Government of India

Central Water Commission

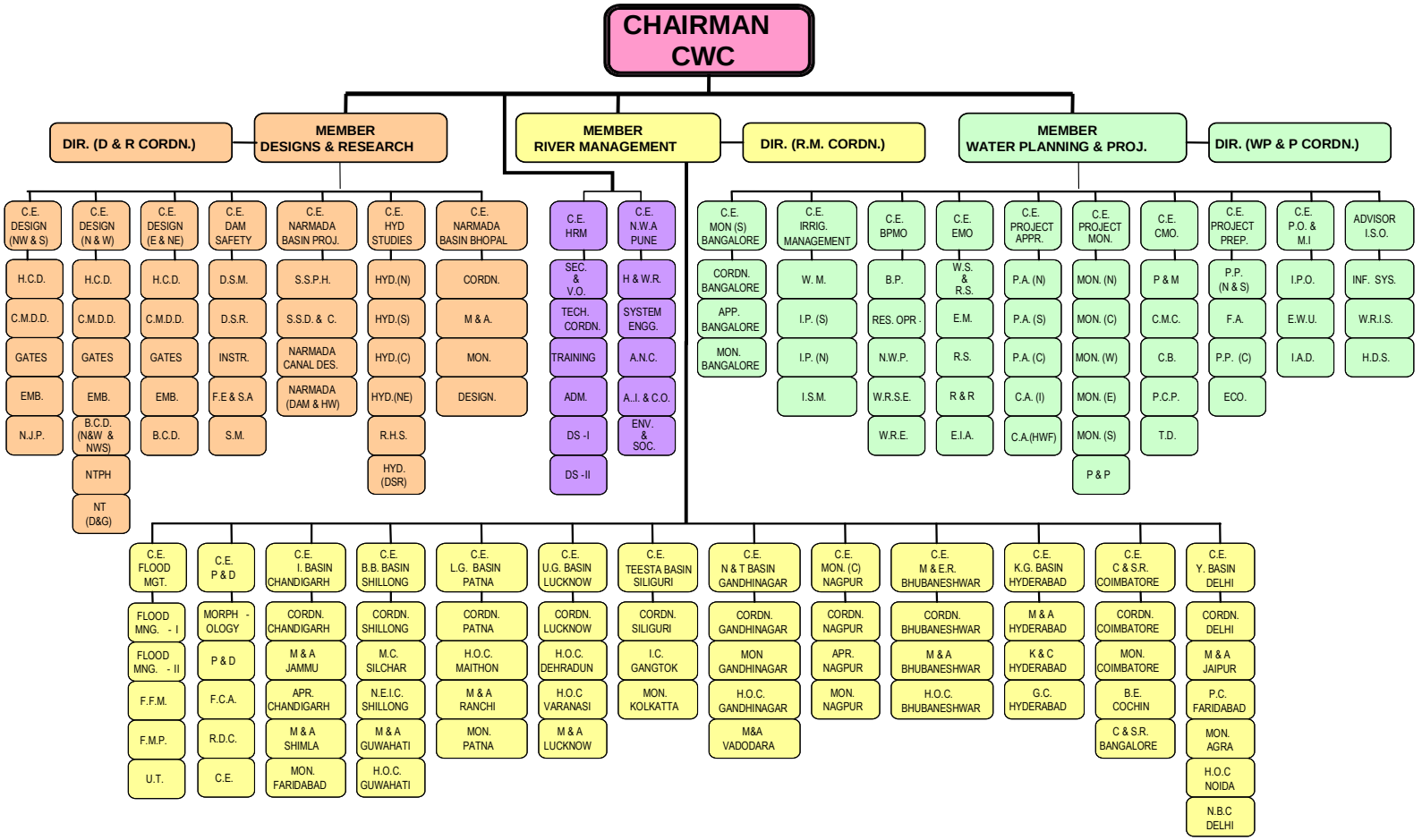
ANNUAL REPORT

2005 - 2006

INDIA – LAND AND WATER RESOURCES : FACTS

•	GEOGRAPHICAL AREA & LOCATION	329 M ha Latitude 8^0 –4' & 37^0-06' North Longitude 68^0 – 7' & 97^0 – 25' East
•	POPULATION 2006 (ESTIMATED ON 2001 CENSUS)	1086.66 Million
•	RAINFALL VARIATION	100 mm in Western most regions to 11000 mm in Eastern most region
•	MAJOR RIVER BASINS (CATCHMENT AREA MORE THAN 20,000 sq km.)	12 Nos. having catchment area 253 M ha
•	MEDIUM RIVER BASINS (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	3722.9 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	183.0 M ha
•	GROSS SOWN AREA	176.0 M ha
•	NET SOWN AREA	133.0 M ha
•	GROSS IRRIGATED AREA	72.6 M ha
•	NET IRRIGATED AREA	53.1 M ha
HYDROPOWER		
•	ULTIMATE HYDROPOWER POTENTIAL (ESTIMATED)	84044 MW at 60% LF
•	POTENTIAL DEVELOPED BY 1^{ST} APRIL, 2006	16031.85 MW at 60% LF

Organogram of Central Water Commission 2005-06



From Chairman's Desk

This Annual Report for the year 2005–06 of Central Water Commission (CWC), an attached premier technical organisation of the Ministry of Water Resources, 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 in the development of the water sector and provided necessary support to the Ministry of Water Resources on all technical and policy matters during the year 2005-06. 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 Water 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 124 Water Resources Development projects in India and neighbouring countries.

Appraisal & Monitoring of Water Resources Projects

- Acceptance for 13 major/medium irrigation/multipurpose projects by the Advisory Committee of the Ministry of Water Resources.
- Techno-economic appraisal of 134 major/medium irrigation/multipurpose projects.
- Monitoring of 88 Major, 38 Medium and 9 ERM Projects and CAD works of 133 projects.
- Examination of proposals for release of Rs. 1711.026 crore of CLA under AIBP programme and monitoring of 114 projects.
- Examination of proposals under the scheme for renovation, restoration and revival of water bodies.

Flood Management

- Timely issue of 5619 flood forecasts (with 96.55% accuracy) during the monsoon period of 2005 to help in effective flood management, particularly in Assam, Bihar, Maharashtra, Karnataka, Gujarat which faced severe floods.
- Techno-economic evaluation of 83 schemes of Flood Management/Master Plans for Flood Control.

(R. JEYASEELAN)
CHAIRMAN
CENTRAL WATER COMMISSION

HIGHLIGHTS OF THE YEAR 2005-06

- **DESIGNS:**
  - Design units of CWC undertook detailed designs and drawings of various types of hydraulic structures for 124 water resources development projects.
  - Upgradation of available technical softwares and hardware capabilities and enhancement of design capabilities of CWC Engineers through training was taken up.
  - The Development of CWC portal "Sangam" was completed by C-DAC. The portal was made operational and hosted at http://cwc.gov.in

- **RIVER MANAGEMENT:**
  - Carried out Hydrological Observations at 945 sites spread all over the country.
  - Operated 173 flood forecasting stations (including 28 inflow forecasting sites) spread over 9 major river basins. 5619 flood forecasts were issued of which 96.55 % were within prescribed limits of accuracy. Daily flood bulletins and weekly flood news letters were issued during the flood season.
  - Assisted Royal Government of Bhutan for maintenance of 35 Hydro-meteorological sites in Bhutan.
  - 11 Hydro Electric Projects were under investigation in North-Eastern region.
  - 57 Minor Irrigation Schemes were under investigation in Mizoram. DPR for 29 schemes have been submitted and investigations / preparation of reports in respect of balance 28 schemes are under process.
  - 83 Flood Management Schemes/Master Plans for Flood Control were cleared.
  - Action Plan on Flood Management was finalized under the guidance of MoWR and NDMA.

- **WATER PLANNING:**
  - 53 new Major Irrigation Projects & 23 revised Major Irrigation Projects and 58 new Medium Irrigation Projects were under appraisal in CWC. 13 projects were accorded approvals by TAC.
  - Monitored 125 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.
  - Central grant of Rs. 1711.026 crore was recommended for release to 114 projects under AIBP.
  - 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:**
  - 283 in service officers were sponsored for training, attending seminars/ workshops, etc. within the country and 27 officers participated in various programmes aboard. NWA, Pune conducted 25 training programmes and 2 workshops for 589 officers and contributed 1491 manweeks of training.

C O N T E N T S

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 2005-06 were:

1.	Chairman, CWC	:	Shri R. Jeyaseelan
2.	Member (WP&P)	:	Shri C.B. Vashista (01.04.05-30.04.05)
		:	Shri B. S. Ahuja (01.05.05 – 31.03.06)
3.	Member (D&R)	:	Shri S.K. Das
4.	Member (RM)	:	Shri M.K. Sharma (01.04.05-30.06.05)
		:	Shri S.K. Agarwal (01.07.05 – 31.03.06)

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 softwares;

- 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 viz. Basin Planning & Management, Central Mechanical, Environmental Management, Irrigation Management, Performance Overview and Management Improvement, Project Appraisal, Project Preparation, Project Monitoring and Information Systems; six organisations are under D&R wing viz. Design (NW&S), Design (N&W), Design (E&NE), Hydrological Studies, Dam Safety and Narmada Basin Projects; two organisations are under RM wing viz. Flood Management and Planning & Development. In addition, Human Resources Management (HRM) Unit headed by Chief Engineer (HRM) dealing with establishment, administration, financial and Training matters is also located at headquarters.

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. 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. In addition, for training of Central and State in-service engineers, CWC also has a National Water Academy located at Pune, which is headed by a Chief Engineer.

1.6 Personnel Management

The staff strength of CWC in position as on 1.1.2006 was 4260 as against the sanctioned posts of 5215. 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 Regional Offices	1995 3220	} } 4260
Total	**5215**	**4260**

Table 1.2
Group-Wise Details of Posts Sanctioned and Filled

Sl. No.	Category	Sanctioned	Filled
1.	Group "A"	710	592
2.	Group "B"	480	408
	Group "B" (Non-Gazetted)	558	437
3.	Group "C"	2450	1962
4.	Group "D"	1017	861
	Total	**5215**	**4260**

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	2005-06			Total Exp. During X Plan upto Mar, 06	Broad Objective
			BE	FE	Actual Exp.		
1	***2***	**3**	**4**	**5**	**6**	**7**	**8**
1.	National water Academy	10.00	1.77	1.79	1.59	4.95	Conducting training courses for Central and State Government officials
2.	Snow Hydrological Studies	2.00	0.4	0.38	0.35	1.26	Collection of Snowmelt run-off data and preparation of snowmelt run-off Model.
3.	Monitoring of Water Quality in rivers of India	7.50	1.72	0.94	0.71	3.48	Collection of Hydro-Meteorological data on quantity and quality of water resources from 376 hydrological observation stations

4.	Hydrological Observations on Rivers originating from Bhutan	1.50	0.24	0.16	0.16	1.45	Collection of Hydrological data for rivers flowing to India through Bhutan and communication of real time data
5.	Strengthening of Monitoring Organization	19.00	4.00	3.56	3.41	12.43	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	1.99	1.13	1.03	4.74	Survey & Investigation and preparation of Detailed Project Reports
7.	Estt/Maintenance of Key Hydrological Stations on rivers other than Ganga and Indus	40.00	10.07	8.93	8.26	31.70	Running & Maintenance of 111 Key HO sites 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	0.32	0.65	0.59	5.47	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, Rangit HE Project Stage II & IV and Manas Teesta Link	9.00	2.74	2.31	1.79	9.11	Survey & Investigation and preparation of Detailed Project Reports
10.	Flood Forecasting on rivers Common to India & Nepal	3.00	0.21	0.00	0.00	0.12	R&M of 37 G&D and Meteorological sites in Nepal
11.	Strengthening and Modernization of FF & H.O Network in Brahmaputra & Barak Basin	14.00	3.64	3.08	2.47	11.27	R&M of 39 HO&FF sites in Brahmaputra and Barak Basin
12.	Hydrology Project Stage	15.13	0.64	0.00	0.00	14.29	Hydrology project Stage II sanctioned in January ‘06
13.	Establishment & Modernization of F.F Network in India including Inflow Forecast	51.00	18.36	11.03	3.42	17.92	Modernization of 172 FF Sites by installing telemetry system, etc.
14.	Capital Outlay for Flood Control Projects	25.00	8.78	8.78	8.35	18.86	Construction of residential & non-residential buildings for CWC field offices
15.	Pancheshwar Multipurpose Project	15.00	2.5	1.6	1.38	9.51	Preparation of DPR of Pancheshwar Multipurpose Project, R&M of 31 HO and Meteorological sites
16.	Survey and Investigation of Kosi High Dam	30.00	7.00	7.00	5.29	7.28	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	2.50	0.54	0.41	1.47	Establishment of two units on dam Break Modelling and Emergency Action Plan.
18.	Upgradation and Modernisation of Computerisation/Information System	8.00	2.27	1.38	0.77	5.93	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	0.83	0.44	0.37	0.76	Setting up of instrumentation museum and training of personnel in specialised subjects.
20.	Studies on Reservoir Sedimentation and other Remote Sensing Applications	14.00	2.63	1.98	1.58	6.40	• Reservoir Sedimentation, and Assessment of Waterlogged and Salinity and/or Alkalinity affected areas in Irrigated Commands through out India using Remote Sensing Techniques. • Reservoir Sedimentation studies using Hydrographic Techniques • Morphological studies of 6 rivers.

1.7.2 Annual Budget

The plan and non-plan budget outlays and expenditure for the year 2005-06 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	
		Outlay	**Expenditure**	**Outlay**	**Expenditure**
1.	Direction & Administration	-	-	11.46	12.77
2.	Consultancy	-	-	13.36	15.04
3.	Research	-	-	1.03	0.97
4.	Training	1.77	1.59	0.40	0.38
5.	Data Collection	10.07	8.26	38.85	43.74
6.	Survey & Investigation	-	-	5.40	4.90
7.	Other - Major and Medium Irrigation	16.90	9.38	2.66	2.62
	- Flood Control	36.87	17.36	31.29	35.36
	Total	**65.61**	**36.59**	**104.45**	**115.78**

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. Sufficient progress has been made in the implementation of the Raj Bhasha Act in CWC. Following initiatives in regard to progressive use of Hindi in 2005-06 were taken.

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

2. With a view to review, the progressive use of Hindi and also to keep a watch on the compliance of orders, instructions, regional offices located at Maithon, Nagpur, Varanasi, Guwahati, Bangalore, Bhubaneshwar and Yamuna Basin Organisation at Delhi were inspected. 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, two Hindi workshops were organised at CWC headquarters. Hindi workshops were also organised in the offices located at Guwahati in January, 2006 and at Bhubaneshwar and Bangalore during the month of March, 2006.

4. Apart from translation of documents falling under section 3(3) of the Official Language Act, the Annual Report of CWC 2004-05, internal directory of CWC and website materials of NWA, Pune were translated in to Hindi.

5. Common terminology used in CWC has been prepared for promoting the use of Hindi, and it is under printing.

6. CWC has won the Rajbhasha Vaijayanthi shield (1st prize) of the MoWR for the year 2004-05 for doing maximum work in Hindi.

7. Hindi Fortnight was organised in September 2005. 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 2004-05 were awarded to Middle Ganga Division-I, Lucknow, Indus Basin organisation, Chandigarh, Chenab Division, Jammu, Dam Safety Rehabilitation directorate and Establishment-IX section for carrying out maximum work in Hindi during the year.

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 1-1-2006)

Category	No. of Filled posts	No. of SCs	No. of STs	No. of OBCs
Group A	554	60	17	13
Group B	618	116	14	-
Group C	1709	213	44	58
Group D	859	248	87	42
Total	**3740**	**637**	**162**	**113**

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

Section 33 of the Persons with Disabilities (Equal Opportunities Protection of Rights and Full Participation) Act 1995 provides that Government shall appoint in every establishment such percentage of vacancies, not less than 3% for persons or class of persons with disabilities of which 1% each shall be reserved for persons suffering from (i) blindness or low vision (ii) hearing impairment and (iii) locomotor disabilities or cerebral palsy in the posts identified for each disability. In pursuance of this, posts for disabled persons have been identified.

The position of Disabled Persons in position as on 1.1.2006 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 1.1.2006

GROUP	OH	VH	HH	TOTAL
'A'	2	-	-	2
'B'	2	-	1	3
'C'	5	-	-	5
'D'	2	4	2	8
Total	**11**	**4**	**3**	**18**

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 include:

1. Benevolent Fund to provide immediate financial assistance;
2. Co-operative Thrift and Credit Society to meet the financial needs and to cultivate the thrift habit;
3. Encouragement to sports personnel by providing prizes and other amenities;
4. Timely redressal of grievances.

Summary of activities under the welfare schemes are given below:

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 2005-06 there were six cases of immediate relief and four case 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 and Delhi State Masters Athletics Championship with first position in three events and second position in four events. CWC Hockey Team won the inter-ministry Hockey tournament. CWC also clinched third position in the inter-ministry Badminton Tournament. CWC Officials were selected as,

- Official of India for Commonwealth Games held at Australia during March 2006.
- Convenor of Hockey Team by the Central Civil Services Cultural & Sports Board.
- Convenor of Badminton Team for the National All India Civil Services Badminton Tournament held at Hyderabad.

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 has awarded the Consultancy for the above studies to the Administrative Staff College of India, Hyderabad. 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.

First introductory workshop on the study was conducted by ASCI during December 2001, which was followed by discussions at New Delhi by ASCI Officers with CWC Officers & Service Associations. ASCI officers also visited number of CWC field offices to know their functioning and some of the State Govts. to discuss their aspirations from CWC.

The draft report was submitted by ASCI in September, 2002, which was circulated to all concerned including CWC field offices. 1st Workshop on "Mission Statement" for CWC was held at Hyderabad in June, 2003. 2nd Workshop on "Core and Associated functions of CWC" was organized on 14-15th June, 2005 at New Delhi. Recommendation of the 2nd workshop on core and

associated functions of CWC were forwarded to ASCI after consultation with MoWR in August, 2005 for arriving at the HR structure for CWC. ASCI suggested to hold interactive group discussions with CWC Officers at different levels to identify the competency descriptor in each job position/ position category. Accordingly interactive sessions were held between ASCI and CWC officers at New Delhi on 24-25 November 2005. The study is in final stages and Final report 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 during the 2nd meeting of the committee on 23-3-2006 and sent to MoWR for approval so that it can be published and put 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.nic.in

Appellate Authority, Nodal Officer and Central Public Information Officers have been nominated for the Headquarters as well regional offices of CWC. The names, designations, addresses, telephone numbers and other particulars of these officers are given in the official website of CWC.

