Executive Office of the Three Gorges Project

Construction Committee, People's Republic of China, visited Central Water Commission on February 15, 2007. Presentations on "Water Resources Development in India" "Environmental protection Guidelines for reservoirs and Rehabilitation and Resettlement Policies in India" "Policies for economic development of reservoir area" were given to them.

13.6.2 Iran

An Iranian delegation of eight members, led by Minister of Energy Mr. Parviz Fatah , visited Central Water Commission on February 15, 2007. A presentation on "Activities of CWC" was given to them highlighting the Constitutional provision on "Water", Central Government's and CWC's role in planning, development and management of water resources of India.

The Iranian delegation showed keen interest in the interstate matters and mechanism for resolution of disputes in India. Chairman, CWC explained the role of Central Govt. in resolution of disputes and the water disputes tribunals. Both sides assured of continued cooperation and interaction of the friendly countries in the field of water resources.

13.6.3 Israel

A six member Israeli delegation headed by Mr. Haim Divon, Deputy Director General and Head of the Centre for International Cooperation, Ministry of Foreign Affairs, H.E. visited Central Water Commission on 22nd February, 2007 for interaction on water related subjects with Senior Officiers of CWC/CGWB (Central Ground Water Board). A presentation on "Activities of CWC" was given to them highlighting the planning, development and management aspects related to water resources of India.

There after a presentation on "CGWB activities" was made by CGWB officers. From the Israeli delegation side, Prof. Avner Adin spoke on present water resources scenario and water policies of Israel. He informed that recently the Govt. of Israel has upgraded Israeli Water Commission and has identified water resources development as strategic means for development of the State.

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CHAPTER-XIV

COMPUTERISATION AND MODERNISATION

14.1 System Management

The Computer Centre under Information System Organisation continued to provide technical support to various user directorates in application and operational use of standard softwares and upgradation of data bank on water resources and related statistics. The centre also organises training programmes on application and operational use of standard softwares including use of Internet. Three Courses were organised during the year.

14.2 Water Resources Data

14.2.1 Hydrological Data

An integrated centralized data bank of hydrological data for non-classified basins is being maintained in Hydrological Data Directorate under Information System Organisation to ensure quick availability of the data. Moreover, the "Integrated Hydrological Data Book – 2005" has been put on the website of Central Water Commission containing the following information:

1. Description of Different River Basins
2. Sedimentation Statistics
3. Water Quality Statistics
4. Land use Statistics

The data bank was updated to cater to the needs of the users interested in further analysis of data.

Under Hydrology Project I, the modernization and computerization of various field offices were undertaken. A dedicated data storage unit at New Delhi with real time connection to the Regional data centres has been setup. The Meta data of the various peninsular basins is available on line.

14.2.2 Water and Related Statistics

Database containing information on water and related subject matters such as rainfall in different meteorological sub-division of the country, water resources potential in the river basins of India, basin-wise and State-wise storages in India, State-wise ultimate irrigation potential, basin-wise hydrological and sediment observation and water quality stations of CWC, has been created in CWC. In addition to above, information/data indicated below has also been included in the database.

- Resources utilisation including Plan-wise/State-wise potential created, potential utilised, achievements of irrigation potential of major & medium irrigation projects (surface Water)

- Production related performance & economic efficiency

- Financial performance of State-wise and Plan-wise financial expenditure on major & medium irrigation

- Social and environmental performance of major and medium irrigation projects covered under Tribal Sub – Plan area (All India financial progress and physical benefits) has been compiled and being updated regularly.

14.2.3 Publication on "Pricing of Water in Public System in India-2005"

The publications containing the following information is being put on website of CWC.

1. Water rates, revenue and operational expense.
2. Governing fixation of water rates/charges in States/UTs.
3. Assessment and collection of revenue.
4. Remission of water revenue.
5. Irrigation projects in India – an overview.
6. Water rates by crops.
7. Water rates by states.

14.2.4 Documentation of Data

The following publications were finalized/ are under finalization.

i. Pocket Book on Water Data 2005 (under printing)
ii. Hand Book on Water & Related Information, January 2006 (Available on CWC Website) under the Head: Water Data – 2005.
iii. Water and Related Statistics – 2006 (under printing).
iv. Financial Aspects of Irrigation Projects in India (under printing).

The publications "Water and Related Statistics 2006" and "Hand Book on Water and Related Information 2007", will be available on the website shortly.

14.3 Information Support to Management:

The publication are intended to cater to the ever growing detailed data requirement of water resources of planners, managers, administrators and researches with spatial and time trend overview for a coordinated systematic analysis and synthesis of various issues involved in, related to and having a bearing on the water availability and overall development.

14.4 Data Bank

A new scheme under Water Resources Information System for the XI Five-Year Plan starting from 2007 has been introduced. Under the scheme, it is proposed to set up a data bank as mandated by the ISWD Act, 1956 for maintaining data on each river basin including data regarding water resources, land, agriculture and related matters.

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CHAPTER - XV

TRAINING

15.1 Training

In order to develop knowledge, technical and managerial skills of CWC personnel, Training Directorate arranges and co-ordinates training programmes/seminars/ workshops in water related fields for in-service officers of CWC and other Central/State Govt. Departments and Organisations. Officers of CWC are deputed to various National and International seminars, conferences, workshops, etc. held both within and outside the country. Further, support is extended to other professional organisations and societies by sponsoring seminars, conferences, workshops, etc. Training Directorate also arranges Apprenticeship Training for fresh engineering graduates/ diploma holders/ vocational certificate holders in collaboration with Board of Apprenticeship Training, Kanpur. A few students of engineering degree courses are given practical training in CWC every year. The training programmes organised during the year are given in Annexure XV-1(a) and (b).

15.2 Induction Training

Induction training to Assistant Directors recruited through UPSC is also being conducted by Training Directorate and National Water Academy at Pune. The 20th Induction training course of 20 weeks duration for the newly recruited Assistant Directors which started in 2005 continued till 13th April 2006.

During the year 2006-07, 2 orientation programmes for newly promoted Extra Assistant Directors of CWC were also organized at NWA, CWC, Pune in which 24 officers participated.

15.3 National Water Academy

National Water Academy (NWA) which was upgraded from Central Training Unit (CTU) during the 9th Plan with the assistance of World Bank under Hydrology Project-I is now functioning as National level training institute for in-service training of water resources engineering personnel.

NWA is imparting training to in-service engineers from Central and State Organisations in various aspects of water resources development planning and management and also developing institutional capabilities at the national level for imparting training in new emerging fields in water resources sector on continuous basis.

The training and other related activities have increased manifold with the development of infrastructure like installation of additional computers, additional classrooms, setting up of library with modern facilities, lodging and boarding facilities for trainee officers and faculties. NWA conducts long term as well

as short term training courses on regular basis and also holds national level seminars and workshops on the emerging technical areas in the field of water resources development and management.

During the year 2006-07, a total of 36 number of training courses including 2 workshops / seminars have been conducted for the benefit of 882 officers with a total man-weeks of 1247.

Out of the above 36 training programmes, following programmes were newly introduced at NWA during the year 2006-07.

- Orientation Programme for Newly Promoted Extra Assistant Directors of CWC.
- Training Programme on PRIMAVERA and MS Project Software.
- Training programme on preparation of Detailed Project Report.
- First Training Programme on Geotechnical Instrumentation.
- Training Programme on Design of Barrages and Canals.
- Training Programme on Design of Hydro-mechanical Equipments (GATES).

Various training courses, workshops and seminars organised by NWA at Pune during 2006-07 are given at Annexure-XV-2.

15.4 Other Training Programmes/ Conferences/Seminars

The consolidated details of CWC officers deputed on training, seminars, workshops, conferences, etc. within the country and abroad during the year 2006–2007 are given in Table 15.1.

Table 15.1 Officers deputed for training

Sl. No.	Name of activities	No. of Participants
1	Sponsoring officers for training, attending seminars/ workshops, etc. in India organised by other organisations	167
2	Sponsoring officers for training, attending seminars/ workshops, etc. abroad	27

15.5 Training Infrastructure

The construction and furnishing of newly built Krishna Hostel of NWA was completed during the year. Hon'ble Union Minister for Water Resources Prof. Saifuddin Soz inaugurated the new Hostel on 4th Sept, 2006.

The construction of residential quarters of NWA was completed during the year. Hon'ble Union Minister of State for Water Resources Shri. Jai Praksh Narain Yadav inaugurated the quarters on 9th Feb, 2007.

15.6 Other Activities

(i) Representatives from International centre of Excellence for Water Resources management (ICEWARM), Australia visited NWA, Pune on 6th September, 2006 and held discussions on bilateral collaboration and exchange of expertise in the field of Training I Water Resources.

(ii) CWC engages graduate/diploma /10+2 passed vocational trainees for a period of one year under Apprenticeship Act 1961. During the year 2006-2007, 19 graduate engineers/Diploma holders/ Vocational Certificate holders were imparted training.

(iii) As part of interaction with academic institutions, on the job practical training of 4 to 6 weeks, 50 engineering and secretarial practices students from various institutions were imparted practical training.

(iv) Lectures were organised on various subjects for the benefit of CWC officers under study circle.

(v) Three CWC officers are continuing PG Diploma course at IIT, Roorkee for one year from July, 2006.

Annexure XV-1

Training Programmes organized by Central Water Commission during the year 2006-07

Sl. No.	Training Programme	Duration	Venue	No. of Participants
1.	Hindi Work Shop.	26-28 Jun	New Delhi	30
2.	Basic Computer Course	3-6 Jun	Cochin	20
3.	Hindi Work Shop	5-7 July	Gandhinagar	30
4.	Ist Orientation course for EAD'S of CWC	10-21 July	Pune	9
5.	Orientation course on Vigilance	24-26 July	Chennai	20
6.	O&M Workshop	23-25 Aug	Patna	30
7.	Hindi	5&6 Sep	New Delhi	35
8.	Course on Water Quality	11-14 Sep	Site under Cauvery Dn	20
9.	Use of Computer Soft Ware and Internet	20-22 Sep	Lucknow	30
10.	Hydrological Observation and Water Quality Monitoring	8-10 Nov	Dehradun	30
11.	Office Automation	13-17 Nov	Hyderabad	32
12.	Hindi	13-14 Dec	New Delhi	10
13.	Hindi	27-29 Dec	Coimbatore	29
14.	2nd Orientation Course for EAD's of CWC	11-22 Dec	Pune	15
15.	SWDES	18-22 Dec	Chennai	20
16.	Integrated River Basin Management and Planning	8-11 Jan	New Delhi	32
17.	Mike II	8-18 Jan	Hyderabad	30
18.	Hydro Metrological Observation and Management	16-20 Jan	Silchar	30
19.	Hindi	17-19 Jan	Bhopal	30
20.	Review of Design Flood and management	17-19 Jan	Lucknow	20
21.	SWDES	22-24 Jan	Hyderabad	30
22.	Basic Computer Course	5-9 Feb	B'Neswar	20
23.	Design Flood Estimation for Small and Medium Catchments	7-8th Feb	New Delhi	24
24.	O&M Work Shop	21-23rd Feb	Jammu	30
25.	Hindi workshop	27-28th Feb	New Delhi	14
				620

Annexure XV-2

List of officers deputed abroad for various training/ seminar/ symposia/ conferences, etc. during 1st April, 2006 to 31st March, 2007

Sl. No.	Topic of the programme /Venue / Period	Participant
1.	Joint Hydrological Observation, Bangladesh, 8th April to 4th June, 2006 (including transit time)	KK Rajan, EE N Chattopadhyay, AE
2.	Regional Workshop on Community Aproach to Flood Management, WMO, Dhaka (Bangladesh), 3rd to 5th April, 2006	BP Singh, CE
3.	Visit to Sri Lanka for technical assistance for investigations and implementation of remedial measures for cracks in Senanayake Reservoir, Sri Lanka, 3rd to 7th April, 2006	AK Nayak, DD
4.	Visit to Bhutan for inspection of river protection works at Paro, inspection of investigation works in Punatsangchu HE Project, 11th to 16th April, 2006	Shiv Nandan Kumar, SE
5.	Residential Conference for former NORAD Fellows organized by NTNU, Kathmandu (Nepal), 11th to 12th May, 2006	AK Agrawal, DD Vijay Saran, DD
6.	22nd Meeting of Tala Hydroelectric Project Authority, Bhutan, 24th to 27th May, 2006	SK Das, Mem
7.	G-15 Experts Seminar on Rural Transformation Through Community Development and Management of Water Resources, Geneva (Swiss), 3rd to 4th July, 2006	SK Sinha, CE
8.	UNEP-DDP 2nd Meeting of Government Advisory Consultative Group and 11th Steering Committee Meeting, the Hague, Netherlands, 28th to 30th August, 2006	VK Jyothi, CE
9.	Training on National Weather Service River Forecasting System applied to Mahanadi River Basin under USAID Project on Disaster Management- Climate Forecasting, NOAA, Fort Collins, USA, 23rd October to 17th November, 2006	Shiva Prakash, EE Ritesh Khattar, DD DR Mohanty, AE AK Roy, Sr. PA
10.	MSc Course in Hydro Informatics and Water Management, Universite de Nice, Sophia Antipolis (France), 1st September 2006 to 1st September, 2008 under Erasmus Mundas Fellowship (on study leave)	Sunil Kumar, DD
11.	MSc Course in Hydropower Development, NTNU, Norway, 11th August, 2006 to 10th August, 2008 under Quota Fellowship Programme (on study leave)	Sharad Chandra, DD

12.	57th ICID Executive Council Meeting of ICID and 3rd Asian Regional Conference & 7th International Micro Irrigation Congress, Kuala Lumpur (Malaysia), 10th to 17th September, 2006	R Jeyaseelan, Chairman
13.	WMO Regional Training Workshop on Water Affairs, Hanoi (Vietnam), 4th to 7th December, 2006	RK Gupta, Dir
14.	57th International Executive Council Meeting of ICID, Kuala Lumpur (Malaysia), 10th to 15th September, 2006	R Jeyaseelan, Chairman
15.	Joint hydrological observation at Hardinge Bridge, Bangladesh, 29th December, 2006 to 22nd February, 2007 (including travel time)	AK Srivastava, DD Ramesh Kumar, AD
16.	Deputed to Salma Project, Afghanistan to oversee infrastructural works, Afghanistan, 16th to 22nd January, 2007	SK Das, Chairman Naresh Kumar, Dir
17.	Joint Hydrological Observation at River Hardinge, 18th February to 15th April, 2007	SC Mishra, EE DK Roy, EAD
18.	World Water Week, Stockholm (Sweden), 20th to 26th August, 2006	SK Das, Member K Vohra, SJC, MOWR