CHAPT34ER-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, the 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 Table 2.1.

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 MoWR/PMO:

- 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.

Table 2.1
Water Resources Potential in the Major River Basins of India

Unit: BCM

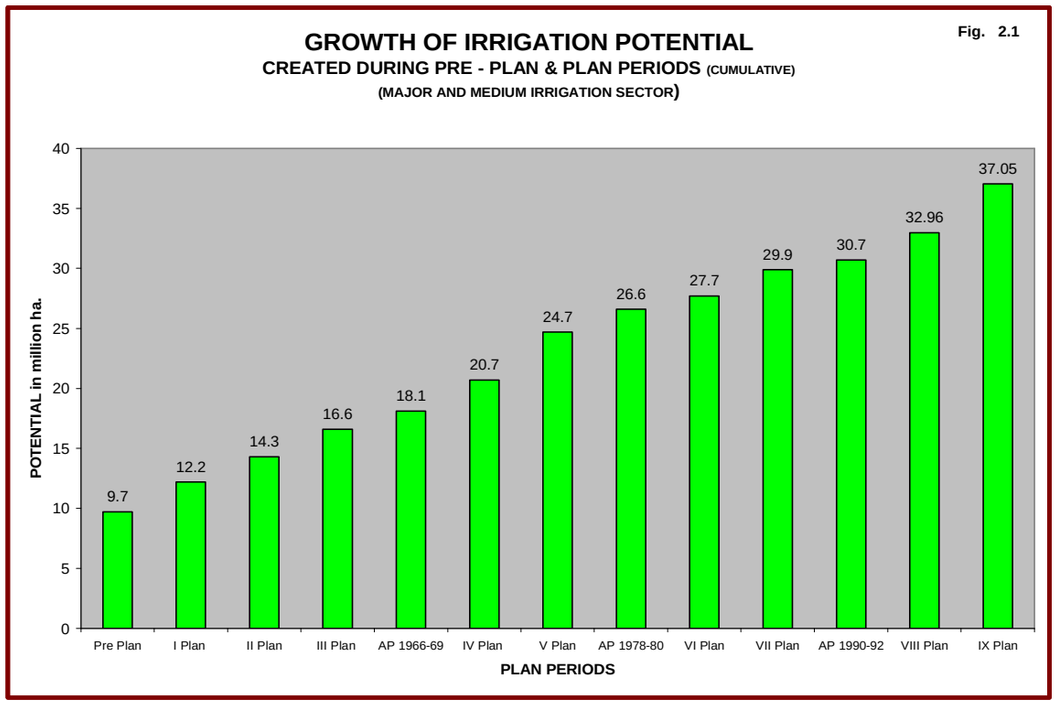
Sl. No.	Name of the River Basin	Average Annual Potential in the River	Estimated Utilisable Flow (excluding Ground water)
1.	Indus (upto Border)	73.31	46.00
2.	a) Ganga	525.02	250.00
	b) Brahmaputra, Barak and others	585.60	24.00
3.	Godavari	110.54	76.30
4	Krishna	78.12	58.00
5	Cauvery	21.36	19.00
6	Pennar	6.32	6.86
7	East flowing Rivers between Mahanadi & Pennar	22.52	13.11
8	East Flowing Rivers between Pennar and Kanayakumari	16.46	16.73
9	Mahanadi	66.88	49.99
10	Brahmani & Baitarni	28.48	18.30
11	Subarnarekha	13.37	6.81
12	Sabarmati	3.81	1.93
13	Mahi	11.02	3.10
14	West Flowing Rivers of Kutch, Saurashtra including Luni	15.10	14.98
15	Narmada	45.64	34.50
16	Tapi	14.88	14.50
17	West Flowing Rivers from Tapi to Tadri	87.41	11.94
18	West flowing rivers from Tadri to Kanyakumari	113.53	24.27
19	Area of Island drainage in Rajasthan Desert	Neg	-
	Minor River Basins drainage to Bangladesh & Myanmar	31.00	-
	Total	**1869.35**	**690.32**

Source: CWC Publication – Handbook on Water and Related Information, Jan, 2005

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 & medium irrigation projects is assessed as 58.5 m ha. Irrigation potential created in the country from major and medium irrigation projects, which stood at 9.7 m ha in 1951, has risen to 37.05 m ha till the end of IX Plan. The target for Tenth Plan is to achieve a cumulative irrigation potential upto 43.55 m ha. The cumulative figures of potential created in the successive plan periods are given in Figure 2.1.

Fig. 2.1



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 IX Plan in 2002, as per available information, 401 major, 1152 medium and 173 ERM (Extension, Renovation & Modernization) schemes were taken up out of which 154 major, 774 medium and 87 ERM projects have reportedly been completed by the end of IX plan. Additionally, 16 major, 19 medium and 3 ERM projects were completed upto March, 2006 during X Plan. Status of projects taken up/completed since pre-plan period upto March, 2006 is given below in Table 2.2.

Table 2.2
Number of Major, Medium & ERM Projects taken up and Completed

Category	No. of Projects Taken upto IX Plan			No. of Projects completed upto IX Plan			Spill over into X Plan	Status as on 01-04-2006	
	Pre-plan	Plan	Total	Pre-plan	Plan	Total		Completed during X Plan upto March, 06	On-going
Major	74	327	401	74	154	228	173	16	168*
Medium	143	1009	1152	143	774	917	235	19	226**
ERM	-	173	173	-	87	87	86	3	86#
Total	**217**	**1509**	**1726**	**217**	**1015**	**1232**	**494**	**38**	**452**

* - include 11 Major additional spillover projects of Maharashtra

** - include 11 Medium additional spillover projects of Maharashtra and 1 project of Goa abandoned

\# - include 2 ERM additional spillover projects of Maharashtra and 2 projects of Bihar merged into one project.

The cumulative irrigation potential created till the end of IX Plan is 37.05 m ha and target for X Plan was 9.93 m ha, which has been revised to 6.50 m ha by mid term appraisal. Statewise

cumulative potential created through major and medium projects upto end of IX Plan and target for X Plan are given in Table 2.3. Growth of irrigation potential created through Major and Medium Irrigation Projects and corresponding outlays/ expenditure in various plan periods is given in Table 2.4.

Table 2.3

Statewise Creation of Irrigation Potential through Major & Medium Irrigation Sector

(Thousand ha.)

Sl. No.	State	Ultimate Irrigation Potential	Achievement of Potential created upto IX Plan (1997-2002)	Target of Potential creation During X Plan	Achievement of potential created during X Plan (upto March, 2004)
1	Andhra Pradesh	5000.00	3303.22	739.88	275.73
2	Arunachal Pradesh	**	0.00	4.00	0.80
3	Assam	970.00	243.92	116.10	22.62
4	Bihar	5223.50	2680.00	948.42	35.00
5	Chhattisgarh	1146.93*	922.50	305.00	26.15
6	Goa	62.00	21.17	26.66	5.48
7	Gujarat	3000.00*	1430.37	1904.00	124.90
8	Haryana	3000.00	2099.49	119.00	0
9	Himachal Pradesh	50.00	13.35	8.00	0.50
10	Jammu & Kashmir	250.00	179.69	25.00	2.61
11	Jharkhand	1276.50	354.47	315.00	4.82
12	Karnataka	2500.00*	2121.12	999.89	95.64
13	Kerala	1000.00	609.49	90.00	27.09
14	Madhya Pradesh	4853.07	1386.90	265.30	74.51
15	Maharashtra	4100.00*	3239.00	1276.43	63.55
16	Manipur	135.00*	156.00	28.15	-
17	Meghalaya	20.00	0.00	-	-
18	Mizoram	**	-	-	-
19	Nagaland	10.00	0.00	-	-
20	Orissa	3600.00	1826.56	465.07	60.57
21	Punjab	3000.00	2542.48	160.30	0
22	Rajasthan	2750.00*	2482.15	413.80	96.16
23	Sikkim	20.00	0.00	0.00	-
24	Tamil Nadu	1500.00*	1549.31	9.38	-
25	Tripura	100.00	4.90	-	-
26	Uttaranchal	346.00	280.30	6.20	0
27	Uttar Pradesh	12154.00	7910.09	1000.76	134.44
28	West Bengal	2300.00*	1683.29	700.00	14.22
	Total U.Ts.	98.00	6.51	-	-
	Total States+U.Ts.	**58465.00***	**37046.28**	**9926.34#**	**1064.79**

* - need revision ** - included under UT # Revised as 6.50 m ha by Mid Term Appraisal

Table 2.4
Planwise 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	376.24	2.50	12.20	12.98
II Plan (1956-61)	380	756.24	2.13	14.33	13.05
III Plan (1961-66)	576	1332.24	2.24	16.57	15.77
Annual Plan (1966-69)	430	1762.05	1.53	18.10	16.75
IV Plan (1969-74)	1242	3005.3	2.60	20.70	18.69
V Plan (1974-78)	2516	5521.5	4.02	24.72	21.16
Annual Plans (1978-80)	2079	7600.10	1.89	26.61	22.62
VI Plan (1980-85)	7369	14968.9	1.09	27.70	23.57
VII Plan (1985-90)	11107	26576.2	2.22	29.92	25.47
Annual Plans (1990-92)	5459	31534.19	0.82	30.74	26.32
VIII Plan (1992-97)	21,072	52606.29	2.22	32.96	28.44
IX Plan (1997-2002)	48259	101896.29	4.09	37.05	31.03
X Plan (2002-2007) (Target)	70862*		9.93#	43.55*	

***Provisional** **Source:** X Five-Year Plan 2002-07 of Planning Commission
Revised to 6.50 m ha by Mid Term Appraisal

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

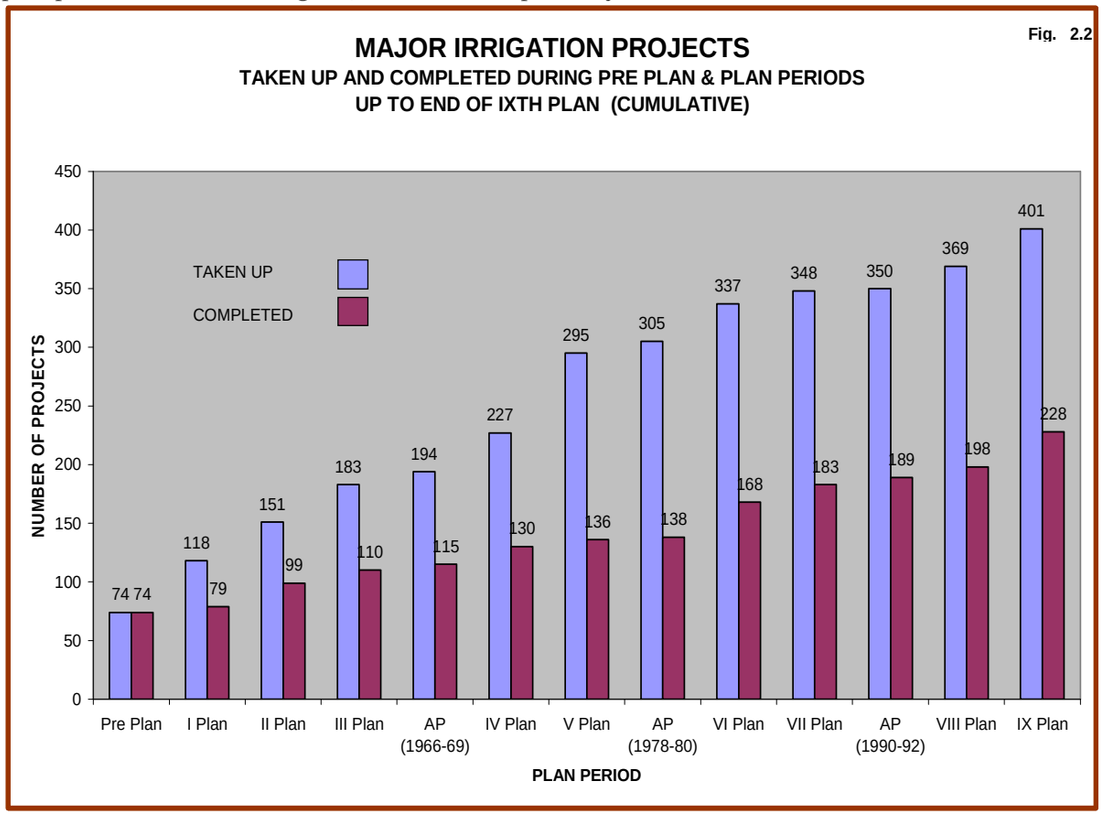


Fig. 2.3

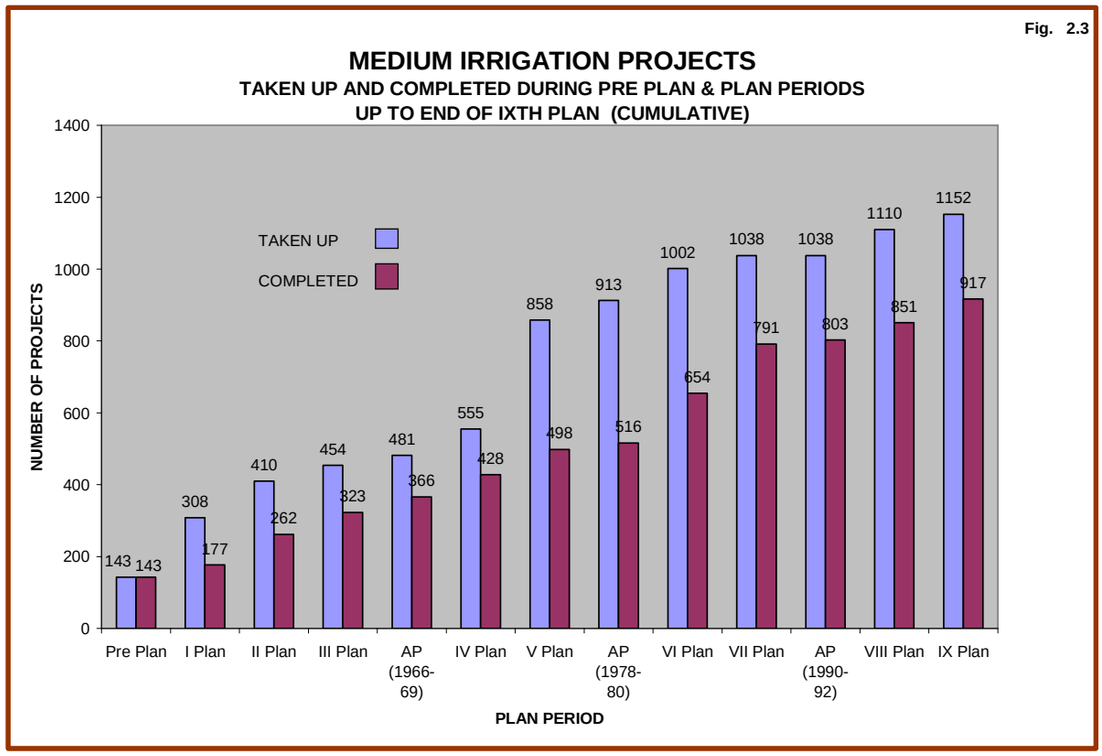
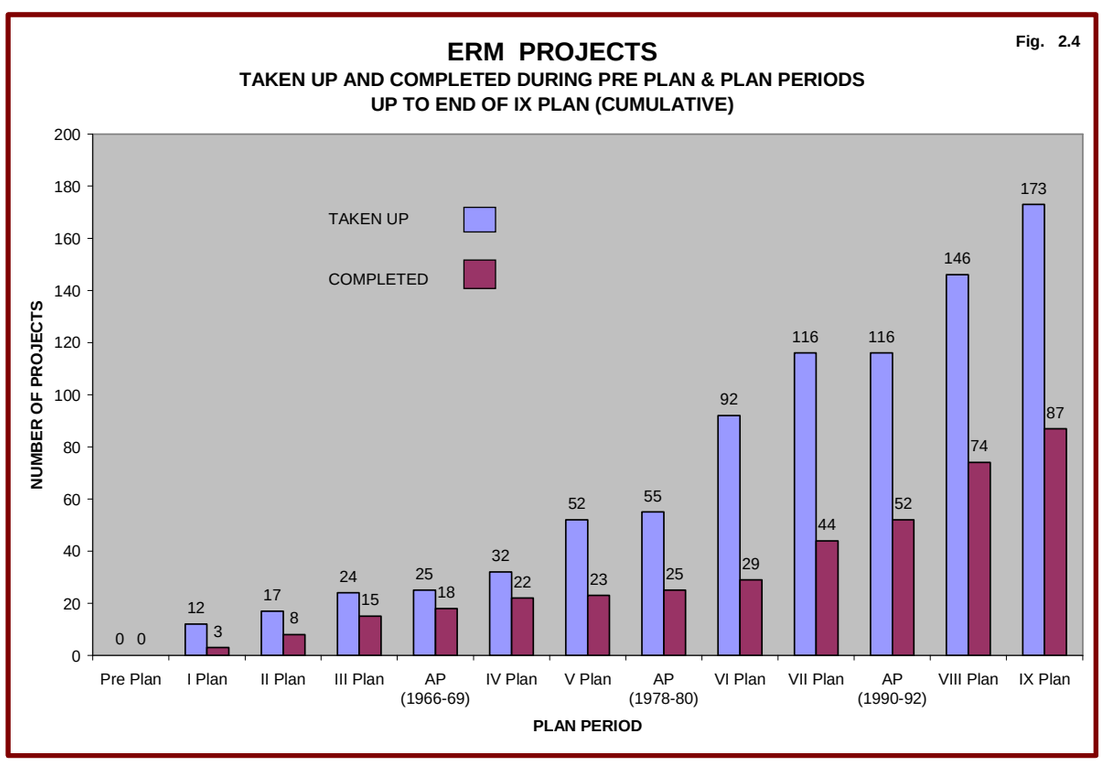

MEDIUM IRRIGATION PROJECTS
TAKEN UP AND COMPLETED DURING PRE PLAN & PLAN PERIODS
UP TO END OF IXTH PLAN (CUMULATIVE)
NUMBER OF PROJECTS
PLAN PERIOD
TAKEN UP
COMPLETED
0
200
400
600
800
1000
1200
1400
Pre Plan
I Plan
II Plan
III Plan
AP (1966-69)
IV Plan
V Plan
AP (1978-80)
VI Plan
VII Plan
AP (1990-92)
VIII Plan
IX Plan
143
143
308
177
410
262
454
323
481
366
555
428
858
498
913
516
1002
654
1038
791
1038
803
1110
851
1152
917

Fig. 2.4


ERM PROJECTS
TAKEN UP AND COMPLETED DURING PRE PLAN & PLAN PERIODS
UP TO END OF IX PLAN (CUMULATIVE)
NUMBER OF PROJECTS
PLAN PERIOD
TAKEN UP
COMPLETED
0
20
40
60
80
100
120
140
160
180
200
Pre Plan
I Plan
II Plan
III Plan
AP (1966-69)
IV Plan
V Plan
AP (1978-80)
VI Plan
VII Plan
AP (1990-92)
VIII Plan
IX Plan
0
0
12
3
17
8
24
15
25
18
32
22
52
23
55
25
92
29
116
44
116
52
146
74
173
87

2.2.3 Irrigation Development under Tribal Sub-Plan districts

155 Irrigation Projects benefiting Tribal Sub-Plan (TSP) districts, which were taken up prior to the formulation of the TSP, have been completed. The ultimate irrigation potential of these projects is 2252.96 th ha. A total of 404 projects under the Tribal Sub-Plan districts have been completed up to end of IX Plan. The total ultimate potential from these projects is 6201.13 th ha. There are 278 on-going irrigation projects under Tribal Sub-Plan districts which have spilled over to the X Plan and the new projects taken up during X Plan. The ultimate irrigation potential of these projects is 12150.62 th ha.