Annexure XV-3

Training programmes and workshops conducted at NWA
during the year 2006-07

Sl. No.	Training Programme	Dates	No. of officers
1.	20th Induction Training programme for the newly appointed officers of CWES (Gr 'A')	1-13th April'06 (Contd from FY 2005-06)	17
2.	Training Programme on Water Quality Management for lakes and reservoirs	25-28th April'06	19
3.	Training programme on Environmental Management and Social Aspects for River Valley Projects	8-12th May'06	12
4.	Training Programme on 'Geoinformatics in Water Sector' (sponsored by ISRO)	9-19th May'06	25
5.	Training of Trainers Programme on Hydrometry	16-26th May'06	14
6.	Training programme on Performance Evaluation & Benchmarking of Water Resources Projects	6-9th June'06	12
7.	Training of Trainers in Participatory Irrigation Management	26-30th June'06	24
8.	First Orientation Programme for Newly Promoted Extra Assistant Directors of CWC	10-21 July'06	9
9.	Training programme on Rainwater Harvesting & Groundwater Recharge	17-21st July'06	31
10.	Training programme on Recycling and reuse of wastewater	24-28th July'06	29
11.	Training Course on FEM/FEA	1-11th Aug.'06	11
12.	Training Programme on 'Geoinformatics in Water Sector' (sponsored by CWC – RS Dte.)	7-18th Aug'06	21
13.	Training of Trainers programme on Hydrometry	22nd Aug – 1st Sept'06	13
14.	Training programme on Watershed Management	11-15 Sept'06	24
15.	Training Programme on Hydropower Development for Officers of Uttranchal Jalvidyut Nigam Limited	18th Sept – 20th Oct'06	21
16.	Training Programme on Water Quality Management	25-29 Sept'06	24
17.	Training Programme on Geoinformatics in Water Sector (Sponsored by ISRO)	10-20th Oct'06	19
18.	Training programme on Design of Barrages & Canals	30th Oct'06 - 3 Nov'06	33

19.	Training of Trainers Programme on Surface Water Data Processing and its validation	7-17th Nov'06	24
20.	Training Programme on Flood Management	20-24th Nov'06	24
21.	Training Programme on PRIMAVERA & MS Project Software.	27 Nov – 1 Dec'06	16
22.	Training programme on preparation of Detailed Project Report (DPR)	6-15th Dec'06	25
23.	Second Orientation Programme for Newly Promoted Extra Assistant Directors of CWC	11-22nd Dec'06	15
24.	Training programme on Performance Evaluation & Benchmarking of Water Resources Projects	12-15th Dec'06	32
25.	Management Development Programmes for senior & middle level officers	19-22 Dec'06	16
26.	Training Programme on 'Geoinformatics in Water Sector'	2-12th Jan'07	27
27.	Training Programme on Hydropower Development	2nd Jan -15th Feb'07	25
28.	First Training Programme on Geo-technical Instrumentation	29 Jan – 2 Feb'07	13
29.	Training programme on Design of Hydromechanical Equipment (Gates)	5-9th Feb'07	33
30.	Training Programme on 'IWRM'	13-23rd Feb'07	14
31.	Training Programme on WISDOM	28th Feb-2nd Mar'07	25 *
32.	Training programme on Repair, Renovation & Restoration of Water Bodies directly linked to Agriculture	5-8th Mar'07	25 *
33.	Training Programme on Hydrological Modelling	7-9th Mar'06	25 *
34.	Training Programme on IDEAS software	12-16th Mar'07	25 *
B	**Workshops/Seminar**		
35.	National seminar on 'Water Laws and their role in IWRM'	21-22 Sept'06	60
36.	World Water Day 2007	22 March'07	100
	Total No. of Officials Trained		882
	Manweeks of training		1247

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CHAPTER–XVI

VIGILANCE

16.1 Disciplinary Cases

The Vigilance/ Disciplinary cases and complaints received against officers & staffs of CWC were given proper and prompt attention. During the year 2006-07, 33 complaints were received and taken up for investigation. Final decision was taken in respect of 41 cases out of which in 15 cases, the officials found guilty were awarded major/minor penalties. The break-up of vigilance/disciplinary cases in respect of different category of officers and staff is as follows:-

a)	No. of cases pending at the beginning of the year	27	3	26	12
b)	No. of cases added during the year	11	12	10	Nil
c)	No. of cases disposed of during the year	16	5	14	6
d)	No. of cases pending at the end of the year (a+b-c)	22	10	22	6

Vigilance Awareness Week was observed at CWC headquarters from 1st to 6th November, 2006.

16.2 Redressal of Grievances

Effective measures have been taken to strengthen the machinery to redress grievances in respect of the serving persons and the retired persons of CWC. Secretary, CWC has been designated as Staff Grievances Officer to deal with the cases of serving/retired personnel, which are not redressed in the normal channels. Both public grievances and that of staff are redressed suitably.

As on 31.03.2007, out of 101 grievance cases, 41 cases were disposed off and 60 cases are pending.

A Complaint Committee was constituted under the chairmanship of an Under Secretary to look into the complaints of women employees working in Central Water Commission at the Headquarters and also in its field formations.

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CHAPTER–XVII

REPRESENTATION OF CENTRAL WATER COMMISSION IN VARIOUS COMMITTEES

17.1 Committees Represented by CWC Officers

Chairman and Members of CWC represent CWC in various Technical Committees of other Organisations either as the Chairman or as a Member. List of such Committees is given below:

Sl. No.	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
1	2	3	4
1.	Technical Advisory Committee to the Governing Council for Central Water and Power Research Station, Pune.	Chairman, CWC	Chairman
2.	Technical Advisory Committee of National Institute of Hydrology.	Chairman, CWC	Chairman
3.	Technical Advisory Committee of National Water Development Agency	Chairman, CWC Member (WP&P) Member (D&R)	Chairman Member Member
4.	Group to speed up the process of arriving at consensus amongst the States on the proposals of inter-basin water transfer of NWDA	Chairman, CWC Member (WP&P)	Chairman Member
5.	National Committee on Dam Safety (NCDS)	Chairman, CWC Member (D&R)	Chairman Vice Chairman
6.	Water Resources Division Council (WRDC) of BIS	Chairman, CWC Member (D&R)	Chairman Member
7.	Committee of Technical Experts for advising on the problems relating to O&M of Bhakra Nangal & Beas Project (Irrigation Wing)	Chairman, CWC	Chairman
8.	Working Group of National Water Board	Chairman, CWC Member (WP&P)	Chairman Vice-Chairman