Fig.2.5 shows the Tribal Sub – Plan Areas and Predominantly Tribal Areas. The Status Report for the year 2004 - 05 with regard to financial progress and physical benefits of the major and medium irrigation projects is in the final stages of preparation.

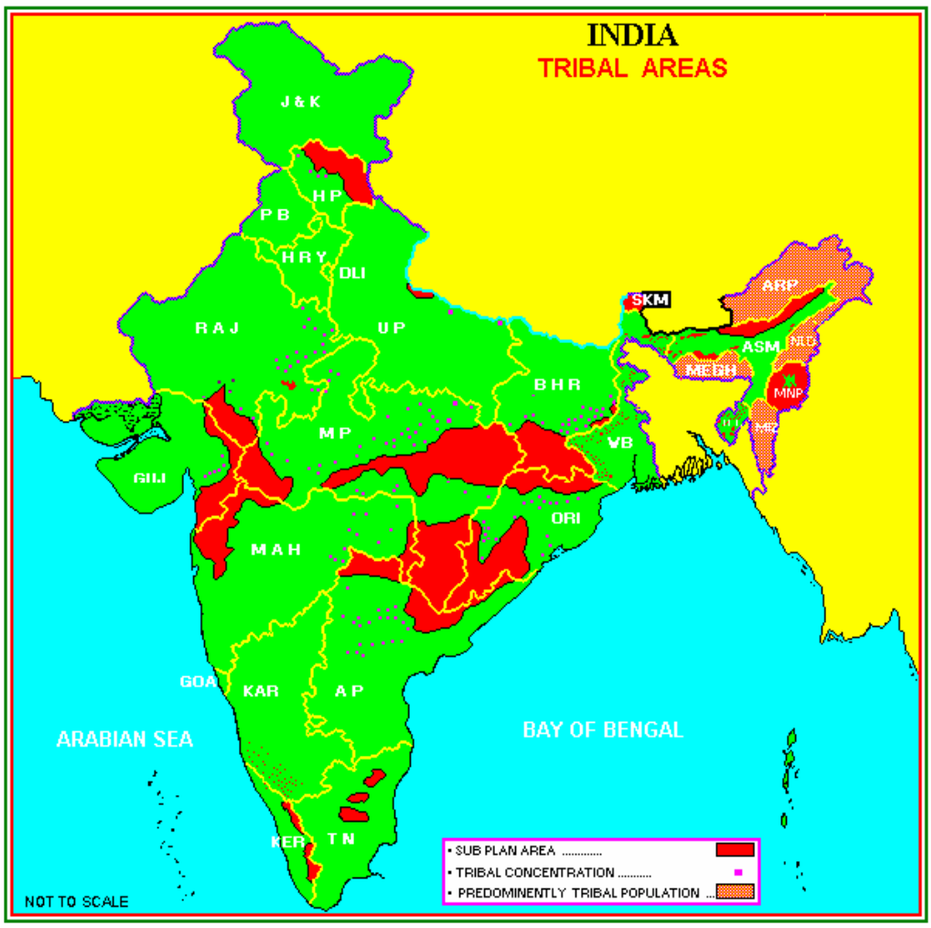


Fig. 2.5: Map of India - showing TSP Areas, Predominantly Tribal Areas and Pockets of Tribal concentration.

CHAPTER-III

RIVER MANAGEMENT

3.1 Systematic Collection and Storage of Hydrological Data

Central Water Commission at present operates National Network of 945 Hydrological Observation Stations. Out of these 945 stations, 246 are Gauge Sites, 282 are Gauge and Discharge Sites, 115 are Gauge Discharge and Water Quality Sites, 41 are Gauge Discharge and Silt Sites, while the remaining 261 are Gauge Discharge Silt and Water Quality Sites. The basin-wise distribution of these sites is detailed below in Table 3.1.

Table 3.1
Basin-wise Details of Hydrological Observation Sites

Sl. No.	Name of Basin	No. of Sites
1	Indus	26
2	Ganga, Brahmaputra, Meghna/Barak	489
3.	Godavari	83
4.	Krishna	73
5.	Cauvery	34
6.	Subarnrekha	8
7.	Brahmani – Baitarni	13
8.	Mahanadi	34
9.	Pennar	8
10.	Mahi	13
11.	Sabarmati	12
12.	Narmada	31
13.	Tapi	6
14.	West Flowing rivers from Tapi to Tadri	45
15.	West Flowing rivers from Tadri to Kanyakumari	21
16.	East Flowing rivers between Mahanadi and Pennar	26
17.	East Flowing rivers between Pennar and Kanyakumari	10
18.	West Flowing rivers of Kuchh and Saurashtra including Luni	13
	Total:	**945**

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) Unit and Information System Organisation (ISO) of CWC.

P&D Unit 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.

The users of the data have been categorized as below:-

(i) Central/State Government offices,
(ii) Public Sector Undertaking and Institutions/Societies working under the direct control of Central/State Governments and IITs,
(iii) Research Institutions/Scholars.

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. The total cost of the Project was Rs. 6020 million and CWC component was Rs.734 million till the project completion date of December 2003. 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 a software (WISDOM) for all surface and ground water participating agencies for data storage and dissemination of hydrological and meteorological data namely gauge and discharge, water quality and climatic under the Hydrology Project. To achieve the same 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 cleared by the CCEA. 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 proposal for Hydrology Project Phase-II consists of two major components - Institutional Strengthening and Vertical Extension. It is proposed to carry out the consolidation of HP-I, increasing awareness for data dissemination and knowledge sharing, logistical support, etc. under the Institutional Strengthening. Under the vertical component following major activities are envisaged :

- Development of Hydrological Design Aids including standardization of methodology/protocols
- Water Resources Planning decision support system.
- The estimated cost of the proposal is Rs. 2489.76 lakh without contingencies and Rs. 2962.98 lakh with contingencies.

3.2 Flood Forecasting & Warning Services

For techno-economic reasons, flood management measures, wherever planned and executed in our country, have been only against the floods of certain magnitudes while the floods of higher magnitudes do occur, creating 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 also 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 (FFU) 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 173 flood forecasting stations, of which 145 are level forecasting and 28 are inflow forecasting stations on major dams/barrages. It covers 9 major river systems in the country, including 71 river sub-basins. They pertain to 15 States viz. Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tripura, Uttaranchal, Uttar Pradesh & West Bengal and one union territory Dadra & Nagar Haveli and the National Capital Territory of Delhi.

On an average, Central Water Commission is issuing about 6000 forecasts every year during the flood season. Normally, these forecasts are issued 12 to 48 hours in advance, depending upon the river terrain, the locations of the flood forecasting sites and base stations. For the purpose of Flood Forecasting, hydrological data is being observed at more than 700 Gauge and Discharge sites and hydro-meteorological data over 500 rain gauge stations which is communicated through a network of about 550 wireless stations. Synoptic weather situations, weather forecast/heavy rainfall warnings etc. are also being collected from Flood Management Offices of IMD.

3.2.1 Flood Forecasting Performance during 2005

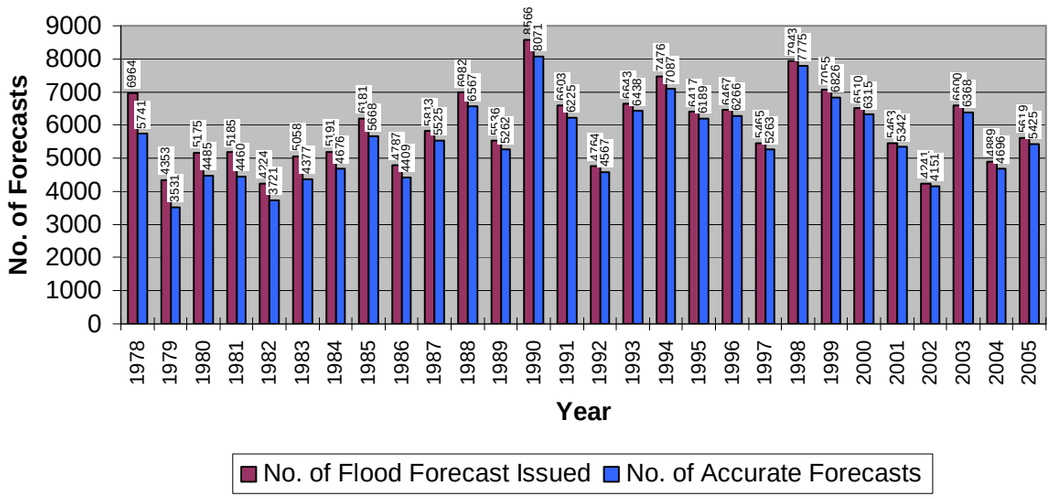
During the flood season of 2005 (May to October), out of 145 level forecasting sites, unprecedented flood situations i.e. peak level was attained at or above previous HFL, were witnessed at 2 flood forecasting stations viz. the Ken (a tributary of Yamuna) at Banda (UP), and the Wainganga (a tributary of Godavari) at Bhandara (Maharashtra).

In 2005, high flood situations i.e. where peak level was attained within 0.5m of previous HFL, were experienced at 8 forecasting stations i.e. the Khowng at Burhi-Dihing (Assam), the Jiabharali at N. T Road Crossing (Assam), the Bagmati at Benibad (Bihar), the Kosi at Basua (Bihar), the Manu at Kailashahar (Tripura), the Ganga at Kannauj (U.P), the Ghaghara at Elgin Bridge (U.P) and the Ghaghara at Ayodhya (U.P).

Due to very high and longer duration rainfall in the Krishna basin unprecedented flood situations were observed in the Krishna at Kurundwad & Arjunwad, the Panchganga at Terwad, the Warna at Samdoli the Bhima at Narsingpur . River Bhima at Deongaon (Karnataka) crossed its previous HFL. It is quite likely that at many other places, the flow (instantaneous measured in cumecs) might have crossed the previous records.

During the flood season 2005, all the 173 flood forecast stations including 28 inflow forecasting stations were operational from flood forecasting point of view. Out of these no forecast was required at 41 (24%) sites including 3 inflow flood forecasting sites. On the whole, 5619 forecasts were issued for the remaining 132 (76%) flood forecasting sites, which included 1295 inflow forecasts. Out of these, 5425 (96.5%) forecasts including 1261 (97.37%) inflow forecasts were found within permissible limits of accuracy. Fig 3.1 shows flood forecasting performance (1978-2005).

Fig 3.1 - Flood Forecasting Performance (1978-2005)



3.2.2 Modernisation of Flood Forecasting Services

Central Water Commission is making a constant endeavour in updating and modernizing the forecasting services. The forecasting of flood involves a number of stages, namely, data observation, collection, transmission, compilation and analysis, formulation of forecasts and their dissemination. To make the flood forecasts more accurate, effective and timely the modernization activities are being taken up on a continuous basis.

During IX Plan, telemetry system was installed in the Chambal and Upper Mahanadi basins for real time data collection and transmission to forecast formulation centres. During X Plan telemetry system is proposed to be installed in Lower Ganga Basin (Damodar River), Krishna Basin, Godavari basin, Pennar basin, Lower Mahanadi Basin, Upper Brahmaputra Basin and Yamuna Basin. The work of supply, installation, testing, commissioning and maintenance of real time data collection equipment on turn key basis have been awarded under the scheme "Establishment and Modernization of Flood Forecasting Network in India including Inflow Forecast". The additional 168 Telemetry Stations in different river basins are as follows:

River Basins	Telemetry Stations
Godavari basin	63 stations
Krishna basin	41 stations
Brahmaputra basin	21 stations
Damodar basin	20 stations
Yamuna basin	15 stations
Mahanadi basin	8 stations

The modeling centers will be at Dibrugarh, New Delhi (UYD), Agra, Hyderabad (LGD), Kurnool, Bhadrachalam, Guwahati and Maithon where the hourly data will be transferred from existing earth stations located at Jaipur (Rajasthan) and Burla (Orissa) through VSAT. The work is expected to be completed by October 2006.

The use of computerized mathematical models for forecast formulation was introduced in CWC in the last two decades. Five such hydrological models viz. SSARR, HECID, NIC, NAM-SYSTEM-11 (MIKE-11) AND CWCFFI were acquired under UNDP and Central Water Commission-DHI Schemes. Recently Window based MIKE-11 modelling software has been procured under World Bank aided DSARP Scheme. Upgradation of DOS based MIKE-11 to latest

window based MIKE-11 Software (12 nos.) and procurement of Arcview & 3D Analyst software has been completed. The upgraded software has been provided to the ten field divisions / circles and two has been kept at CWC (HQ) in FCA and FFM Directorates. Three weeks training by International expert was also imparted to the concerned CWC officers.

3.3 Flood Situation Assessment and Flood Damages

Central Water Commission is maintaining a network of 173 Flood Forecasting stations in the country on various inter-state river basins to monitor the flood situation during the monsoon season. As per the information received from these flood- forecasting stations, floods of varying magnitudes were reported in the States of Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Himachal Pradesh, Jammu & Kashmir, Karnataka, Madhya Pradesh, Maharashtra, NCT of Delhi, Orissa, Tripura, Uttaranchal, Uttar Pradesh and West Bengal. The data on flood damage was also collected and compiled. A statement showing the damages due to floods / heavy rains throughout the country in 2005 is shown at Table 3.2.

3.3.1 Flood Bulletins

Central Water Commission has been issuing daily Flood Bulletins and special Flood Bulletins during the flood season every year based on the information collected from affected State Government as well as its own field formations. During this year's monsoon, 158 level forecast bulletins and 122 inflow forecast bulletins were issued. In addition 13 special Flood Bulletins were also issued.

3.4 Flood Management Works

The Rashtriya Barh Ayog (1980) assessed 40 m ha area ($1/8^{th}$ of total geographical area i.e. 329 m ha) as flood prone, out of which 32 m ha (80%) of flood prone area is protectable. Upto March 2005, an area of about 17.5 m ha has been provided with a reasonable degree of protection. The protection has been offered by means of construction of embankments (34398 km), drainage channels (51318 km), town protection works (2400 Nos.) and raising of villages (4721 Nos.).

3.5 Flood Plain Zoning

The need for enactment of Flood Plain Zoning legislation has been emphasized in various National forums since 1957. A model bill for Flood Plain Zoning was circulated in 1975 for enactment by the State assemblies and for implementation of its regulation measures. The Rashtriya Barh Ayog in their report of 1980 had also strongly recommended enactment of the Flood Plain Zoning legislation by the States on the lines of the Model Flood Plain Zoning Bill circulated to the States in 1975.

Central Water Commission has been continuously impressing upon the States for necessary follow-up action to implement flood plain zoning approach. Manipur and Rajasthan enacted the legislation in 1978 and 1990 respectively whereas it is still under consideration in the States of Andhra Pradesh, Assam, Bihar, Himachal Pradesh, Orissa, Punjab, Tripura and West Bengal. Haryana, Delhi and UP consider that existing laws are sufficient to serve the intended purpose.

Out of the total identified area of 1,06,000 sq km for flood risk mapping, survey & preparation of contour maps of about 55,000 sq km, to the scale 1 :15,000 with contours at an interval of 0.3 m, have been completed in the States of Bihar, Assam, UP, West Bengal, Punjab, Haryana and J&K . These maps have been sent to respective State Governments as well as to the Ganga Flood Control Commission (GFCC) & the Brahmaputra Board for preparation of flood risk zone maps.

Central Water Commission has taken up the digitization of the prepared maps through Survey of India at an estimated cost of Rs. 1.79 crore. An amount of Rs.44.76 lakh was released to Survey of India as the first installment.

A Working Group under the National Natural Resources Management System (NNRMS) Standing Committee on Water Resources (SC-W) for flood risk zoning of major flood prone rivers, considering remote sensing inputs, constituted by MoWR during June 1999, has finalised the broad methodology to be followed in flood risk zoning and formulated guidelines for the same. Two flood plain reaches, one on the main Ganga river and another in the Brahmaputra basin were selected for taking up pilot projects for flood risk through GFCC and Brahmaputra Board.

3.6 River Morphology

Morphological Studies of rivers are very important to study the behaviour of a river, its aggradation/degradation, shifting of the river course, erosion of river bank etc. and to plan remedial measure for erosion and other related problems. Ministry of Water Resources had sanctioned an SFC Memo "Studies of Reservoir Sedimentation and other Remote Sensing Applications" in July 2002, amounting to Rs.1383.80 lakh for implementation during the X Five Year plan period in which Rs. 276 lakh has been provided from Modernization of Morphological studies to be carried out by CWC.

During the X Five Year Plan Morphological studies of all six flood prone rivers viz. Kosi, Gandak, Brahmaputra, Ghaghra, Sutlej and Ganga (Allahabad to Buxar) were to be carried out using Remote Sensing Techniques. The work of Morphological study of the Kosi, the Ghaghra and the Satluj was entrusted to NIH Roorkee. The draft report for the Kosi has been received and comments offered to NIH Roorkee for incorporating in the final report. The draft report of river Satluj has been received and is under review. Draft report of river Ghaghra is in progress. The work of Morphological study of the Gandak was entrusted to CWPRS Pune and is under progress. The requisite proposal for development of Morphological model of the Brahmaputra by IIT Roorkee has been sent to MoWR for its approval. A proposal for the constitution of Standing Committee on Morphological studies of all Himalayan Rivers has also been sent to MoWR. Morphology Directorate is monitoring all the above studies and related physical and financial progress.

3.7 Follow-up Action on Rashtriya Barh Ayog Recommendations

The Rashtriya Barh Ayog submitted its report in 1980, which contained recommendations covering the entire gamut of flood management activities in the country. Guidelines and instructions for the implementation of these recommendations were circulated to Governments of States/UTs in September 1981 for expeditious action.

Status report incorporating a review of the status of implementation of various recommendations of RBA by the States/other Agencies was prepared in February, 1987 and circulated to all the states with a request to expeditiously implement the various recommendations.

The Working Group on flood management for the X Five Year Plan again emphasized the need to implement the 25 important recommendations on a priority basis in its report submitted during 2001. It has also recommended setting up an Integrated Commission for examination of the flood problem and suggesting measures to tackle the same.

Ministry of Water Resources set up an Expert Committee under the Chairmanship of Shri R. Rangachari for review of the implementation of RBA recommendations. The committee has submitted its report. The Committee has observed that in general the recommendations of RBA have not been implemented by the States. The Committee has identified 40 important recommendations for implementation on priority. The recommendations of the Committee have been accepted by the Ministry of Water Resources. MoWR has forwarded the recommendations to

the states as well as Central Government agencies for follow-up. CWC carried out the coordination and further follow-up activities during the year.

3.8.1 Task force on Flood Management / Erosion Control

In view of the unprecedented floods during 2004 in Assam, Bihar and some other parts of the country and as a follow up of the announcements made by the Hon'ble Prime Minister during his visit to Bihar and Assam, the Government has set up a 21 Member Task Force headed by the Chairman, Central Water Commission to look into the problem of recurring floods and erosion in Assam and other neighbouring States as well as Bihar, West Bengal and Eastern Uttar Pradesh. The terms of reference for the Task Force *inter alia* include study of flood/erosion problem, suggesting short term and long term measures for the management of floods and erosion control, examine international dimensions, suggest institutional arrangements for tackling the problem and source of funding for future action plan. The Task Force submitted the report on 31st December, 2004 to MoWR.

As a follow-up of the recommendations of the Task Force, the jurisdiction of Farakka Barrage Project (FBP) has been extended. Revised Memorandums for Expenditure Finance Committee on "Critical flood control & Anti-erosion schemes in Brahmaputra and Barak Valley (Rs.830.14 crore, central share)" as well as "Critical Anti-erosion works in the Ganga Basin States (Rs.889.51 crore, central share)" incorporating the schemes of immediate & short term recommended by the Task Force have also been proposed and are at various stages of approval.

3.9 Water Quality Monitoring

Central Water Commission is monitoring water quality at 376 key locations covering all major river basins of India with a three-tier laboratory system for analysis of different parameters. The level-I Laboratories are located at 258 field water quality monitoring stations on the 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. Besides these 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 also 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 Water Quality Year books which are published yearly 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 through the extraordinary notification in the Gazette of India dated 22nd 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 the Member (RM), has submitted its recommendations to WQAA. WQAA has also constituted a Standing Group-II, headed by the 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 2005-06 and the Terms of Reference (TOR) for appointment of Consultants for abatement of pollutants in selected hotspots in the river reaches were prepared and submitted to WQAA.

3.10 Coastal Erosion

Coastal erosion is a phenomenon experienced all over the world and the Indian coast is not an exception. 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 problems of various magnitudes.

In order to assist the maritime States/UTs in protection of vulnerable coastal areas from sea erosion, there are two schemes namely (i) National Coastal Protection Project (NCPP) for protection of coastal areas of maritime States / UTs from sea erosion and (ii) Centrally Sponsored Scheme (transferred to State sector since April 2005) currently under implementation during the X Plan for providing central assistance to maritime States.

3.10.1 Centrally Sponsored Scheme (CSS)

To tide over the immediate fund constraint faced by the States in completing anti-sea erosion measures on the critical reaches, a Centrally Sponsored Scheme, "Critical anti-erosion works in Coastal and other than Ganga Basin States", estimated to cost Rs. 20.64 crore, is under implementation during the X Plan. The scheme has now been transferred to State sector. Central grant of Rs.8.52 crore has been released to coastal States / UTs till February, 2006 under the Scheme.

3.10.2 National Coastal Protection Project (NCPP)

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 coastal States of Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu, West Bengal and UT of Pondicherry have been found acceptable for inclusion in the National Coastal Protection Project while the compliance of CWC comments is awaited from the coastal States of Andhra Pradesh, Goa and Gujarat. UT of Lakshadweep has been requested to reformulate proposal of Lakshadweep for inclusion in the NCPP in the light of recommendations / discussions held during site visit to Lakshadweep Island by a team of CWC / CWPRS officers in January 2006. The UT of Andaman and Nicobar Islands has not submitted any proposal so far.

3.10.3 Coastal Protection and Development Advisory Committee (CPDAC)

Realising the need of over all planning and cost effective solution to the coastal problems, the Government of India constituted the Beach Erosion Board in the year 1966 under the Chairmanship of Chairman, CWC (erstwhile CW&PC). With the objective of development in the protected coastal zone, the Beach Erosion Board 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 Beach Erosion Board held 24 meetings in all. So far, CPDAC has held 9 meetings. Last meeting of CPDAC was held at Port Blair (A&N Islands) from 23rd - 25th January 2006.

3.11 North East Water Resources Authority

In pursuance of the directions from PMO for a cohesive, self-contained entity in the North East Region (NER) for water resources development, Secretary (WR) took an inter-ministerial meeting on 24.12.04 and constituted an inter-ministerial sub-group under Member (RM), CWC to firm up the proposal. The sub-group submitted its report on 11.2.2005 on the constitution of "North East Water Resources Authority" after consultation with concerned State Governments and

Central Ministries and Departments. The report was circulated to all concerned Ministries and Departments. Secretary (WR) called an Inter-Ministerial meeting on 18.2.2005 and discussed the report in detail and a draft proposal was finalized.

Secretary (WR) called a meeting of Chief Secretaries on 4.3.2005 to discuss the proposal after suitably incorporating the views of concerned Ministries / Organizations. The Meeting was attended by the Chief Secretaries / Representatives from Arunachal Pradesh, Assam, Meghalaya, Mizoram, Nagaland and Tripura. There was no representation from Manipur. All the States except Arunachal Pradesh were in agreement with the proposal of setting up the proposed Authority. The Chief Secretary, Arunachal Pradesh 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 NE Region. Views of the Arunachal Pradesh Government were formally communicated and were replied by Secretary (WR) and the State Government was requested to reconsider their decision. A draft note for Committee of Secretaries was also prepared and submitted to MoWR. Secretary (WR) took a meeting of concerned Secretaries/Officials of NE States (including Arunachal Pradesh) and West Bengal on 07 -05-05 at Shillong to discuss the flood management issues.

In the meantime a presentation was made by Member (RM), CWC to Principal Secretary, PMO on 5.5.2005, wherein Chief Secretary, Arunachal Pradesh was also present and as per the directions a note was prepared for the consideration of Arunachal Pradesh after incorporating their suggestions/rewording the concept note sent earlier to the State governments of NER. Secretary (WR) took two inter-ministerial meetings (08.03.06 & 24.03.06) to discuss matters about 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. As desired in the meeting some more information is being collected from Brahmaputra Board, NHPC and CWC Offices located in the area.

3.12 Study on Almati dam

With a view to have an objective analysis of the unprecedented flood situation experienced in upper reaches of river Krishna in July-August, 2005, a committee was constituted by MoWR. Member(RM), CWC and Chief Engineer(KGBO), CWC, Hyderabad were the members of this committee. The committee visited the problem areas during 15th - 17th August, 2005 under the direction of the Union Minister for Water Resources.

The Committee analysed the possible reasons for the flood experienced during July-August 2005 in the upper reaches of river Krishna. Studies were also carried out in CWC regarding the back water effect of Almati Dam.

The committee submitted its recommendations to MoWR, which were discussed in subsequent meetings taken by the Secretary (WR). However, no consensus could be arrived at between Maharashtra and Karnataka about the implementation of the recommendations.

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.

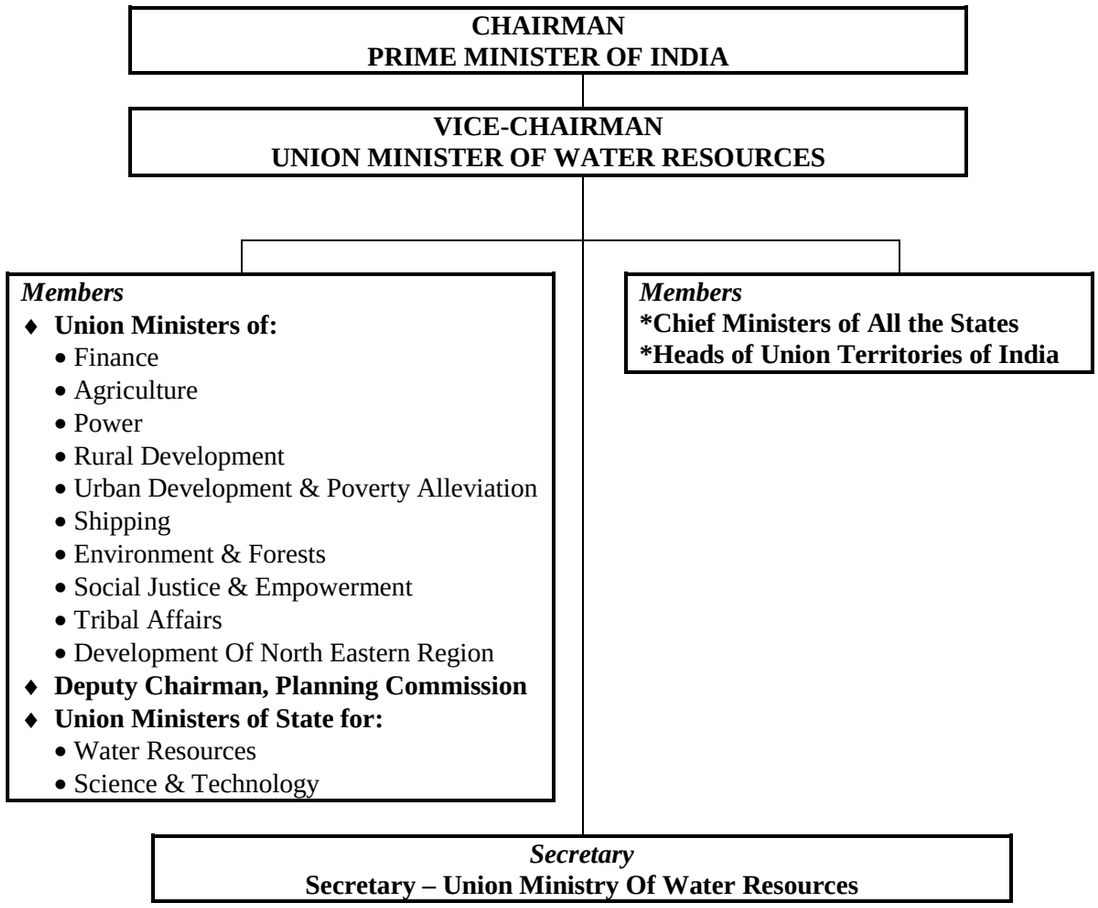


Fig. 4.1 – Composition of National Water Resources Council

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 held eleven regular and two special meetings so far. In the 11th meeting of the Board held on 14th August 2002, the main agenda items for discussion were draft Action Plan for Implementation of National Water Policy – 2002, draft National Policy Guidelines for Sharing/Distributions of Waters of Inter State Rivers amongst States and River Basin Organisations.

National Water Board formed a working group under the Chairmanship of the Chairman, Central Water commission with the Chief Engineer (IMO), CWC as Member Secretary and representatives from eight states namely Punjab, Rajasthan, Andhra Pradesh, Karnataka, Bihar, Chhattisgarh, Madhya Pradesh and Tamil Nadu as its members to examine draft National Policy Guidelines for Sharing/Distributions of Waters of Inter-State Rivers amongst States, taking into consideration views of all states. The Working Group held three meetings on 31st May 2003, 18th December 2003 & 18th July 2004. The draft National Policy Guidelines have been finalized and will be considered in the next meeting of National Water Board.

The agenda notes for the next meeting of the National water Board were prepared and sent to MoWR last year. MoWR decided to have agenda items suggested by different states on relevant issues to be discussed in the next meeting of National Water Board. During the year, responses from the states of Bihar, Goa, Gujarat, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Orissa, Punjab and Tamil Nadu have been received and CWC's views on the responses have been sent to MoWR for its consideration.

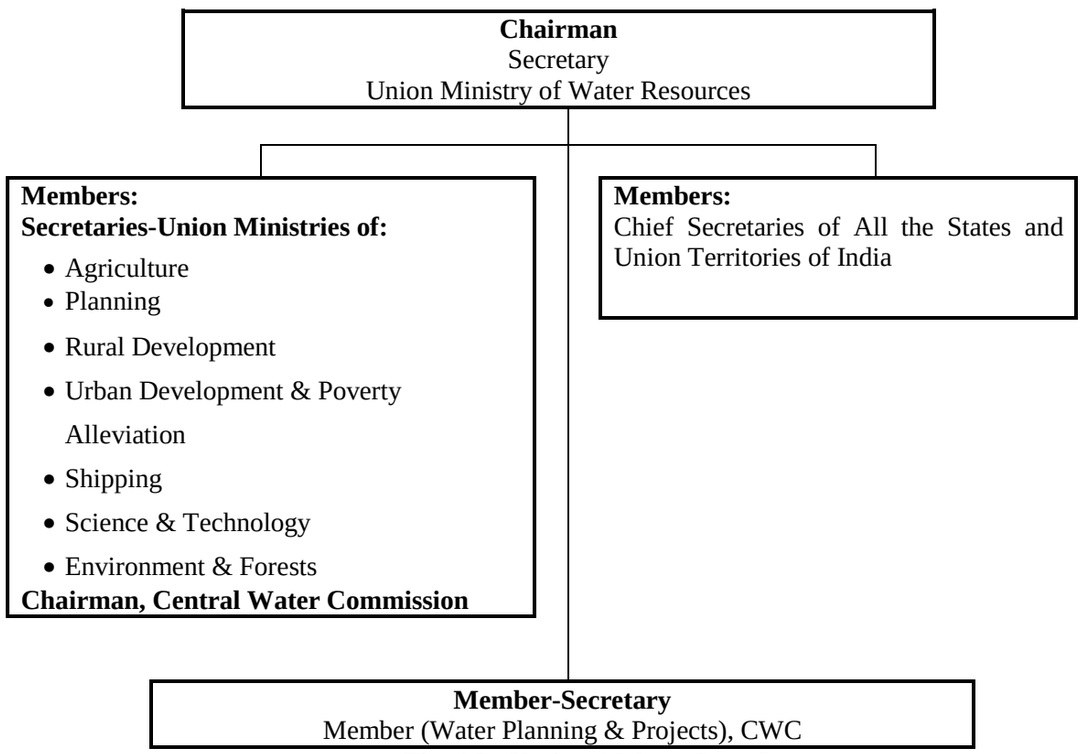


Fig. 4.2 - National Water Board

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, has been submitted and will be considered in the next meeting of 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 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 six meetings. Sixth and last meeting of the Consensus Group was held on 13th May, 2005 to discuss the Godavari (Polavaram)- Krishna (Vijayawada) link.

4.4.2 Expert Committee

MoWR has constituted an Expert committee of environmentalists, social scientists and other experts on interlinking of rivers with a view to make the process of proceeding on interlinking of Rivers (ILR). Secretary, MoWR is the Chairman and Chairman, CWC is one of the members of the committee. The 1st and 2nd meetings of the committee have been held on 18.1.2005 and 28.10.05 respectively. During the last meeting held on October 28, 2005, detailed deliberations were made on modalities for preparation of Ken-Betwa link.

4.4.3 Committee to monitor work for preparation of DPR of Ken-Betwa Link

A Committee to monitor and supervise the overall work for preparation of DPR of Ken-Betwa Link Project was constituted on 16th February, 2006 under the chairmanship of Chairman, CWC and Member (D&R), CE (BPMO), CE Designs (NW&S) and CE (YBO) as members. CE (HQ), NWDA is the Member Secretary. The function of the committee is to monitor and supervise the preparation of DPR, suggest manner of execution of works related to DPR, review of specifications to be adopted in field, and to resolve inter-State dispute arising while preparing DPR.

First meeting of the committee was held on 27th March, 2006 and decision was taken that CWC would carryout the following activities of DPR:

a) Irrigation planning studies
b) Man power and equipment planning
c) Construction planning and scheduling
d) Design studies of Daudhan dam and upper Betwa dam
e) Design studies of barrages and canals
f) Design studies of hydel component of Daudhan dam
g) Morphological studies
h) Cost estimation
i) Hydrological studies of Daudhan dam and upper Betwa dams/barrages
j) Integrated study of Ken and Betwa basin

4.4.4 National Water Convention

NWDA is organising the National Water Convention every two years to provide forum to deliberate, discuss and exchange experiences on important issues involved in the field of water resources development at national level. 11th national water convention was held on 11th May, 2005 in Vigyan Bhavan on the theme "Water for life with the special reference to Interlinking of Rivers in India". Dr. A.P.J. Abdul Kalam, His Excellency, the President of India inaugurated the Convention and addressed the gathering and made a presentation on "Integrated Water Mission". Member(WP&P) was the member of the high level organising committee. Member(D&R) was the chairman of the technical sub-committee and Chief Engineer(BPMO) & Director (NWP) were its other members. CWC also extended support by contributing papers, reviewing of papers, etc.

4.5 Integrated River Basin Planning, Development & Management – A Demonstration Study on Sabarmati River Basin under Hydrology Project.

As per National Water Policy, 2002, "Water is a scarce and precious National Resource to be planned, developed, conserved and managed as such, on an integrated and environmentally sound basis, keeping in view of the socio – economic aspects and needs of the states. Efforts to develop, conserve, utilize 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 core Group for Comprehensive System Studies (CSS) of Damodar Barakar Basin was formed with Director (WSE), CWC as the Group Leader, two members each from CWC, I&W Deptt., Govt. of West Bengal, Water Resources Deptt., Govt. of Jharkhand and Damodar Valley Corporation (DVC) with SE (HOC), CWC, Maithon & Member Secretary (DVRRC) as the Group Co-ordinator. The study is completed and draft has been circulated to its core group members.