9.	Indian National Committee on Hydrology (INCOH)	Chairman, CWC	Chairman
10.	Indian National Committee on Irrigation and Drainage (INCID)	Chairman, CWC Member (WP&P)	Chairman Member
11.	Selection Committee for i) JAIN-INCID Sookshma Sinchai Puraskar ii) JAIN-INCID Krishi Sinchai Vikas Puraskar	Chairman, CWC	Chairman
12.	Executive Committee of Betwa River Board	Chairman, CWC Member (WP&P)	Chairman Member
13.	Executive Committee of Bansagar Control Board	Chairman, CWC Member (WP&P)	Chairman Member
14.	Regulation Committee of Bansagar Reservoir	Chairman, CWC Member (WP&P)	Chairman Vice Chairman
15.	Standing Committee on Education & Training	Chairman, CWC	Chairman
16.	Committee for expediting Environment/Forest clearance of TAC cleared projects	Chairman, CWC	Chairman
17.	Advisory Board of NWA, Pune	Chairman, CWC	Chairman
18.	Office Council of CWC	Chairman, CWC Member (WP&P) Member (D&R) Member (RM)	Chairman Member Member Member
19.	Committee to Monitor and Supervise the overall work of preparation of Detailed Project (DPR) of Ken-Betwa Link.	Chairman, CWC	Chairman
20.	Joint Panel of ICAR-CWC with the problems relating to optimizing the return from the investment in Irrigation	Chairman, CWC Member (WP&P)	Chairman/ Associate Chairman Member
21.	Joint Group of Experts on Pancheshwar Multipurpose Project	Chairman, CWC Member (RM)	Team Leader Spl. Invitee
22.	Steering Committee for the preparation of Status Report on Water Resources Requirements and its availability for urban areas.	Chairman, CWC Member (RM)	Co-Chairman Member
23.	Governing Council for Central Soil & Materials Research Station.	Chairman, CWC Member (D&R)	Vice-Chairman Member

24.	International Commission on Irrigation & Drainage (ICID)	Chairman, CWC	Vice-President
25.	Committee of Environmentalists, Social Scientists and Other Experts on Interlinking of rivers	Chairman, CWC	Member
26.	ICID Working Group on comprehensive approaches to Flood Management (WG-CAFM)	Chairman, CWC	Member
27.	Departmental Council of MoWR	Chairman, CWC	Member
28.	Governing Council for the Central Water and Power Research Station, Pune	Chairman, CWC	Member
29.	National Institute of Hydrology Society	Chairman, CWC Member (D&R)	Member Member
30.	Governing Body of National Institute of Hydrology	Chairman, CWC	Member
31.	Monitoring Committee for the National River Conservation Plan (NRCP)	Chairman, CWC	Member
32.	Steering Committee of National River Conservation Plan (NRCP)	Chairman, CWC	Member
33.	Water Quality Assessment Authority (WQAA)	Chairman, CWC	Member
34.	High Powered Review Board of Brahmaputra Board	Chairman, CWC Member (RM)	Member Permanent Invitee
35.	Board of Governors (BOG) of National Institute of Construction Management and Research (NICMAR)	Chairman, CWC	Member
36.	Indo-Nepal Joint Committee on Water Resources	Chairman, CWC	Member
37.	Farakka Barrage Control Board	Chairman, CWC	Member
38.	Sardar Sarovar Construction Advisory Committee	Chairman, CWC Member (WP&P)	Member Invitee
39.	Society of National Water Development Agency	Chairman, CWC Member (D&R) Member (WP&P)	Member Member Member
40.	Governing body of National Water Development Agency	Chairman, CWC Member (D&R) Member (WP&P)	Member Member Member
41.	National Water Board (NWB) of the National Water Resources Council	Chairman, CWC Member (WP&P)	Member Member-Secretary

42.	High Powered Committee (HPC) on Maintenance of Minimum Flow of River Yamuna	Chairman, CWC	Member
43.	Cauvery Monitoring Committee (CMC)	Chairman, CWC	Member
44.	Standing Committee on Water Resources (SC-W) of Planning committee of National Natural Resources Management System (PC-NNRMS) of Planning Commission	Chairman, CWC	Member
45.	Advisory Committee for consideration of Techno Economic viability of Major & Medium Irrigation, Flood Control and Multipurpose project proposals	Chairman, CWC Member (WP&P) Member (RM) Member (D&R)	Member Special Invitee Special Invitee Special Invitee
46.	Ganga Flood Control Board	Chairman, CWC	Invitee
47.	Narmada Control Authority	Chairman, CWC	Invitee
48.	Review Committee of Narmada Control Authority	Chairman, CWC	Invitee
49.	Betwa River Board	Chairman, CWC	Invitee
50.	Bansagar Control Board	Chairman, CWC	Invitee
51.	Joint River Commission	Chairman, CWC	Member
52.	Upper Yamuna River Board	Member (WP&P)	Chairman
53.	National Environmental Monitoring Committee	Member (WP&P)	Chairman
54.	Joint Operation Committee for Rihand Dam	Member (WP&P)	Chairman
55.	Contracts Works Sub-Committee of Betwa River Board	Member (WP&P)	Chairman
56.	Sub-Committee for processing tenders and proposals for purchase of stores & equipments of Bansagar Control Board	Member (WP&P)	Chairman
57.	Sub-Committee of officers to consider the claims of M/s HSCL in Earth Dam- Lot of Rajghat Dam Project	Member (WP&P)	Chairman
58.	Committee for settlement of claims of M/s N.P.C.C. Ltd of Betwa River Board	Member (WP&P)	Chairman
59.	Sub-Committee to examine and process claim cases of contractors of Bansagar Control Board	Member (WP&P)	Chairman
60.	Monitoring committee for non-structural aspects of the proposed Tipaimukh Multipurpose Project	Member (WP&P)	Chairman

61.	Technical Advisory Committee on Socio-Economic, Agro-economic and Environmental Impact studies	Member (WP&P)	Chairman
62.	Screening Committee for selection of arbitrators on Arbitration Boards.	Member (WP&P)	Chairman
63.	Joint regulation committee of Chandil Dam and Galudih Barrage	Member (WP&P)	Chairman
64.	Joint Regulation Committee of Kharkai Dam	Member (WP&P)	Chairman
65.	Sub-Committee on Irrigation, Performance Assessment History, Education, Training, Research & Development	Member (WP&P)	Chairman
66.	Standing Project Appraisal committee of Central Water Commission	Member (WP&P)	Chairman
67.	Water Resources Planning Management and evaluation Sectional Committee-WRD-06 (BIS)	Member (WP&P)	Chairman
68.	Recommendation of National Commission for Integrated Water Resources Development (NCIWRDP) Task Force for reporting guidelines for reporting figures of Irrigation Potential created and utilized in a uniform manner	Member (WP&P)	Chairman
69.	Task Force for Flood Management in the country (North Western Region)	Member (WP&P)	Chairman
70.	Committee for Cost Sharing of Hathnikund Barrage	Member (WP&P)	Chairman
71.	Sub-Group-1 for Research topics under invited reserved Category	Member (WP&P)	Chairman
72.	Sub-Group-II Rain Water Harvesting	Member (WP&P)	Chairman
73.	Committee for the Re-organised UP/ Uttaranchal States	Member (WP&P)	Chairman
74.	Committee for Re-organised Bihar/ Jharkhand States	Member (WP&P)	Chairman
75.	Upper Yamuna Review committee	Member (WP&P)	Member-Secretary
76.	Working Group of INCID on capacity building	Member (WP&P)	Member
77.	Working Team on Socio-Economic Impacts & Policy Issues (ICID)	Member (WP&P)	Member
78.	Standing Committee for overall National Perspective Water Planning and Coordination in relation to diverse use of water	Member (WP&P)	Member

79.	Committee constituted by Hon`ble Supreme Court of India in the matter of WP No.914 / 96 (Sector, 14 Resident Welfare Association Noida versus Union of India & Others)	Member (WP&P)	Member
80.	Committee Constituted by Hon`ble Supreme Court of India in matters of WP (Civil) No.725/94. Regarding news item in Hindustan Times on "And quiet flow the Maily Yamuna versus Central Pollution Control Board and others".	Member (WP&P)	Member
81.	Standing Committee on Rural Development (SC-R) of Planning Committee of National Natural Resources Management System (PC-NNRMS) of Planning Commission	Member (WP&P)	Member
82.	Committee for Eastern River Waters of Indus System of River	Member (WP&P)	Member
83.	National Watershed Committee	Member (WP&P)	Member
84.	Central Loan Assistance under Accelerated Irrigation Benefits Programme	Member (WP&P)	Member
85.	Steering Committee of Indian National Committee on Hydrology (INCOH)	Member (WP&P)	Permanent Invitee
86.	High Powered Committee-Yamuna Action Plan of Ministry of Environment and Forests	Member (WP&P)	Invitee
87.	Technical Advisory Committee for Flood Control, Drainage and Anti-Sea Erosion Schemes (Goa)	Member (RM)	Chairman
88.	State Technical Advisory Committee-Floods (Karnataka)	Member (RM)	Chairman
89.	Subernarekha Embankment Committee (Orissa, West Bengal & Bihar)	Member (RM)	Chairman
90.	Working Group to advise WQAA on the minimum flow in the rivers	Member (RM)	Chairman
91.	National Level Steering Committee for Implementation of World Bank assisted Hydrology Project Phase-II	Member (RM)	Chairman
92.	Setting up of HISMG (Data and Data dissemination) for Implementation of the World Bank assisted Hydrology Project Phase –II.	Member (RM)	Member
93.	Setting up of HISMG (Technical) for Implementation of the World Bank assisted Hydrology Project Phase –II.	Member (RM)	Chairman

94.	Steering Committee for the Preparation of Status Report on Water Resources requirements and its availability for Urban Areas	Member (RM)	Chairman
95.	Coastal Protection and Development Advisory Committee (CPDAC)	Member (RM)	Chairman
96.	National Coastal Zone Management Authority (NCZMA)	Member (RM)	Chairman
97.	Ghaggar Standing Committee	Member (RM)	Chairman
98.	Yamuna Standing Committee	Member (RM)	Chairman
99.	Sahibi Standing Committee	Member (RM)	Chairman
100.	Apex Committee constituted under the Chairmanship of Hon`ble Chief Minister of Delhi to recommend, supervise and co-ordinate flood control measures in the NCT of Delhi	Member (RM)	Chairman
101.	Flood Control Board set up by the Irrigation and Flood Control Department of Govt. of NCT of Delhi	Member (RM)	Chairman
102.	Committee for Flood Control Works in Brahmaputra Valley	Member (RM)	Chairman
103.	Standing Committee to Brahmaputra Board	Member (RM)	Chairman
104.	West Bengal State Committee of Engineers	Member (RM)	Chairman
105.	Ganga Flood Control Commission	Member (RM)	Chairman
106.	Kosi High Level Committee	Member (RM)	Chairman
107.	Damodar Valley Reservoir Regulation Committee	Member (RM)	Chairman
108.	WRD 01 Sectional Committee of BIS for Fluid Flow Measurements	Member (RM)	Chairman
109.	WRD-22 River and Diversion Works Sectional Committee	Member (RM)	Chairman
110.	Sub-Committee-III (Flood Management, Drainage and Environment Impacts) of INCID	Member (RM)	Chairman
111.	Joint Group of Experts on Pancheshwar Multi-purpose project	Member (RM)	Special Invitee
112.	Joint Team of Experts (JTE) on Sapta Kosi Project	Member (RM)	Team Leader
113.	Committee for examination of technical issues regarding Baglihar Hydro-Electric projects on the Chenab Main in J&K	Member (RM)	Chairman

114.	TAC to Assam State Brahmaputra Valley Flood Control Board	Member (RM)	Chairman
115.	TAC to Cachar Flood Control Board (Assam)	Member (RM)	Chairman
116.	High Level Committee to Study the Regulation of Releases from various Hydro-Electric Projects Constructed Along Teesta	Member (RM)	Chairman
117.	Committee to study Erosion Problem of Bhutani Diara (West Bengal) and Majauli Island (Assam)	Member (RM)	Chairman
118.	Standing Committee to prepare guidelines and prioritization of schemes for Flood Control and anti Erosion works to be taken up by Brahmaputra Board.	Member (RM)	Chairman
119.	Standing Technical Advisory Committee (STAC) to the Governing Council for CSMRS, New Delhi.	Member (D&R)	Chairman
120.	Technical Committee for procurement of Instruments and working models for Instrumentation Centre (IDC)	Member (D&R)	Chairman
121.	Governing Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
122.	General Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
123.	Science and Technology Advisory Committee (STAC)	Member (D&R)	Member
124.	Board of Management of Geological Survey of India	Member (D&R)	Member
125.	Research Advisory Committee (RAC) of National Council for Cement and Building Materials.	Member (D&R)	Member
126.	Board of Consultants for Koyna Dam and its appurtenent works and Generating Equipment/Machinery including Koyna Power	Member (D&R)	Member
127.	Indian National Committee on Hydraulic Research (INCH)	Member (D&R)	Chairman
128.	R&D Implementation and Monitoring Committee(RIMC)	Member (D&R)	Chairman
129.	National Committee on Seismic Design Parameters of River Valley Projects (NCSDP)	Member (D&R)	Chairman
130.	WRD 09, Dams & Spillway Sectional Committee of BIS	Member (D&R)	Chairman

131.	National Level Steering Committee (NLSC) for Dam Rehabilitation and Improvement Project (DRIP)	Member (D&R)	Member
132.	Technical Committee (TC) for Dam Rehabilitation and Improvement Project (DRIP)	Member(D&R)	Chairman
133.	Technical Advisory and Review Committee (TARC) for preparation of PMP Atlas	Member (D&R)	Chairman
134.	World Meteorological Organization	Member (D&R)	Representative
135.	Committee of International Commission on large dams, India	Member (D&R)	Member
136.	Board of Directors Satluj Jal Vidyut Nigam Ltd. (SJVNL)	Member (D&R)	Director
137.	Board of Directors of Tehri Hydro Development Corporation	Member (D&R)	Part Time Director
138.	Indo-French Working Group on Energy	Member (D&R)	Member
139.	Group of Implementation of Hydro-Electric Projects in J&K State	Member (D&R)	Member
140.	Bureau of Indian standards, WRD-15	Member (D&R)	Chairman
141.	Technical Advisory Committee of the Farakka Barrage Project.	Member (D&R)	Chairman
142.	Technical Co-ordination Committee (TCC) for Tala HE Project, Bhutan.	Member (D&R)	Co-Chairman
143.	Board meeting of Tala HE Project Authority (THPA), Bhutan	Member (D&R)	Invitee
144.	Committee of CEA to accord of techno-economic appraisal of Power Schemes.	Member (D&R)	Permanent Special Invitee
145.	NHPC Performance Review Committee	Member (D&R)	Member
146.	Tender Committee of Farakka Barrage Project	Member (D&R)	Chairman

17.2 Activities of Some Important Committees

17.2.1 Technical Advisory Committee (TAC) of NWDA

Chairman, CWC is the Chairman of the Technical Advisory Committee (TAC) of NWDA and Member (D&R), CWC and Member (WP&P), CWC are the members.