- Training Course on " Integrated River Basin Planning, Development & Management " was organized from 12-15, July-2005 to disseminate / propagate the knowledge about IRBDM. Thirty Three (33) participants from different states and Central Govt. Organisations participated in the training programme.

4.6 PODIUM Model

PODIUM, a policy dialogue model, has been developed by International Water Management Institute, Colombo, Sri Lanka and Central Water Commission, India. The present model predicts based on "what if Analysis" about the food grain requirement, water requirement, water balance situation and availability or deficit of surface water and ground water in the year 2025 based on 1995 data. The model can be suitably rectified if the prediction is to be made for another year with another base year data. As most of the input data is available for the year 1995 and some predictions are available for the year 2025, the model has been framed accordingly. For

making the prediction for 2025 certain assumptions like population growth, per capita cereal intake, irrigated areas, rain fed areas, etc. have been made. 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 (CPSP) launched by International Commission on Irrigation and Draining (ICID). During the year, the report of the study was finalised and is under printing.

4.7 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 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:

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

The committee held four meetings and has come out with a set of recommendations. The first and second meeting of the committee was held on 3rd March, 2004 and 20th September, 2004 respectively at New Delhi. During the year, the third and fourth meeting of the committee was held on 13th April, 2005 and 28th September, 2005 respectively at New Delhi. The report of the committee has been submitted to MoWR in December, 2005.

4.8 Domestic Water Requirement and its Availability in Urban Areas

On the request of the Ministry of Urban Development, a Steering Committee under the chairmanship of Secretary (Water Resources) was constituted by the MoWR in 2001 for estimation of the domestic water requirements of the population in all the urban areas with population exceeding one million as well as identification of the water resources, which could be tapped to meet the demand of these areas. Chairman, CWC is the Co-Chairman of the Steering Committee and Chairman, CGWB, Member (RM), CWC, Joint Secretary (UD), MoUD, Advisor (CPHEEO), MoUD, Director (NIH), Director (HUDCO) and Commissioner (PP), MoWR are the Members and Chief Engineer (BPMO), CWC is the Member-Secretary of the Committee. The Regional Committees under the Chairmanship of Regional/Field Chief Engineers of CWC consisting of State Governments, Chief Engineer (PHED) of State governments as members and Director of the Regional Office of CWC as Member-Secretary were also constituted to assist the Steering Committee in preparation of the status report. 35 Urban Agglomerations (UA's)/ Cities having population of more than one million as per the Census 2001 were identified for preparation of the status report.

The Status Report was prepared after receiving/reviewing 35 reports from the concerned Regional Committees and sent to the Ministry of Water Resources.

4.9 Reservoir Operation Manual

4.9.1 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 69 years of simulation and detailed discussion with Tehri authorities, a draft manual for the operation of Tehri reservoir has been prepared and sent to concerned authorities for comments.

4.9.2 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 to Director (Reservoir Operation) under Basin Planning and Management Organisation, 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. The outline for Reservoir Regulation of Bansagar Dam has been prepared and sent to the State for their comments, if any.

CHAPTER–V

DESIGN & CONSULTANCY

5.1 General

Design and Research wing of CWC plays a pivotal role in 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.

Major activities of D&R wing comprises of:

1. Appraisal of multipurpose river valley projects in design aspects.
2. Planning and Design of hydraulic structures of water resources projects.
3. Hydrological studies.
4. Review and planning of safety aspects of dams and monitoring their behaviour.
5. Coordination of research, development and training.

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 have been established to cater to specific requirements and to 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)

Each unit has specialised Directorates such as Hydel Civil Design (HCD), Concrete & Masonry Dam Design (CMDD), Embankment Design (Emb.), Gates Design (GD) and Barrage and Canal Design (BCD), etc.

5.2.1 Project Appraisal

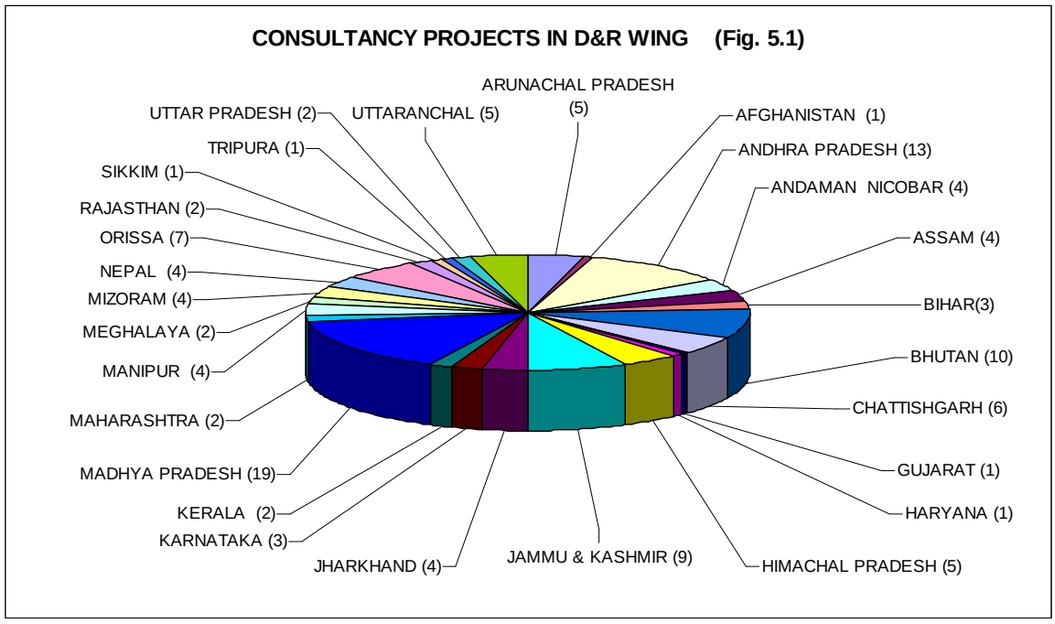
Design aspects of Detailed Project Reports of 116 projects submitted by various State Governments and other agencies were technically examined in D&R Wing during the year 2005-06. This includes one project from Afghanistan, 4 projects from Nepal & 10 projects from Bhutan.

5.2.2 Detailed Design and Preparation of Drawings

Design units carried out designs in respect of 124 projects during the year 2005-2006 as follows:

S No.	Category	No. of Projects
1.	Projects at construction stage.	74
2.	Projects at investigation and planning stage (for which detailed project reports are being prepared)	49
3.	Projects with special problems	1

The break up of all the 124 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.

The proposed project envisages a 293 m high rock fill dam, just 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 investigation 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 HE Project (Bhutan)

The project envisages construction of a 91m high and 130 m long concrete gravity diversion dam across river Wangchu near Honka 3 km down stream of the existing Chukha HE Project to divert 142.5 cumec of water into 22.40 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 has been appointed as design consultants for specification/construction stage works. The necessary design and drawings for all the civil components are being issued in time to the project authorities as per site requirements. The project is likely to be commissioned in July, 2006. Major problems encountered in this project are the huge cavities in rock at pressure shafts and squeezing rock over a small stretch of HRT (Head Race Tunnel). CWC provided solutions for tackling these problems.

iii) Tehri Dam Project (UP)

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 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 has started and the project is set for generation mode by June/July, 2006.

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 HE Project (Uttaranchal)

Koteshwar HE project is an integrated part of Tehri Power Complex comprising of Tehri Dam & Hydro Power Plant (1000 MW), Tehri Pumped Storage Plant (1000 MW) and Koteshwar Hydro Electric Project (400 MW) to develop Hydro-electric potential of river Bhagirathi. The project envisages construction of gravity dam across Bhagirathi River and a surface power house with an installed capacity of 4x100 MW. The powerhouse will be located on the right bank of the river near village Pindaras of Tehri District. The reservoir created by Koteshwar dam shall also act as a lower reservoir for a 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 an installed capacity of 2400 MW.

D&R wing is providing consultancy services for the entire powerhouse design including intake and tail race etc. During the winter of 2005, large scale slides took place in the right abutment, for which special stabilizing measures by way of geo-grids was suggested.

v) Sardar Sarovar Project (Gujarat)

Sardar Sarovar project envisages construction of 1210 m long, 163 m high (above deepest foundation level) concrete gravity dam across the river Narmada, two power houses with total installed capacity of 1450 MW and 458 km long Main Canal which envisages irrigation for 17.92 lakh ha and drinking water to 8215 villages and 135 urban centers in Gujarat. Consultancy for complete planning, design and construction drawings for 6x200 MW River Bed Power House (RBPH) and 5x50 MW Canal Head Power Houses (CHPH) of the project is being provided. The spillway has been raised upto EL 110.64 m (MDDL) by virtue of which four units of 50 MW each of CHPH have been commissioned. CWC is also associated with monitoring of progress of construction of RBPH as per Revised Implementation Schedule (RIS 2000), through identifying bottlenecks and suggesting remedial measures and design related issues involved with the raising of the dam height in various phases. In addition, there is active involvement of CWC in works related to Sardar Sarovar Construction Advisory Committee, Project Review Panel and Narmada Control Authority.

vi) Loharinag Pala and Tapovan Vishnugad HE Project (Uttranchal)

A Memorandum of Understanding (MoU) for complete design engineering including pre-award engineering & assistance during construction for technical and site related issues for the 600 MW Loharinag Pala and 520 MW Tapovan Vishnugad HE Projects had been signed between NTPC and CWC during the year 2004. CWC has issued complete tender stage drawings of both the projects during the year 2005-06 and further work will continue after tenders are called by NTPC.

vii) Sapta Kosi High 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. 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 Govt. of 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. Hydrological Studies for the project have been undertaken and are under progress. DPR stage design engineering for this project will be provided by CWC after completion of investigations.

5.2.3 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 8 projects at construction stage for which design consultancy is being provided by D&R wing. 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:

A. Arunachal Pradesh	
1. Lohit Dam Project 2. Jiadhal Multipurpose Project 3. HE Projects on Nuranang Chu River 4. HE Projects on Tawang Chu River 5. Nyukcharong Chu HE Project	
B. Assam	
6. Karbi Langpi HE Project 7. Pagladia Irrigation Project 8. Bharbhag Drainage Development Scheme- Sluice Regulator 9. Kulsi HE Project	- Construction Stage - Construction Stage - Construction Stage

C. Manipur	
10. Khuga Multipurpose Project	- Construction Stage
11. Thoubal Multipurpose Project	- Construction Stage
12. Dholaithabi Barrage Project	- Construction Stage
13. Irang HE Project	
D. Meghalaya	
14. Myntdu HE Project	- Construction Stage
15. Jadukata Dam Project	
E. Mizoram	
16. Kolodyne HE Project Stage – II	
17. Tuirini HE Project	
18. Tuivawl HE Project	
19. Tuichang HE Project	
F. Sikkim	
20. Rangit HE Project Stage	
G. Tripura	
21. Kalasi Barrage	- Construction Stage

5.3 Hydrological Studies

CWC has carried out hydrological studies in respect of most of the projects in the country. 100 projects were dealt by CWC during 2005-06 from hydrological point of view, wherein 18 projects were dealt for consultancy work and 82 projects were dealt for Technical Examination/Study of Hydrology.

5.3.1 Development of 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. Such models are available for 23 Sub zones out of 26 Sub zones into which the country has been divided. These models are updated from time to time with the availability of additional data.

The revised Flood estimation reports of Lower Narmada and Tapi Sub zone 3 (b) have been finalized.

5.3.2 Preparation of PMP Atlas

The preparations of PMP Atlases for Ganga, Brahmaputra & Barak, Indus and Krishna Basins were taken up through consultants. The PMP atlases of Krishna and Indus Basins are under preparation with the assistance of IITM, Pune. 80% work of PMP Atlases has been completed during the year 2005-06 and the balance work is to be completed in the year 2006-07. Monitoring work for this assignment rests with the Hydrological Studies Organisation of D&R wing.

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 (Credit 2241-IN), it was proposed to extend the dam safety activities to other States owning significant number of large dams. On the basis of details received from the 13 participating States namely, Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamil Nadu, Uttar Pradesh, Uttaranchal and West Bengal, a scheme "Dam Safety Assurance, Rehabilitation & Disaster Management Project" (DSARDMP) now renamed as "Dam Rehabilitation & Improvement Project" (DRIP) was prepared at an estimated cost of Rs. 900 Crore and submitted to MoWR for taking up with the World Bank. The proposal has been cleared by the Planning Commission and DEA and presently the project is under appraisal by the World Bank.

In addition to above proposal, following three Plan Schemes have been approved by the Ministry of Water Resources and are in operation under Dam Safety Organization:

- Up gradation of facilities & skills in CWC regarding Dam Safety & Rehabilitation in India
- Setting up of specialized units in HE Designs, Pumped Storage and Instrumentation
- Up gradation & Modernization of Computerization/Information System

The CWC would expand its existing capabilities in dam safety monitoring, including training programmes, hydrological analysis and modernization.

5.4.2 Dam Safety Act

The draft Dam Safety Act was circulated to various State Governments and the matter is being pursued with the States to bring in the legislation at the earliest. A number of State Authorities have informed that the act is under active 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. This 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 provide guidance to Dam owning States/agencies. Chairman, CWC is the Chairman of this Committee.

The 27th meeting of NCDS was held on 27.09.2005 at New Delhi, under the Chairmanship of Chairman, CWC and NCDS. The meeting was attended by the representatives from 14 States besides 5 other organizations. Major dam safety issues were discussed and deliberated during the meeting. "Guidelines for the preparation of Emergency Action Plan" (EAP) were finalized and circulated amongst all the states for preparation of EAP in respect of Dams of National Importance to begin with.

5.4.4 National Committee on Seismic Design Parameters

The Standing Committee to suggest Design Seismic Coefficient of Hydraulic Structures in River Valley Projects renamed as National Committee on Seismic Design Parameters (NCSDP)

was reconstituted in Oct., 1991. Member (D&R), CWC is the Chairman of this Committee. The meetings of this Committee are convened normally once in a year to finalise the seismic design parameters for various river valley projects referred to the NCSDP. The next meeting of NCSDP is scheduled to be held after the monsoon of 2006.

5.4.5 Technical examination of seismic and foundation aspects of river valley projects

14 river valley projects in various states namely Himachal Pradesh, Uttaranchal, Sikkim, Jammu & Kashmir, Uttar Pradesh, Chhattisgarh and Arunachal Pradesh were techno-economically appraised with respect to foundation engineering and seismicity aspects.

5.4.6 Consultancy Services on Instrumentation in Hydraulic Structures

During the year, consultancy services on instrumentation for hydraulic structures in the shape of construction drawings, specification drawings, framing of technical specifications, vetting of instrumentation system and technical examination of DPR, etc. were offered for 7 projects.

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 the consultancy basis using one dimensional mathematical model MIKE 11 developed by Danish Hydraulic Institute (DHI), Denmark. During the year, the dam break study for Lakya Tailing Dam of Kudermukh Iron Ore Company Ltd. (KIOCL), Karnataka, the backwater studies of Almatti Dam, Karnataka, sedimentation profile studies for the reservoir of Baglihar HE Project, Jammu & Kashmir, water profile Studies for Tail Race Tunnel of Tala HE Project, Bhutan have been completed.

- The Govt. of Pakistan has raised certain points of difference with India regarding Baglihar HE Project (Jammu & Kashmir) and the matter stands referred to a Neutral Expert for determination on points of difference. CWC has prepared material to defend the stand of India and submitted the same to the Neutral Expert to counter objections raised by Pakistan against the project under the Indus Water Treaty. A number of reports and documentation have been compiled on all the issues raised by Pakistan on the design of Baglihar HE Project and furnished to the Ministry of Water Resources for onward transmission to the Neutral Expert.

5.6 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 subjects with a huge collection of more than one lakh books and over 2.6 lakh technical journals on account of subscription to most of the reputed international and national journals.

The Library has subscribed to 67 National and International Journals related to Civil Engg., Environment and Water Resources. During the year, 157 technical books were purchased for the Library in the field of Water Resources. In addition 58 of books in Hindi were purchased. About 3000 Officers of CWC, MoWR, State Govt. and students from various educational institutions visited the Library during the year 2005-06.

In order to continuously improve the facilities available to the users, a new multi storied building to house the library has been constructed 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 almost been completed except some works of auditorium.

CWC Library is in the process of being computerized by M/s C-DAC, as part of Plan Scheme “Upgradation and Modernisation of Computerisation/Information System”, which will provide intranet/internet based on-line facilities such as search of subject/title/keyword/author, issue station, return schedule and other reference services. The facility will be integrated with the CWC portal “Sangam”.

Annexure – 5.1

List of Active Consultancy Projects in D&R Wing during 2005-06

Sl. No.	State/ name of project
	Andhra Pradesh
1	SRBC Owk Reservoir Complex
2	Nagarjuna Sagar Tail Pond & Power Station Project
3	Singareni Coal field Protection Works
4	NSRS(Srisailam) Project
5	Dummugudem HE Project
6	Polavaram Project
7	Upper Vamsadhara Irrigation Project
8	Godavari Lift Irrigation Scheme
9	Sripada Sagar Project
10	Tadipudi Lift Irrigation Scheme
11	Pushkar Lift Irrigation Scheme
12	Ali Sagar Lift Irrigation Scheme
13	Arugula Rajaram Guthpa Lift Irrigation Scheme
	Arunachal Pradesh
14	Lohit Dam Project
15	Nyukcharong Chu HE Project
16	HE Projects on Nuranang Chu River
17	HE Projects on Tawang Chu River
18	Jiadhal Multipurpose Project
	Andaman & Nicobar Island
19	Indira Nalla Water Supply Scheme
20	Chouldhary Nalla Project
21	Kamsrat Water Supply Scheme
22	Scheme for raising the height of Dhanikhari Dam for augmentation of water supply to Port Blair
	Assam
23	Pagladia M.P. Project
24	Karbi Langpi HE Project
25	Barbhag Drainage Dev. Scheme-Sluice Regulator
26	Kulsi HE Project
	Bihar
27	Durgavati Reservoir Project
28	Western Kosi Main Canal
29	Sone Western-Eastern Link Canal
	Chhattisgarh
30	Mongra Irrigation Project
31	Sukha Nalla Barrage
32	Karra Nalla Barrage
33	Ghumaria Nalla Barrage
34	Sutiapat Medium Irrigation Project
35	Kelo Project
	Gujarat
36	Sardar Sarovar Project
	Haryana
37	Western Yamuna Canal Project Stage - II
	Himachal Pradesh
38	Shahnahar Irrigation Project
39	Nathpa Jhakri HE Project
40	Seli HE Project
41	Raoli HE Project
42	Rampur HE Project
	Jammu & Kashmir
43	Parnai Hydel Project
44	Tulbal Navigation Lock Project
45	Baglihar HE Project
46	Kishan Ganga Project
47	Igo Mercellong HE Project
48	Ujh Level Crossing
49	Upper Sindh HE Project
50	Chenani HE Project
51	Kirthai HE Project- Stage - II
	Jharkhand
52	Amanat Barrage
53	Gumani Barrage
54	Garhi Reservoir Project
55	Punasi Reservoir
	Karnataka
56	Donimalai Tailing Dam
57	Kudremukh Iron Ore Project
58	Tungbhadra mini Hydel Proj.
	Kerala
59	Water Supply dam for Naval Academy
60	Athirapilly HE Project
	Madhya Pradesh
61	Ban Sagar Project

62 Jobat Project
63 Mahi Main Dam
64 Mahi Subsidiary Dam
65 Man Project
66 Sindh (Phase –II) Project
67 Kutni Feeder Reservoir Dam
68 Sagar Water Supply Scheme
69 Kushalpura M.P. Project
70 Gulab Sagar Mahan Project
71 Malanjkhand Tailing Dam
72 Upper Beda Project
73 Ken Betwa Link Project
74 Pench Diversion Project
75 Lower Goi Project
76 Upper Narmada Project
77 Indira Sagar Project
78 Samoha Pick-up Wier
79 Halon Irrigation Project

Maharashtra

80 Purna Barrage
81 Koyna Stage – IV HE Project

Manipur

82 Khuga M. P. Project
83 Thoubal M.P. Project
84 Dholaithabi Barrage Project
85 Irang HE Project

Meghalaya

86 Myntdu HE Project
87 Jadukata M.P. Project

Mizoram

88 KolodyneHE Project(Stage - II)
89 Tuirini HE Project
90 Tuivawl HE Project
91 Tuichang HE Project

Orissa

92 Dhauragoth Irrigation Project
93 Ong Dam Project
94 Brutang Irrigation Project
95 Ib Irrigation Project
96 Naraj Barrage Project
97 Control Structures across Jouranalla & Indravati Rivers
98 Upper Indravati Project

Rajasthan

99 Mansi Wakal Project
100 Water Supply Project for Bharatpur & Dholpur Distt.

Sikkim

101 Rangit HE Project(Stage – IV)

Tripura

102 Kalasi Barrage Project

Uttaranchal

103 Tehri Dam Project
104 Koteshwar Hydro Power Plant
105 Tehri pumped Storage Plant
106 Tapovan Vishnugad HEProject
107 Loharinag Pala HE Project

Uttar Pradesh

108 Rihand dam project

Foreign Projects

Afghanistan

109 Salma Dam Project

Bhutan

110 Tala HE Project
111 Chenary Mini Hydel Scheme
112 Gyesta Mini Hydel Project
113 Khalanzi Mini Hydel Scheme
114 Khaling Mini Hydel Scheme
115 Lhuntshi Mini Hydel Scheme
116 Thimpu Mini Hydel Scheme
117 Wangdi Mini Hydel Scheme
118 Chukha HE project
119 Punatsangchu HE Project

Nepal

120 Kamla Dam Project
121 Sapta Kosi High Dam M.P. Project
122 Sun Kosi Storage-cum-Diversion Scheme
123 Pancheswar Multi purpose Project

Projects with special problems

Uttar Pradesh

124 Matatila Dam

CHAPTER-VI

WATER MANAGEMENT, RESERVOIR SEDIMENTATION AND POST PROJECT EVALUATION

6.1 Monitoring of Reservoir Storage

During the water year 2005-06, 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	
		2004-05	2005-06
Number of Reservoirs monitored		71	76
Total designed live storage at FRL		131.28	133.021
As on June, 1 *(Start of water year)*	Storage	16.727	17.003
	Storage as percentage at FRL	13	13
	Storage as percentage of 10 years average storage	78	91
As on Sept, 30 (*End of Monsoon Period*)	Storage	85.12	109.773
	Storage as percentage at FRL	65	83
	Storage as percentage of 10 years average storage	90	120
As on December 31 *(End of Year)*	Storage	62.503	88.129
	Storage as percentage at FRL	48	66
	Storage as percentage of 10 years average storage	84	124

During 2004-05, 54 more projects have been identified (each having storage capacity of 0.250 BCM or more) for inclusion in the monitoring system and five of them were included in the monitoring system during 2005-06. Inclusion of remaining 49 reservoirs 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 in the country" initiated during VIII Plan and continued through IX Plan. At the end of IX Plan, 19 reservoirs were covered under the scheme at a total cost of Rs 4.26 crore and 15 more reservoirs are planned to be covered during X Plan at an estimated cost of Rs. 3.29 crore. Capacity survey of 22 reservoirs have been completed so far. During 2005-06, it was proposed to carry out capacity surveys for 10 new reservoirs. However, the proposal was postponed, but subsequently approval for 4 reservoirs was obtained from the competent authority. The bilateral agreements between consultants and CWC have been signed during Feb., 2006.

6.3.2 Status Report on Watershed Management and Water Harvesting

The field functionaries and the concerned State Departments published a report on Watershed Management and Water Harvesting during 2004-05 for information and record of statistics. Work on second Status Report on Watershed Management and Water Harvesting is in progress.

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 taken up as a continuing scheme of IX Plan during X Five Year Plan at an estimated cost of Rs. 1383.80 lakh. The progress for the year 2005-06 is as follows:

- **Satellite Remote Sensing based Reservoir Sedimentation Assessment Studies** : Out of the study of 10 reservoirs awarded to NRSA, Hyderabad, draft report of three reservoirs have been submitted by the consultant and study of one reservoir is under process. Similarly, out of 10 reservoirs study awarded to MERI, Nashik, draft reports of 6 reservoirs have been received. Reports of three reservoirs (In House) were finalized. Draft reports of three reservoirs were under preparation. Analysis of three reservoirs was under progress.

- **Satellite Monitoring of Projects under AIBP :** Draft Reports for the work "Assessment of Irrigation Potential created through mapping of Irrigation Infrastructure using high resolution satellite data in Upper Krishna and Teesta Projects" have been submitted by National Remote Sensing Agency (NRSA), Hyderabad.

- A training programme on "Image Processing and GIS Fundamentals including applications for Water Resources Development" was organised during Aug.-Sep.-2005 at NWA, Pune.

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

In order to update the data of the Working Group Report, 1991, of Ministry of Water Resources, on 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 CWC in collaboration with "Regional Remote Sensing Service Centre" (RRSSC), Jodhpur.

The preparation of State wise status report on water logging and salt affected soil are being completed within the frame work of X Five Year Plan. In first phase of the study, six reports in respect of Rajasthan, Karnataka, Goa, Bihar, Jharkhand and Haryana have been prepared. The reports have been accepted by TAC and the reports have been circulated to all the concerned State Governments for taking remedial measures for reclaiming waterlogged and/or saline/alkaline areas of various irrigation commands.

In the second phase, study for the State of Chhattisgarh, Madhya Pradesh, Punjab, Gujarat and Maharashtra is under progress and final reports are expected by June, 2006.

6.6 System Performance Overview of Completed Irrigation Projects

CWC is also carrying out Performance Evaluation of completed irrigation projects departmentally. During 2005-06, the report on "Performance Evaluation Study of Jojwa Wadhwan Irrigation Project, Gujarat has been finalised and sent for printing and will soon be circulated to the concerned Project Authorities for follow-up action and giving feed back.

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 co-ordinate the activities regarding Benchmarking process and assist the State ion Benchmarking of Irrigation systems, a Core Group for Level Workshop on "Benchmarking of Irrigation Systems in India" was organised at Gandhinagar (26-27 May, 2005). Three project level workshops were organised at Imphal, Manipur (27-28 June, 2005), Kota, Rajasthan (8-9 December, 2005) & Trichy, Tamil Nadu (2-3 March, 2006). One National/ Regional/ State Level and three project level workshops will be conducted during 2006-07.

6.8 Study of Water Use Efficiencies

Irrigation Sector is the biggest consumer of fresh water (about 83%) and any improvement in irrigation water use efficiency will be like creating a new source of water supply which can be gainfully utilised to various competing demands of water. Water use efficiencies are generally low and it is felt that there is a need to improve the same. It is, therefore proposed to construct a data bank relating to water use efficiency in all major and medium projects in a period of five years.

The objective of the study is to cover:

- Reservoir Filling Efficiencies (Inflow and release pattern)
- Delivery System/ Conveyance Efficiency.
- On farm Application Efficiency
- Drainage Efficiency
- Irrigation Potential created and utilised.

It is proposed to carry out aforesaid studies of some selected irrigation projects initially and to gradually cover all the major & medium projects in the country through consultants mainly through Water and Land Management Institutes/ Irrigation Management & Training Institutes/ NERIWALAM, etc. and other private consultants. So far, 43 major and medium irrigation Projects across the country have been taken up for previously mentioned studies.

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 viz Ministry of Water Resources, Central Water Commission, Central Board of Irrigation and Power and Irrigation Departments of States.

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 are targeted to be accomplished, through consultants, during the X five-year plan. The studies 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) were awarded to the consultants during the financial year 2003-04. Inception reports of these four studies have been received during December 2004.

During 2005-06, the study of five more projects, viz. Itiadoh Irrigation Project (Maharashtra), Kodaiyar Irrigation Project (Tamil Nadu), Loktak Irrigation Project (Manipur), Nanak Sagar Irrigation Scheme (U.P.) and Chandan Reservoir Project (Bihar) were awarded to consultants. These studies are under progress. Performance evaluation study of one more project i.e. Ukai – Kakrapar (Gujarat), is planned.

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, Water Resources (WR) 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.

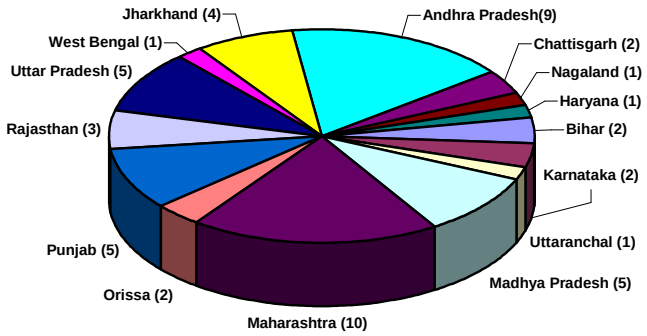
7.2 Appraisal of Major Irrigation Projects

Major irrigation projects with culturable command area (CCA) of more than 10,000 hectares 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 2005-06, 53 new major and 23 revised major irrigation projects were under appraisal in the Project Appraisal Organisation. In principle, consent of CWC for DPR preparation was communicated in respect of 11 major irrigation project proposals. Fig. 7.1 shows state-wise distribution of new major irrigation projects.

State Wise Distribution of New Major Irrigation Projects under Appraisal
(As on 31.03.2006)

Fig. 7.1



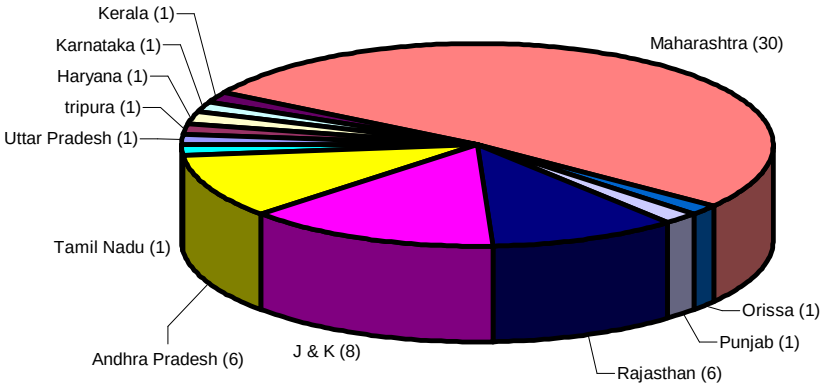
Total Projects - 53

7.3 Appraisal of Medium Irrigation Projects (in Inter-State River Basins)

For medium irrigation projects (CCA 2,000 to 10,000 hectare), 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 2005-06, 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.

State Wise Distribution of New Medium Projects Under Appraisal
(As On 31.03.2006)

Fig. 7.2



Total Projects - 58

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, the Ministry of Water Resources reconstituted the Advisory Committee for Irrigation, Multipurpose and Flood Control Projects with the Secretary (WR) 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 2005-06, the Advisory Committee met on 12.05.2005 & 22.02.2006 under the chairmanship of Secretary (WR) and considered 27 projects, out of which, 14 projects (6 major & 8 medium) were deferred and 13 projects were accepted comprising 6 major, 5 medium and 2 flood Control projects. The details of the projects are as under.

Sl No	**Name of the State**	**Name of the Project**	**Estimated Cost (Rs. crore)**	**Annual Irrgn. (ha)**
1	Assam	Dhansiri (Revised -Major)	401.24	83366
2	Assam	Champavathi (Revised – Major)	147.24	24994
3	Andhra Pradesh	Sri Ram Sagar Project Stage-II (Major)	1043.14	193871
4	J&K	Modernization of Mav Khul Canal (Medium)	12.82	9352
5	J&K	Modernization of Nandi Canal (Medium)	6.46	3060
6	J&K	Modernization of Marthandi Canal (Medium)	27.71	6498
7	Madhya Pradesh	Punasa Lift Irrigation (Major)	185.03	36758
8	Madhya Pradesh	Pench Diversion Project Major)	583.40	96519
9	Maharashtra	Punad Irrigation Project (Major)	175.78	10846
10	Maharashtra	Gul River Project (Medium)	65.73	3025
11	Maharashtra	Haranghat Lift Irrigation Project (Medium)	49.20	4819
12	Himachal Pradesh	Swan River Flood Management & Integrated Land Development Project Ph-II (Flood Control – New)	235.52	-
13	Punjab	Canalising of Sakki-Kiran Nallah (Flood Control)	118.05	-
		Total	**3051.32**	**473108**

Out of these 13 accepted projects by the Advisory Committee, 11 are irrigation projects which will provide additional annual irrigation benefit of 4.73 lakh ha in the states of Assam, Andhra Pradesh, Jammu & Kashmir, Maharashtra, Madhya Pradesh and Punjab. Two flood control schemes in the state of Himachal Pradesh and Punjab will provide protection to an area of 33328 hectares thereby saving on flood damage of Rs.30.6 crore annually.

7.6 Appraisal of Power Projects

Techno-economic appraisal of 33 hydroelectric power projects were taken up and 3 projects having total installed capacity of 913 MW were cleared by CEA.

7.7 Expediting Environmental and R&R Plan Clearance

Chairman, CWC convened region-wise review meetings to discuss pending issues related to environment, forest and R&R of the projects cleared by the Advisory Committee of MoWR, which were awaiting investment clearance of the Planning Commission, with the concerned State Irrigation Secretaries along with State Forest Secretaries and Principal Chief Conservator of Forests (PCCFs) of State Governments and Regional Chief Conservator of Forests (CCFs) of Ministry of Environment and Forests. During the year, 2005-06 one review meeting was held on 21-7-05 to discuss the pending clearances for Subarnarekha Multipurpose Project of Jharkhand.

7.8 Appraisal and Clearance of Flood Management Projects

Flood Management Organisation of the CWC examines the Flood Management Project proposals pertaining to basins other than the Ganga basin, which are received from the respective State Govts., concerning and Multi purpose Projects having flood control aspects to establish their techno-economic feasibility before submission to the Advisory Committee of MoWR for acceptance and investment clearance of the Planning Commission. Such proposals pertaining to Ganga basin are examined in Ganga Flood Control Commission (GFCC).

As per the revised guidelines issued by the Planning Commission in Sep, 2003, schemes costing upto Rs. 7.5 crore can be sanctioned by the State Govt. after they are duly approved by the State Flood Control Board (FCB) on the advice of State Technical Advisory Committee. Schemes having inter-state implications should be cleared by CWC (for schemes in basins other than Ganga basin)/ GFCC (for schemes in Ganga basin) and schemes with international implications should be got cleared from MoWR before approval by the State Flood Control Board. Schemes costing more than 7.5 crore and not exceeding 15 crore, which are on inter-state rivers and tributaries after processing through State TAC & FCB, will be examined in CWC/GFCC, as the case may be, for techno-economic clearance. On the recommendations of CWC/GFCC, the approval of these schemes for inclusion in Plan will be processed by the Planning Commission. For schemes with international implications, State Govts. are required to obtain specific clearance from MoWR before recommending the same to CWC/GFCC for detailed examination and Techno-economic clearance. For all schemes costing more than 15 crore, the same procedure as applicable to schemes costing between 7.5 crore to 15 crore has to be followed. The schemes will be put up to the Advisory Committee of MoWR for acceptance and subsequent investment approval of the Planning Commission.

In the year 2005-06, 83 flood management schemes/master plan were examined/appraised till March-2006.

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 System 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 Field Offices (RO). During 2005-06, a total of 125 irrigation projects were monitored by CWC. The list of monitored Projects is reviewed on yearly basis.

Out of 125 major, medium and ERM projects taken up for monitoring by CWC during 2005-2006 (Table- 8.1), 14 projects (9 major & 5 ERM) were monitored from HQ and the remaining 111 projects (71 major, 37 medium and 3 ERM) were monitored by the regional offices of CWC.

Besides above, during 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 CWC field units requiring more than one visit in a year. The task of vigorous monitoring was assigned to the specific field officers of CWC to ensure their completion as stipulated. Out of these 30 projects, 8 projects were completed by the end of 2004-05 (Table 8.2) and remaining 22 projects are included in the list of 125 projects which were taken up for monitoring during 2005-06.