35th TAC meeting was held on 22nd Sept 2006 and the technical aspects of the following reports have been discussed:

- Preliminary water balance study of Tapi at Ukai
- Feasibility report of Par-Tapi-Narmada link project
- Feasibility report of Ken-Betwa link project

- Feasibility report of Parbati-Kalisind-Chambal link project
- Feasibility report of a link system of Mahanadi- Godavari Krishna-Pennar-Cauvery –Vaigai-Gundar linkage
- Feasibility report of Daman Ganga-Pinjal link project
- Feasibility report of Jogighopa-Teesta-farakka link project

17.2.2 Technical Advisory Committee of NIH

The research programmes and other technical activities of NIH are monitored and guided by Technical Advisory Committee of NIH headed by Chairman, CWC. Member (D&R) and Chief Engineer, Hydrological Studies Organization are its Members. TAC gets feedback from 3 Working Groups on Surface Water, Ground Water and Hydrological Observation and Instrumentation. Chief Engineer, HSO and Chief Engineer, BPMO are the Members of the Surface Water Group and Chief Engineer (P&D) is the Member of the Hydrological Observations and Instrumentation Group. The 54th meeting of TAC was held on 4.04.2006 at Roorkee. 55th meeting of TAC was held on 30.10.2006 at Centre for Flood Management Studies, NIH, Patna. The 25th meeting of Surface Water Working Group of NIH (Surface Water) was held on 5-6th September, 2006 at Roorkee.

17.2.3 Technical Advisory Committee of CWPRS

The TAC was constituted mainly for the purpose of providing an overall perspective and technical guidance in the area of hydraulic research. The TAC is composed of 17 members drawn from various public Institutions and is headed by Chairman, CWC. Member (D&R), CWC is one the Members of TAC. No meeting could be held during 2006-07.

17.2.4 Technical Advisory Committee of Farakka Barrage Project

The TAC of Farakka Barrage Project is headed by Member (D&R), CWC, which generally meets once every year and takes decisions about various works to be executed for efficient and safe functioning of the project. Various problems, special studies and related design work were referred to D&R wing from time to time. Member (D&R) held discussions with the Farakka Barrage Project authorities from time to time and chaired the Technical Advisory Committee meeting of Farakka Barrage Project. The jurisdiction of Farakka Barrage Project has also been extended 40 km on up stream and 80 km on down stream of Farakka Barrage for carrying out the erosion protection works of River Ganga. The 103rd meeting of TAC of Farakka Barrage Project was held from 11-13th February, 2007 at Farakka.

17.2.5 Standing Technical Advisory Committee of CSMRS

The STAC was constituted mainly for providing an overall perspective and guidance in technical scrutiny of research schemes being done at CSMRS. The STAC is composed of 11 members drawn from various public sector institutions and is headed by Member (D&R), CWC. The 25th meeting of STAC was held on 23.02.2007 to provide an overall perspectives and

guidance on technical matters (R&D) and S&T to CS MRS.

17.2.6 Indian National Committee on Hydraulic Research (INCH)

The R&D activities in the Ministry of Water Resources (MoWR) are planned and monitored through Science and Technical Advisory Committee (STAC); Standing Advisory Committee (SAC) assisted by Indian National Committees on (a) Hydrology, (b) Irrigation and Drainage, (c) Hydraulic Research, (d) Geo-Technical Engineering, (e) Construction Material and Structures. One of the five Indian National Committees(INC) dealing with Hydraulic Research has been constituted by the Ministry of Water Resources to promote research work in the field of management of floods, hydraulic structure and river hydraulics, environment hydraulics, drainage and reclamation, coastal and estuarine hydraulics and hydraulic machinery, city water supply, ports and harbours. INCH is entrusted with the promotion and funding of research work in the above fields. Member (D&R), CWC is the Chairman of this committee.

INCH includes eminent experts in the field of hydraulics including representatives from various Central and State Research Institutes. FE&SA Dte., CWC serves as the Secretariat. R&D session and meetings are convened from time to time to discuss research proposals received by the Secretariat and discuss on going research schemes for monitoring and reviewing them.

During the year, out of the 8 nos. new research proposals received for funding under R&D programme of MOWR, 6 nos. proposals were sent to experts for their comments and 2 nos. returned with the approval of Chairman, INCH as they do not come under INCH domain. Draft completion report of the Research Scheme (1 no.) was also sent to members for comments. Service request for revalidation of the unspent amount and time extension for ongoing schemes were sent to MoWR. Monitoring of ongoing Research Schemes (11 nos.) for their physical and financial progress was carried out.

In the 14th Standing Advisory Committee (SAC) meeting held on 23.08.2006, one No. research scheme under INCH was approved by the committee. The other two schemes were agreed to in principle subject to verification by MoWR.

In the 15th meeting of INCH held on 29th March, 2007 at Hyderabad, seven research proposals were presented and deliberated upon.

17.2.7 Indian National Committee on Hydrology (INCOH)

The Indian National Committee on Hydrology (INCOH) was constituted by the Ministry of Water Resources in the year 1982. It is an apex body with the responsibility of coordinating the various activities concerning hydrology in the country. The Chairman, Central Water Commission is the Chairman of the Committee with the members drawn from Central and State Governments as well as experts from academic and research organizations besides a few members drawn from non-Governmental professional associates. The committee gets

a feed back from States and coordinates activities at State level through State co-ordinators.

INCOH plays an active role for implementation of UNESCO sponsored International Hydrological Programme (IHP). The Committee normally meets twice a year, the 31st and 32nd meetings were held on 5.06.2006 and 2.02.2007 respectively under the Chairmanship of Chairman, CWC at New Delhi. The sub-committee meetings of INCOH held during 2006-07 are as follows:

a) Steering Committee – Member (D&R) is the Chairman and Chief Engineer, HSO is the Member of this sub-committee. The 25th meeting of the sub-committee was held on 9.08.2006 at Jal Vigyan Bhawan, Roorkee.

b) Research Committee (Surface Water) – Director, Hyd(DSR) is a member of this sub-committee. The 14th and 15th meetings of this sub-committee were held on 3.05.2006 and 23.02.2007 respectively at NIH, Roorkee.

17.2.8 Indian National Committee on Irrigation and Drainage (INCID)

Indian National Committee on Irrigation and Drainage (INCID) was constituted in 1990 by Ministry of Water Resources. The Chairman, CWC is the Chairman of INCID and Member (WP&P) is one of its members. The secretariat of INCID is located at New Delhi. The INCID pursues the mission and activities of ICID in India. It also looks into the R&D activities in irrigation and drainage sectors. To promote research schemes and for their expeditious processing and monitoring, following four Sub-Committees of INCID have been constituted:

(i) Irrigation Performance Assessment, History, Education, Training, Research and Development;
(ii) Crops, Water Use and Drought Management, Micro and Mechanized Irrigation
(iii) Flood Management, Drainage and Environmental Impacts, and
(iv) Construction, Rehabilitation and Modernisation, Operation, Maintenance and Management.

In addition, two Sub-Groups and one Working Group to deal with initial research have been constituted.

The activities of INCID during the year are given below:

- 9th meeting of the INCID Sub-Committee-I on Irrigation, Performance, Assessment, History, Education, Training Research and Development were held on 5th May, 2006 under the Chairmanship of Member (WP & P) at CWC, New Delhi. During the meeting two new proposals were accepted in principle and Principal Investigators was requested to submit the revised proposals and estimate.

- 9th meeting of the INCID Sub-Committee- II INCID Sub-Group on Crop Water Use and Draught Management and Mechanical and Micro Irrigation were held on 26th June, 2006 at Water Technology Centre, IARI, Pusa Complex, New Delhi under the Chairmanship of Project Director, WTC,

IARI and Chairman of the committee. During the meeting two new proposals were accepted by the committee. Five new research proposals were presented by the respective Principal Investigators.