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 (2005-06)

		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	6	7	-	4	4	1	-	1
2	Assam	-	3	3	-	1	1	-	-	-
3	Bihar	-	6	6	-	2	2	-	1	1
4	Chhattisgarh	-	3	3	-	1	1	-	-	-
5	Goa	1	-	1	-	-	-	-	-	-
6	Gujarat	-	-	-	-	4	4	1	-	1
7	Haryana	-	1	1	-	-	-	-	-	-
8	Himachal Pradesh	1	-	1	-	-	-	-	-	-
9	Jammu & Kashmir	-	-	-	-	-	-	-	-	-
10	Jharkhand	1	2	3	-	4	4	-	-	-
11	Karnataka	-	5	5	-	6	6	-	1	1
12	Kerala	-	3	3	-	1	1	-	-	-
13	Madhya Pradesh	1	9	10	-	1	1	-	-	-
14	Maharashtra	1	18	19	-	3	3	-	-	-
15	Manipur	-	2	2	-	-	-	-	-	-
16	Meghalaya	-	-	-	-	1	1	-	-	-
17	Orissa	1	5	6	-	1	1	1	-	1
18	Punjab	-	1	1	-	-	-	-	1	1
19	Rajasthan	1	3	4	-	2	2	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**	**71**	**80**	**-**	**37**	**37**	**5**	**3**	**8**
	Grand Total	**80 (Major) + 37 (Medium) + 8 (ERM) = 125**								

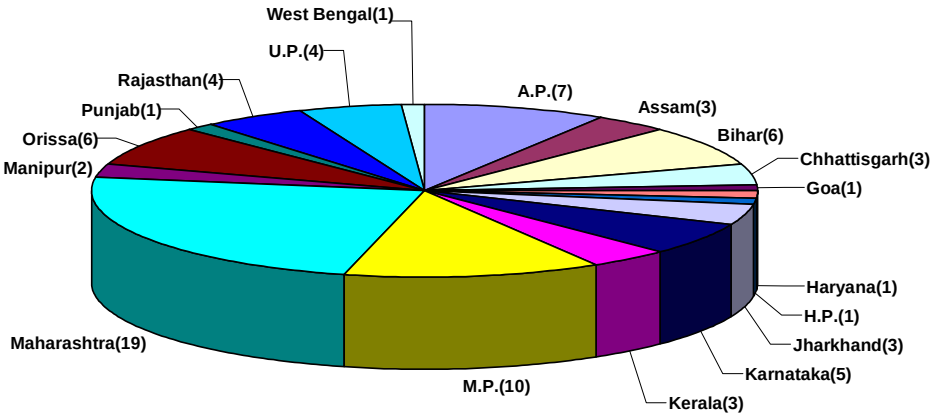
TABLE 8.2 - List of Major Pre-Fifth/ Fifth Plan Projects Under Vigorous Monitoring Completed upto March, 2006

Sl. No.	State	Project	Plan	Completed during
1.	Assam	Bordikarai	V	2003-04
2.	Haryana	Gurgaon Canal	III	2003-04
3.	Madhya Pradesh	Upper Wainganga	V	2003-04
4.	Karnataka	Tungabhadra HLC	II	2003-04
5.	Haryana	Rewari Lift	III	2004-05
6.	Maharashtra	Jayakwadi St. I &II	V	2004-05
7.	Uttar Pradesh	Madhya Ganga Canal	V	2004 -05

Fig.8.1

MAJOR PROJECTS MONITORED BY CWC

(FIELD UNITS & HEAD QUARTER)



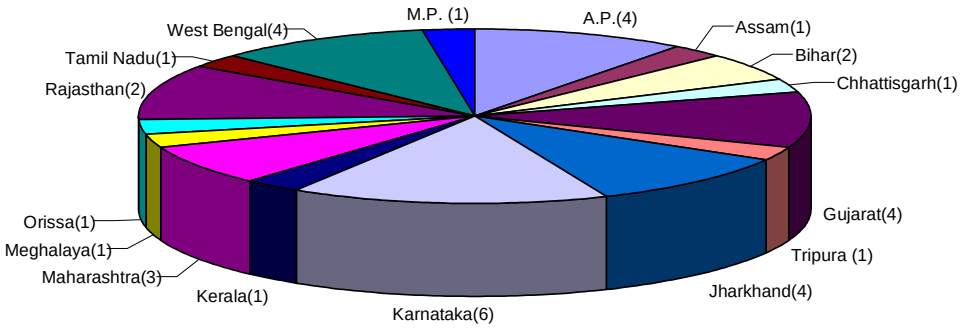
Total Projects - 80

Monitored From HQ - 9 Monitored by Field Units- 71

Fig.8.2

MEDIUM PROJECTS MONITORED BY C.W.C.

(FIELD UNITS)



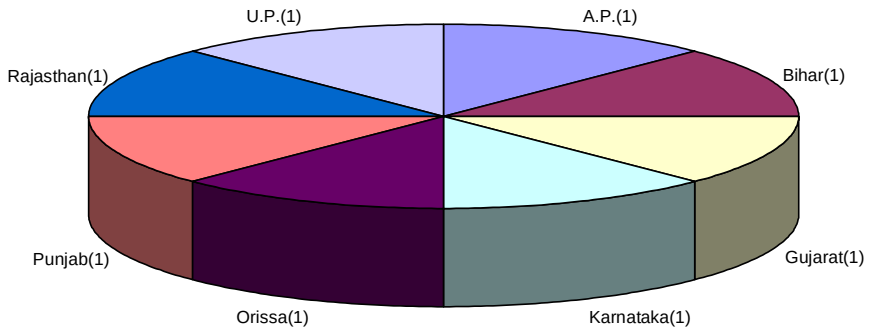
Total Projects - 37

ERM Projects Monitored by CWC

Fig 8.3

TOTAL PROJECTS - 8

Monitored From HQ - 5 Monitored by Field Units- 3



8.2 Assessment of Utilization of Irrigation Potential

In order to assess the utilization of irrigation potential, Satellite monitoring of two projects viz. Teesta Barrage (WB) and Upper Krishna Project (Karnataka) through remote sensing techniques has already been entrusted to NRSA, Hyderabad on pilot basis which will cover the aspects of irrigation potential creation & utilization under AIBP. The draft NRSA report has been received which is being examined. Further view to extend the satellite monitoring to more number of AIBP projects will be taken thereafter.

The aspect of potential creation is already being covered during CWC monitoring. Regarding the aspect of determination of potential utilization, guidelines have been issued to all the CWC field CEs to cover the same during monitoring as well.

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 in the country. While these projects are executed by the States, monitoring of all externally aided irrigation projects schemes 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 2005-06.

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 one 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, Uttaranchal 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 2005-06 and the States are authorised to raise loan component by market borrowing.

Central assistance under AIBP has been provided to 24 States under the programme till March, 2006. A total of 179 projects under normal AIBP and 42 projects under fast track AIBP received the benefit of this programme. Considering 20 common projects between normal AIBP and fast track AIBP, the net number of beneficiary projects is 201 upto March , 2006. Out of 201 projects, 50 projects have been completed upto March, 2006 as a result of AIBP. Statewise list of projects completed till March-2006 are given in Table 8.3.

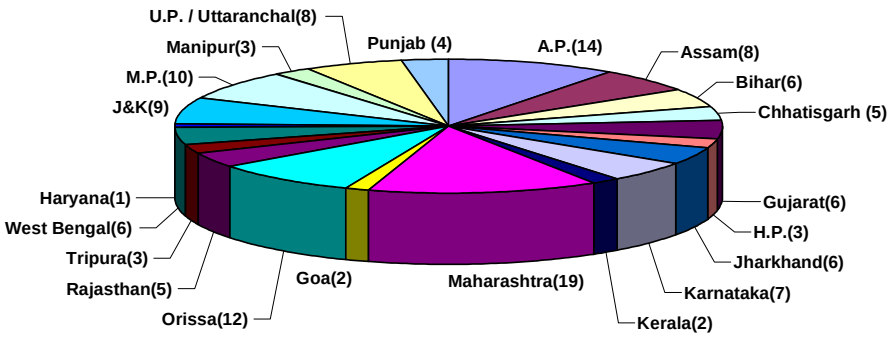
The Accelerated Irrigation Benefits Programme is being implemented by MoWR. CWC has been assigned the responsibility to comprehensively monitor the projects receiving CLA. Presently, there are 140 ongoing projects under AIBP (both Normal & Fast Track) which are getting CLA and are being monitored by CWC. State-wise number of projects under AIBP is indicated in Fig-8.4 The projects under AIBP are monitored twice a year by CWC officers and thereafter the status reports are prepared and issued to all concerned.

Fig.8.4

MAJOR, MEDIUM & ERM PROJECTS UNDER AIBP

(Normal & Fast Track)

As on 31.03.2006



Total Projects - 140

Major - 65 Medium - 59 ERM - 16

Table 8.3 - Statewise Major & Medium projects completed under AIBP

Sl. No.	State	Project	Sl. No.	State	Project
1	Andhra Pradesh	Cheyyeru (Annamaya)	26	Maharashtra	Kasari
2	Assam	Bordikarai	27		Kasarsai
3		Rupahi	28		Khadakwasla
4	Bihar	Bilasi	29		Upper Tapi
5	Chhattisgarh	Shivnath Div.	30	Orissa	Upper Kolab
6	Gujarat	Damanganga	31		Potteru
7		Deo	32		Sason Canal
8		Harnav-II	33		Salki Irrigation
9		Jhuj	34	Punjab	Ranjit Sagar
10		Karjan	35	Rajasthan	Gambhiri Mod.
11		Sipu	36		Jaisamand Mod.
12		Sukhi	37		Chhapi
13		Umaria	38		Panchana
14		Watrak	39	UP	Gunta Nala
15	Haryana	Gurgaon Canal	40		Gyanpur Pump Canal
16	Jharkhand	Latratu	41		Madhya Ganga and Upper Ganga Canal Modernisation
17		Tapkara Res.	42		Rajghat Dam
18	Karnataka	Maskinallah	43		Sarda Sahayak
19	Kerala	Kallada	44		Providing Kharif Channel in H.K.Doab
20	MP	Banjar	45	W.B.	Kangsabati

21		Urmil	46		
22		Upper Wainganga	47		
23	Maharashtra	Jawalgaon	48		
24		Jayakwadi stage-II	49		
25		Kadvi	50		

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	2574.577	198.555	2773.132
2005-06	1491.694	219.332	1711.026
Total	**17060.864**	**1770.982**	**18831.846**

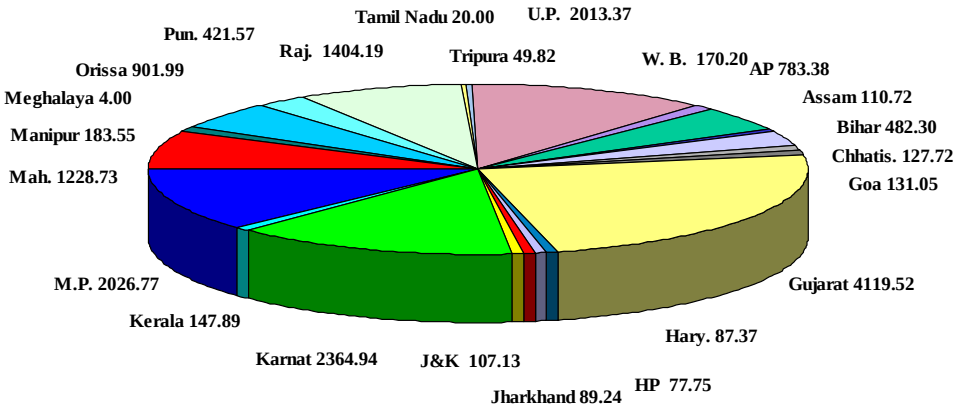
For the year 2005-06, a provision of Rs. 4500 crore (comprising of about Rs. 2820 crore as loan and about Rs. 1680 crore as grant) was kept in the budget estimate. Against this, a grant of Rs. 1711.026 crore (Rs 1491.694 crore for Normal & Rs. 219.332 crore for fast track) has been released to 107 major / medium irrigation projects under AIBP. During 2005-06 till 31.3.2006, additional 17 projects have been included under AIBP making a cumulative total of 201 projects and the Central Loan Assistance provided is Rs. 18831.846 crore (Rs. 17060.864 crore under normal AIBP & Rs. 1770.982 crore under fast track AIBP) since the inception of the programme as shown in Table 8.4. The details of statewise cumulative CLA/Grant released under normal and fast track AIBP upto March, 2006 are given in Figure-8.5 & 8.6 respectively.

As reported by the states, additional irrigation potential created in the country under AIBP from 1996-97 to 2004-05 is of the order of 3.12 million ha. As a result of AIBP, the achievement of potential creation during IX Plan period i.e. 1997 to 2002 has been higher as compared to average potential creation in the previous plans. The potential created during IX Plan is of the order of 4.09 million ha from major & medium projects against the average potential creation per plan of 2.68 million ha. Contribution in potential creation during IX Plan from AIBP is 1.65 million ha, which is 40% of the total potential created during IX Plan.

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 total investment in AIBP up to March, 2005 including the State share on major / medium irrigation projects was Rs. 24954.356 crore (CLA released Rs. 15569.17 crore under Normal and Rs. 1551.65 crore under fast track and corresponding State share Rs. 7833.536 crore). Against this, the potential created in the corresponding period is 3.12 million ha. Accordingly, the cost per ha. of potential creation comes to around Rs. 77500/- which is a reasonable cost of development.

Fig. 8.5

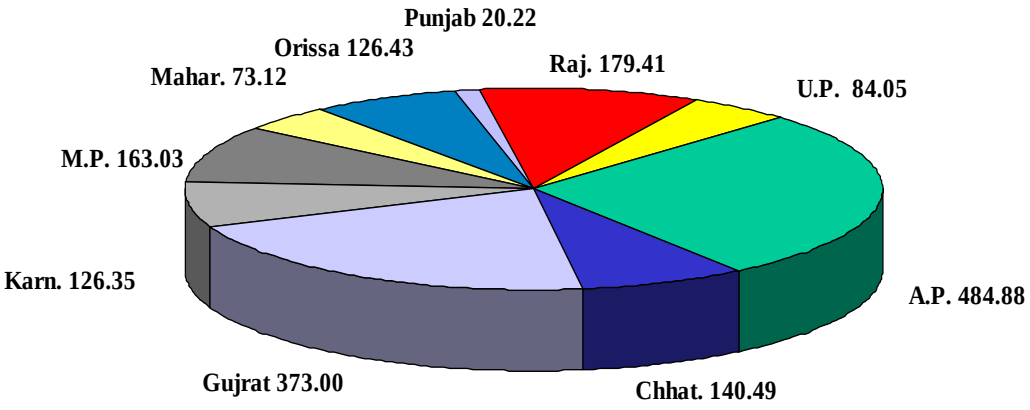
STATEWISE CUMULATIVE CLA RELEASED UNDER NORMAL AIBP
(Upto March 2006)



Total CLA Released Rs. 17060.864 crore

Fig. 8.6

STATWISE CUMULATIVE CLA RELEASED UNDER FAST TRACK AIBP
(Upto March 2006)



TOTAL CLA Released 1770.982 crore

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&WM Programme in respect of 133 projects were carried out. During the year 2005-06 the field units of CWC have monitored almost all projects allotted to CWC and 90 half yearly status reports were prepared.

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 AP (2), Karnataka (2), Jharkhand (2), Chhattisgarh (1), Orissa (2), Rajasthan (2), West Bengal (2), Tamil Nadu (2), MP (2), HP(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 2005-06 on the basis of approved projects for the states. Proposal received from the State Govt. were examined in CWC field organisations and consolidated proposal of the participating States was sent to MoWR by the Planning & Development Organisation of CWC 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 tresatment to a limited extent will also form part of this scheme.

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, 32 project reports of irrigation, power and multipurpose projects of various states were technically examined from plant planning angle. Out of this, 24 project reports were recommended for acceptance with provision worth Rs. 7075.51 lakh in respect of earthmoving and construction equipment. In respect of the remaining 8 project reports, the observations/comments were conveyed to the project authorities for compliance and further review.

9.2 Consultancy

- Consultancy assistance is being provided to NTPC for execution of two Hydro electric projects in the State of Uttaranchal, viz, Loharinagpala HEP (4x150 MW) and Tapovan-Vishnugad HEP (4X130MW). The construction methods, equipment planning and construction schedule for the following contract packages in respect of two projects were finalized and a write-up on the same furnished:

  - Barrage & desilting chambers complex of Loharinagpala Project'
  - Power House complex of Loharinagpala Project
  - Barrage & desilting Basin complex of Tapovan-Vishnugad project

- The list of minimum equipment required for construction of HRT of Loharinagpala Project was reviewed in the light of observations of bidders and finalized the major equipment which is to be compulsorily deployed by the contractor.

- Construction schedule for undertaking permanent remedial measures (PRM) at downstream of Chukha Dam, Bhutan prepared as part of consultancy assignment by Bhutan Investigation Division, CWC was examined and observations conveyed.

- Consultancy assistance rendered to Irrigation & Flood Control Department, Govt. of NCT, 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 unit with a view to identify reasons for low performance/utilisation of equipment. Eight quarterly returns in respect of two projects of the State of Punjab were received during the year 2005-06 and the same were analysed.

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

The Irrigation Department of Uttar Pradesh and Uttaranchal 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 Uttaranchal have constituted eleven and two Disposal Committees respectively in which an officer of Central Mechanical Organisation is a member. During the year 2005-06, fifteen meetings of the Committees were held in which reserve prices for 2330 items of unserviceable equipment/machinery valued at Rs. 2.90 crore were fixed. Representative from CWC participated in these meetings. Assistance is also being rendered in fixation of reserve price of equipment, vehicle and other miscellaneous items of the field formation and head quarters of CWC for disposal.

9.5. Manpower Planning

A report "Expenditure and Employment Statistics in Major and Medium Irrigation Projects (under construction)" which is 9th in the series on manpower planning studies of major and medium irrigation projects has been published and distributed to various concerned offices of Central and State Governments. The draft 10th report in the series on manpower planning has been prepared. CWC is providing necessary inputs from time to time to Institute of Applied Manpower Research (IAMR) under Ministry of Planning and Programme Implementation for various studies on manpower planning.

CHAPTER-X

INTER-STATE MATTERS

10.1 Interstate River Water Disputes

Central Water Commission continues to provide technical assistance to Ministry of Water Resources to amicably settle interstate water disputes among the states through negotiation. During the year, assistance was rendered in respect of the following:

10.1.1 Cauvery Water DisputesTribunal

The Tribunal set up for resolving the Cauvery water disputes in 1990, continued the adjudication proceedings during the year. However, for implementation of the interim orders of the Cauvery Water Disputes Tribunal (CWDT), Cauvery River Authority and a Monitoring Committee under it were constituted in August 1998. The Cauvery River Authority is headed by the Prime Minister and Chief Ministers of the basin states are its members. Secretary, MoWR is the Member-Secretary. The Cauvery Monitoring Committee (CMC) is headed by the Secretary, MoWR with Chief Secretaries of the basin states along with one Chief Engineer from each basin State and Chairman, CWC as its members. Chief Engineer (IMO), CWC is the Member-Secretary of the Monitoring Committee.