- 5th meeting of INCID sub-group –I on deficit Irrigation, Crops and crop planning for Flood Prone areas was held on 20th November'2006 under the Chairmanship of Member (WP & P) at CWC, New Delhi. Sub-group decided for five new topics for invited research. The status of ongoing scheme viz. "Crop and Crop Planning for floods and Flood Prone areas: was reviewed and comments/mid-term corrections suggested by the members for achieving the desired objectives.

- 5th meeting of INCID sub-group –II on Rainwater Harvesting and Conservation of Water in Command Areas for Supplementing was held on 20th November'2006 under the Chairmanship of Member (WP & P) at CWC, New Delhi. Three new research proposals were presented by the Principal Investigator and after discussion the sub-group directed the PI to send the modified scheme based on the comments of the members. The status of the ongoing schemes was also discussed.

- 25th meeting of the INCID was held under the Chairmanship of Chairman, INCID and CWC and on 9th March, 2007 at CWC, New Delhi. During the meeting many important items viz. broad basing. Cooperation with other National Committees,. Progresses of ongoing R&D schemes participation of Indian nominees of ICID work bodies etc. were discussed.

- The progress of 39 ongoing research schemes was also reviewed in the 7th R&D Session of INCID held at NERIWALM, Tezpur on February 26-27, 2007 attended by more than 78 technical personnel.

- During the year, INCID has also brought out regular publication of the Quarterly Newsletters- INCID NEWS" and Annual Report- for dissemination of its activities.

- INCID has instituted the "JAIN-INCID AWARDS" to encourage institutions, engineers, scientists, agriculturists, economists, etc. who have made outstanding contribution in the fields of irrigation and drainage. The award is given to institutions and individuals in alternate year.

- INCID Sub-committee-III on Flood Management Drainage and Environmental Impacts with Member (RM) CWC as its Chairman for selection and monitoring of R & D schemes in the field of " Flood Management, Drainage and Environmental Impacts" convened it's 8th meeting on 1.9.2006. A proposal on R&D Scheme "Measurement of Discharge of Rivers, Canals and Tube-wells - a Manual for Field Workers" received was decided to be considered in the next meeting of INCID.

17.2.9 World Water Council

The World Water Council (WWC) is an

International Organisation, which makes and approves the Policy on water. The CWC is a Member of this organisation. A centre of WWC has been set up in New Delhi to promote the activities of WWC in India. Global Water Partnership (GWP) is an International Organisation, which is semi-official in nature and discusses the policy papers on water at global level and then puts it to WWC for further consideration. Indian National Committee on Irrigation and Drainage (INCID) is a Member of GWP from India. There is one regional water partnership for South Asia Region with a Technical Advisory Committee for South Asia Region (SASTAC). At country level, a Non-Governmental Organisation has been formed which is named as India Water Partnership (IWP). CWC is represented in the Steering Committee of IWP. The Chairman, CWC is one of the Members of this Steering Committee. Irrigation Planning (South) Directorate functions as a nodal directorate for all the works related to World Water Council.

One of the important activities of the New Delhi Centre of World Water Council is organisation of brainstorming sessions.

17.2.10 International Commission on Irrigation and Drainage

International Commission on Irrigation and Drainage (ICID) is a non-governmental organisation with representation from more than 80 countries, with headquarters at New Delhi. India is one of the founding Members of the ICID. The mission of the ICID is to stimulate and promote the development of arts, science, techniques of engineering, agriculture, economics, ecology and social sciences in managing irrigation, drainage, flood control and river training applications including research and development and capacity building, adopting comprehensive projects and promote state-of-the-art techniques for sustainable agriculture in the world.

Executive Council of ICID

The 58th International Executive Council (IEC) meeting of ICID and Inter regional Conference on Food Production and Water were held from 30th September 2006 to 5th October 2006 at California, USA. The Chairman, CWC & INCID attended the council meeting as one of the Vice-Presidents of ICID.

Committees/Working Groups under ICID

Various Committees/Working Groups have been constituted by ICID in which CWC officers are represented to promote the above activities. The representation of CWC in the committees/ working groups of ICID is as under:

Sl. No.	Name of the Committee	Member
1.	Permanent Committee on Strategy Planning and Organisational Affairs (PCSPOA)	Chairman, CWC & INCID
2.	Permanent Committee for Technical Activities (PCTA)	Chairman, CWC & INCID

3.	Working Group on Comprehensive Approaches to Flood Management (WG-CAFM)	Chairman, CWC & INCID
4.	Working Group on Capacity Building, Training and education (WG-CBTE)	Chairman, CWC & INCID
5.	Committee on Public Relations and publications	Member, WP&P, CWC
6.	Working Group on History of Irrigation, Drainage and Flood Control (WG-HIST)	Chief Engineer, (POMIO),CWC

Watsave Award 2005

Search & Selection Committee composing of Member (WP&P), CWC, CE (IMO), CWC and CMD (WAPCOS) processed the nominations received and recommended one nomination each for the three categories of ICID Watsave Award 2006.

17.2.11 ICAR - CWC Joint Panel

The ICAR- CWC Joint Panel was constituted for the first time in March, 1979 by the ICAR for a period of three years mainly to deal with the problems relating to efficient water use management and suggest measures for maximizing the return from investment on irrigation in areas covered under major, medium, minor and other irrigation programmes. The functions of the Panel include providing adequate and efficient agricultural research, education and extension services in irrigation commands. The Panel also reviews the work done by Agricultural Universities/ Research Institutes, Command Area Development Authorities, Central and State Ground water Organisations and others with a view to optimize the yield per unit of water. The Joint Panel, after expiry of its term of three years, was further reconstituted seven times so far. The present Panel was reconstituted in September, 2003. Director General, ICAR and Chairman, CWC are the Chairman of the Panel in alternate years.

A Workshop on "Efficient Water Management in Command Areas" on 18.09.2006 was organized by the ICAR, Pusa under the programme of CWC-ICAR Joint Panel. Member (WP&P) chaired the Technical Session-I.

17.2.12 Bureau of Indian Standards (BIS)

Central Water Commission being an apex technical body in the water resources sector, has been playing an important role in formulation of standards in field of water resources development and management and allied areas through its participation in activities of Water Resources Division (WRD) and Civil Engineering Division (CED) of BIS. Chairman, Central Water Commission is presently the Chairman of Water Resources Division Council (WRDC). Member (D&R), CWC and Chief Engineer, Designs (NW&S) are the Principal and Alternate Member in Civil Engineering Divisions Council (CEDC). CWC is involved in all the 18 Sectional Committees under WRDC. Out of 41 Sectional Committees under Civil Engineering Division, CWC is involved in 9 Sectional

Committees. There are 18 Sectional Committees of WRDC and on these, CWC is represented by its officers of the rank of Director and Deputy Director.

Following are the important activities attended during the year.

- Total of 7 draft Indian Standards pertaining to roof top rain water harvesting, geophysical logging of bore holes for hydrological purposes, recommendations for preparation of geological and geo-technical maps of river valley projects, geological exploration by geological methods were approved by Chairman, CWC/WRDC, for adoption and printing.

- Preparation / Examination of draft BIS Standards were done as and when requested / received from Bureau of Indian Standards.

- WRD – 01 Sectional Committee (Hydrometric Sectional Committee) meetings of BIS are generally held on half yearly / yearly basis under the chairmanship of Member (RM) CWC, New Delhi and the follow up action subsequently was attended.

- The draft ISO Standards of TC - 113 of ISO as and when received were examined and the comments were communicated to BIS (The Secretariat for ISO works).

- During the current financial year, 5 Indian Standards under Sectional Committee WRD-01 were approved by Chairman, CWC/WRDC, for adoption and printing and 3 Standards under Sectional Committee TC-113 were reviewed.

- Amendments permitting use of fly ash in cement in water resources projects and 11 amendments in respect of Sectional Committee WRD-8 were also approved.

- Chief Engineer (BPMO), CWC participated in the meeting of ISO TC/113 and its sub-committee during 17th to 21st May, 2004 at Tsukuba, Japan.

17.2.13 Sub-Committee on "More Crop and Income per drop of Water"

The Hon'ble Union Minister for Water Resources is heading the Advisory Council on Artificial Recharge of Ground Water. The first meeting of the Council was held on 22nd July, 06 at Vigyan Bhavan, New Delhi and was inaugurated by Hon'ble Prime Minister of India. In his inaugural address the Prime Minister mentioned that "we have to minimize our water use-invest in science and technology to ensure that we can grow crops which use less water. In other words, find ways of valuing the crop per drop". To implement the suggestions of Prime Minister, the council in its first meeting constituted a Sub-Committee under the Chairmanship of Dr. M.S.Swaminathan to prepare a report on "more Crop and income per Drop of Water." The Chief Engineer (IMO), CWC was Member Secretary. The Sub-Committee consists of representatives of various related ministries and organisations under them. The Sub-Committee held two meetings on 9th and 20th September, 06 and submitted its report to Hon'ble Minister (WR) on 2nd October,2006.

To implement the recommendations of the Sub-Committee, MoWR constituted a National Project Steering Committee. CE(IMO), CWC represents CWC in the Steering Committee. The Committee in its first meeting held on 5.2.07, finalised format for submission of the proposal for PARP and recommended forming a small group under the banner of Project Implementation Team (PIT) to evaluate and operationalise the programme. It will draw guidelines/ develop format, which inter-alia will include signing of agreements with universities / institutes, pattern of release of funds, time frame for implementation limited to two/ three crop seasons, monitoring of the progress , submission of completion reports and economic evaluation of PARPs.

Agriculture universities/ institutions, ICAR Research Institutes, CRIDA ICRISAT, WALMIS, Engineering Colleges and private sector R&D institutions etc. dealing with water conservation and management have been requested to submit proposals for PARPs. The proposals received, will be evaluated and short listed by Project Implementation Team (PIT) set up by the Steering Committee for inclusion in the PARPs.

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CHAPTER – XVIII

PUBLICITY AND PUBLICATION

18.1 Printing and Publication

The press attached to the Publication Division carried out various printing jobs for CWC & MoWR. About 5400 pages were composed and 1,12,900 copies of various publications/ forms were printed during the year. The publications/ reports/ journals/ pamphlets/ folders printed and brought out during the year 2006-07 are given below:

Sl. No.	Name of Publication/Job
1.	Annual Report of MOWR 2005-06 (English)
2.	CWC Administration News Bulletin March, 2006 (English)
3.	Bhagirath (Hindi) Jan-March, 2005
4.	CR Form of AD
5.	Annual Report of MOWR 2005-06 (Hindi)
6.	Bhagirath Hindi April-June, 2005 No. 2
7.	Bhagirath English Jan-March, 2005 No. 1
8.	CWC Administrative News Buleltin Vol. 1 No. 3 March 2006 Hindi
9.	CWC Administrative News Bulletin (English) Vol. VIII, No. 4 April, 2006
10.	CWC Administrative News Bulletin (Hindi) Vol. VIII, No. 4 A April, 2006
11.	National Environmental Monitoring Committee of River Valley Projects Annual Report 2003-04 (English)
12.	CWC Administrative News Bulletin May, 2006
13.	CWC Administrative News Bulletin May, 2006 (Hindi)
14.	Bhagirath (Hindi) Rajbhasha Visheshank 2005
15.	CWC Administrative News Bulletin June (English)
16.	CWC Administrative News Bulletin June (Hindi)
17.	Real time integrated operation of reservoirs
18.	Bhagirath (Hindi) July-December, 2005 – (Text matter)
19.	Bhagirath (English) July-December,2005 Cover (Text matter to be printed)
20.	Cover Bhagirath (Hindi) July-December, 2005
21.	Bhagirath (English) January-March, 2006 issue- cover
22.	CWC Administrative News Bulletin VIII July 2006 (Hindi)
23.	CWC Administrative News Bulletin VIII July 2006 (English)
24.	Bhagirath (English) July-December, 2005

25.	CWC Administrative News Bulletin August, 2006 (Hindi)
26.	Bhagirath (Hindi) January-March, 2006
27.	Bhagirath (Hindi) April-June, 2006
28.	Bhagirath (English) January-March, 2006 Text matter
29.	CWC Administrative News Bulletin September, 2006 (Hindi)
30.	Bhagirath (English) April-June, 2006 Text

18.2 Microfilming

With a view to preserve important drawings and other documents for future references, the microfilming unit of Technical Documentation Directorate records documents in microfilms after proper indexing and coding. During the year 2006-2007, nearly 1165 number of engineering drawings / documents were microfilmed.

18.3 Journals

TD Directorate of CWC publishes several technical and semi-technical journals and publications in the field of Water Resources development. 'Bhagirath' a quarterly semi-technical journal, both in English and in Hindi were published separately during the year. In addition, `Administrative News Bulletin' on monthly basis was also published during the year.

18.4 AZO Prints

Nearly 9440 number of Azo Prints were developed from tracings of drawings/ documents pertaining to various Directorates of CWC/MOWR at Ferro-printing Units of T.D. Directorate.

18.5 Technical Publications

A comprehensive report entitled "Water Resources Development in Cauvery Basin- Historical background, present status and future road map" is under preparation.

18.6 Publicity and Mass Awareness

Publicity and Mass Awareness programmes on water were arranged/prepared. In this regard, pamphlets on various topics with focus on Water Conservation were prepared and distributed in various exhibitions. Under the media plan activities, preparation of slogans, scripts etc. on water are prepared and submitted to Media Committee of CWC/MOWR. For World Water day 2007 two papers namely Introduction to Theme Paper by Chairman, CWC and another under Dr. Kanwar Sain Memorial Lecture by Prof. R. Rangachari were got printed for circulation. Necessary steps for Printing of Water Year, 2007 Logo on official stationeries, slips-pads etc. has also been taken up.

18.6.1 Media Plan 2006-2007 of MoWR

As per Media Plan 2006-2007 of Ministry of Water Resources, CWC participated in the following exhibitions along with other departments of MoWR.

- 7th Water Asia-2006 at Pragati Maidan, New Delhi from 02.11.2006 to 04.11.2006.

- IITF 2006 at Pragati Maidan, New Delhi from 14.11.2006 to 27.11.2006.
- Krishi Expo at Pragati Maidan, New Delhi from 21.02.2007 to 25.02.2007.
- Thrissurpooram Exhibition – 06 at Thrissur (Kerala) and won the First Prize.

18.6.2 Engineering Museum

Central Water Commission is maintaining an Engineering Museum at B-5, Kalindi Bhawan, Qutub Institutional Area, New Delhi-16, which is fully devoted to water resources development in the country. Various aspects of the development in the field of water resources in India are illustrated through self-explanatory working models. The museum is visited by a large number of visitors, which include students, professionals and people from all walks of life.