The Cauvery River Authority (CRA) has, so far, held six meetings, the last being on 10.2.2003. The Cauvery Monitoring Committee has so far held 22 meetings. The 22nd meeting was held on 23.06.2005.

In the 22nd meeting of the Cauvery Monitoring Committee, storage position in the reservoirs in the Cauvery Basin, along with other issues relating to implementation of interim award of CWDT were deliberated. The format for exchanging data between the basin states suggested by Expert Group and reviewed by Chairman, CWC was accepted for adoption in this meeting. It was also agreed to place the distress sharing formula along with further views of the states before the Cauvery River Authority for its consideration in its next meeting.

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 Inter-State Water Disputes 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 River 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 in its sitting held on 13th April, 2005 has issued notice to the basin States under Rule 4 of the Inter State Water Disputes (ISWD) Rules 1959 for nominating their representative on or before May 19, 2005 to present their cases in the proceedings before the Tribunal. During the next meeting of the Krishna Water Disputes Tribunal (KWDT) held on 19th and 20th May, 2005 in New Delhi, all the parties requested for time to file their objections/reply to the complaint filed by each other, which was granted by the Tribunal. Besides, on behalf of the State of Karnataka, one application was moved for interim orders. The States of Andhra Pradesh and Maharashtra have sought time to file reply to the application for interim relief moved by the State of Karnataka.

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 Catchment area lies in Maharashtra also. The Government of Karnataka in the past prepared proposal for diversion of Mandovi water outside the basin. Ministry of Water Resources 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 principal' 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 in the meeting 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. The meeting scheduled for 15.2.2005 by Secretary (WR) was postponed. Subsequent meetings convened by Hon'ble Minister (WR) on 9.8.2005 and 19.11.2005 and Secretary on 5.9.2005 to discuss the matter were also postponed. Secretary (WR) took a meeting of Chief Secretaries of basin states on 16.1.2006 to discuss Mondovi River Disputes. No decision could be taken due to differing views of party states.

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 Inter-State River Water Disputes (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. In April, 2006, Secretary (WR) convened an inter-State meeting with the Secretaries of Irrigation of the Governments of Andhra Pradesh and Orissa regarding Vamsadhara river water disputes. It was also decided that CWC would reassess the yield of Vamsadhara using data upto 2005 and the two States would hold further discussions to arrive at a negotiated settlement.

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 is 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. Some of the geo-technical data is yet to be received from the Project Authorities.

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 70 meetings.. The 70th meeting was held on 22.7.2005. The committee terminated the contract of M/s NPCC for work of spillway bridge and piers and decided financial, administrative, technical issues and advised the project authority to complete the balance work of Dam Project by November, 2005.

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 fr, held 77 meetings. The 77th meeting of Executive Committee was held on 22.7.2005. The Committee decided the 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. Ministry of Water Resources 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 16 meetings. In the 16th meeting held on 29th September, 2005, the releases made by Rihand Reservoir in the year 2004-05 were reviewed and the operation plan for the year 2005-06 was finalized, taking into consideration the hydropower generation plan of Uttar Pradesh and the irrigation requirement of Bihar.

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.

The Committee held its 17th meeting on 12.5.2005 under the chairmanship of Member (RM). In the meeting, it was agreed that the project for construction of embankments and widening of river Ghaggar for a length of 20 km from Khanauri to village Karail, District Sangrur in Punjab, could be taken up by the Govt. of Punjab.

A Sub-Committee to the Ghaggar Standing Committee was constituted by MoWR on 21.12.2005 to monitor the water quality of river Ghaggar and to suggest the remedial measures to control the pollutants. The first meeting of Sub-committee was held on 21.2.2006 and it was decided to collect the data of pollutants entering into the river Ghaggar from concerned States.

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. The Committee held its 70th meeting on 11.11.2005 under the chairmanship of Member (RM), CWC.

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 in1978 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 2005-06.

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 26th meeting of the Committee held on 19-23 December, 2005 under the chairmanship of Chief Engineer (FMO) was prepared and sent to all the Members of the Committee and Ministry of Water Resources.

10.7 Comprehensive System Studies of Damodar – Barakar Basin

A Core Group for Comprehensive System Studies (CSS) of Damodar Barakar basin was formed with Director (WSE), CWC as the Group-Leader with two members each from CWC, I&W Deptt, Govt. of West Bengal, Water Resources Deptt, Govt of Jharkhand and DVC and SE (HOC), CWC, Maithon & Member Secretary (DVRRC) as the Group-Coordinator.

The group has held three meetings till date. The third meeting of the Group was held in July, 2005. The study has been completed and draft report of study has been circulated to the core group members for their views/comments in Feb. 2006.

10.8 Sub-Group for preparation of prospective plan for Indus, Chenab and Jhelum basins

A committee has been constituted under the chairmanship of Additional Secretary (WR) on the request of Govt. of Jammu & Kashmir to work out an action plan for utilising the potential of the western rivers as permissible under the Indus Waters Treaty. In its first meeting held on 18th January 2006 the committee constituted a Sub-Group with Chief Engineer (BPMO), CWC as group leader to make prospective plan for the Indus, Chenab and Jhelum basins. Subsequently, three meetings of the Sub-group have been held so far. The draft report on Jhelum basin was prepared and circulated to the State Government for comments/views etc. the comments/views have been received from the State Government and the same are being incorporated in the draft report for finalisation of the report on Jhelum basin. The draft report of Indus (main) and Chenab river basin have also been prepared and sent to the Ministry for its circulation.

10.9 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 111th meeting on 27-5-2005 and 112th on 2-12-2005 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.

CHAPTER XI

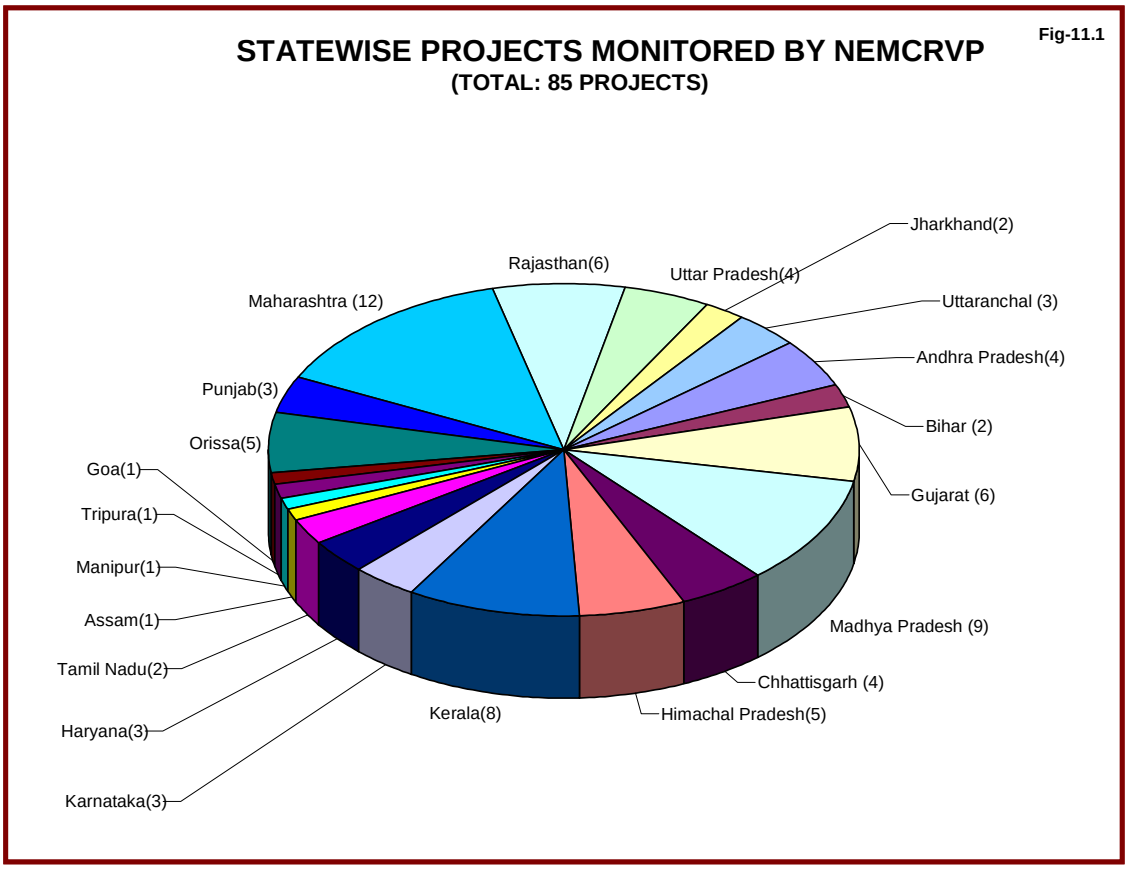
ENVIRONMENTAL MANAGEMENT OF WATER RESOURCES PROJECTS

11.1 Environmental Management

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

National Environmental Monitoring Committee for River Valley Project (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

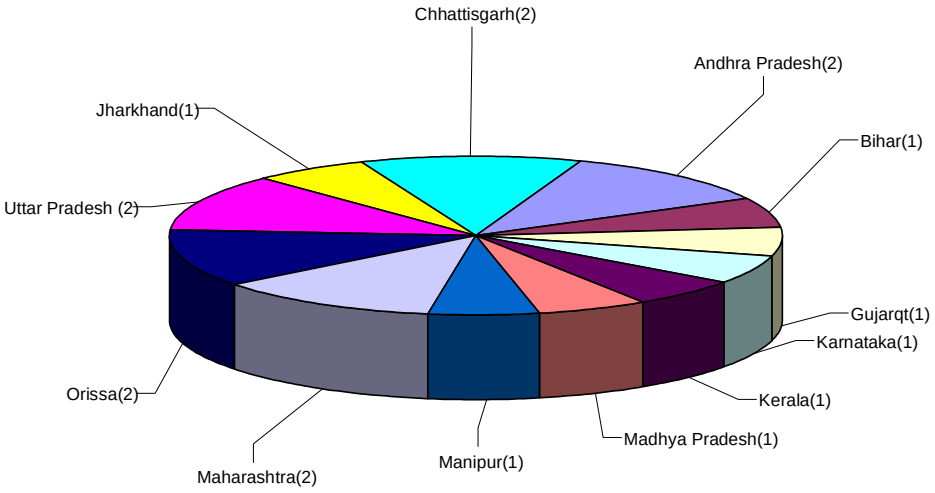


11.1.2 Constitution of NEMCRVP

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.

Fig 11.2

STATEWSIE PROJECTS UNDER CLOSE MONITORING BY NEMCRVP (TOTAL: 17)



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 53 WRD projects which includes all the closely monitored projects during last 15 years.

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, 46 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 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.

The NEMCRVP has, so far, held 57 meetings. The 56th and 57th meeting of NEMCRVP in respect of Man and Jobat Irrigation Projects of Madhya Pradesh were held during 2005-06. Draft Annual Report of NEMCRVP for the year 2005-06 has been prepared.

11.2 Environmental Impact Assessment

As a part of Environmental Impact assessment (EIA), environmental evaluation studies of Mahi Project have been completed and the report is being printed. Reports on Jakham Irrigation Project (Rajasthan) and Barapani HE Project (Meghalaya) are in a final stage.

A draft manual for "Environmental Impact Assessment and Clearance of River valley Projects" has been prepared and it is under finalization in consultation with Expert Committee on River Valley & HE projects of Ministry of Environment and Forests.

EIA Reports of 11 projects for Expert Committee on river valley and hydroelectric projects referred to CWC by Ministry of Environment and Forests have been examined and comments prepared. Eight meetings of the Expert Committee were held and 13 projects were recommended for environmental clearance.

Feasibility reports/DPRs of 15 projects have been examined from environmental angle for granting "In principle" consent of CWC. Five projects have been accepted for detailed examination.

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).

Norms/Act/policies adopted by the State Governments on R&R of displaced /affected families of major/medium projects are collected and analysed. Half yearly progress report of 20 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. Status Report prepared on R&R Action Plan on Water Resources is under circulation. A status report on R&R of project affected persons of Kol Dam Hydro Power Project (HP) has also been prepared on the basis of field visit by the CWC's R&R monitoring team and circulated to all concerned.

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) (formerly Overseas Economic Cooperative Fund (OECF)), 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 Central Water Commission

The important activities of Central Water Commission 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.

Central Water Commission is monitoring the progress of Major & Medium Irrigation Projects only. So far, 41 such projects have received assistance from World Bank, 5 from JBIC, 2 from USAID, 1 from IFAD and 1 from EEC.

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, 37 projects have been closed and the assistance utilised is as shown in Table 12.1

Table 12.1
Details of the Closed Agreements

Sl. No.	State	No. of Projects	Assistance in Million US Dollar	
			As per SAR	Utilised
1	Andhra Pradesh	5	825.00	641.82
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	**37**	**5056.30**	**4424.93**

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 three such projects are taken up with the assistance of the World Bank in the State of Rajasthan, Madhya Pradesh and Uttar Pradesh.

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 follows:-

Sl. No	Name of Project	Credit No/Loan No.	Agency	Time Slice		Est. Cost in Rs. M		Assistance in US $ Million (M)	
				Starting Month	Closing Month	Total (As per SAR)	Latest	Total	Utilized ending 03/06
1	2	3	4	5	6	7	8	9	10
1	AP Economic Restructuring Project	Ln.4360-IN Cr.3103-IN	IBRD IDA	02/99	03/06	11292.00	9622.50	142.00 28.30	124.96 26.41
2.	Rajasthan Water Sector Restructuring Project	Cr.3603-IN	IDA	03/02	03/08	8305.07	8305.07	140.00	38.68 SDR
3.	Uttar Pradesh Water Sector Restructuring Project	Cr.3602-IN	IDA	03/02	10/07	8351.00	8351.00	149.20	20.06 SDR
4.	Madhya Pradesh Water Sector Restructuring Project	Ln 4750 IN	IBRD	01/05	03/11	20402.23	20402.23	394.02	22.44 USD

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, 2 projects of Orissa have been closed and assistance to the tune of ¥ M 6713.83 has been utilised against the total assistance of ¥ M 7513 provided as per agreement.

12.3.2 On-going Agreements

There are three ongoing projects out of which Tranch-I assistance to Rengali Irrigation project and K.C. Canal modernisation project was closed in December 2004 and February, 205 respectively. The assistance utilized is as follows**:-**

SL. No.	Name of Project		Loan Agreement No.	Effective date Closing date	Estimated Cost		Assistance As per agreement (M Yen)	Assistance utilised up to 03/06	Remark
					As per Agreement (Total) (Rs. M)	Latest Cost (Rs. M)			
1	2		3	5	6	7	8	9	10
1	**K..C.Canal** Modernisation Project, Andhra Pradesh	**Tranch-I**	ID-P-113	26.03.1996 26.02.2005R	10337.37	**11070.00**	**16049.00**	**15728.65**	**Closed on 26.2.2005**
		Tranch-II	ID-P-155	18.06.2004 22.03.2009			**4773.00**	**1661.38**	---
2	**Rajghat Canal Irrigation** Project, Madhya Pradesh		ID-P-126	01.04.1997 29.05.2006	5525.47	5929.61	**13222.00**	**10938.13**	---
3	**Rengali** Irrigation Project Left Bank Canal-II Phase-I, Orissa	**Tranch-I**	ID-P-135	05.02.1998 31.12.2004R	4494.72	**5915.45**	**7760.00**	**6844.23**	**Closed on 31.12.04**
		Tranch-II	ID-P-154	18.06.2004 31.12.2007			**6342.00**	**895.96**	---

12.4 European Economic Community Assistance

EEC provides financial assistance to irrigation projects (major, medium or minor) in the form of grant. The criteria for assistance to the project is as follows:

1. No specific cost
2. Must involve the beneficiaries in project management, operation and maintenance.

Sidhmuk & Nohar Irrigation project of Rajasthan aided by EEC has been closed and assistance to the tune of € M 39.60 has been utilized against the total assistance of € M 45 provided as per agreement.

CHAPTER-XIII

INTERNATIONAL COOPERATION WITH NEIGHBOURING COUNTRIES

13.1 Cooperation between India and Nepal

- Most of the rivers, which create flood situation in the States of UP and Bihar in India 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 flowing from Nepal, 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 to the downstream of the 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. Assistance was provided 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 Detailed Project report (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 2005-06, 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 the 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, regarding the artificial lake created in 2004 on Pareechu River in China due to a landslide dam, discussions were held during the visit of Secretary level delegation to Beijing in March 2005 and during the visit of Hon'ble Premier of China to India in April, 2005. The Chinese side agreed to take measures for controlled release of the accumulated water of the landslide dam as soon as conditions permit. However, the dam breached on 26th June, 2005 causing widespread damage in Himachal Pradesh. Post breach monitoring of the lake by NRSA using satellite imageries have shown free flow of water, indicating no danger of further flash floods. However, monitoring of the situation is being continued.

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 departed for joint observation at Hardinge Bridge, Bangladesh.

- **Joint Committee of Experts on sharing of Teesta Water**

  The 4th Meeting of Joint Committee of Experts (JCE) on sharing of Teesta waters between India and Bangladesh was held at New Delhi on 27-28th August 2002. The terms of reference for the Joint Scientific Study on the availability and requirement of Teesta waters in both the countries and Interim Agreement for sharing of Teesta water between Bangladesh and India were discussed in detail. The 5th meeting of JCE held at Dhaka in January 2003 to discuss unresolved issues in detail. The 6th Meeting of JCE was held on 20th and 21st January, 2004 at New Delhi for a logistic solution of sharing Teesta waters. 7th Meeting of the JCE was held at Dhaka in September 2004. A Joint Technical Group (JTG) has been set up to resolve the issues on Joint Scientific Study.

- **Joint River Commission (JRC) Meeting**

  36th JRC Meeting was held at Dhaka from 19th to 21st September, 2005. The JRC inter-alia had directed Joint Committee of Experts (JCE) on sharing of Teesta waters to meet as soon as possible and report to JRC for evolving suitable sharing arrangement/agreement. The implementation of the 1996 Treaty on sharing of the Ganga/Ganges water at Farakka was reviewed as per provisions of the Treaty. While reviewing the activities of the Standing Committee on Indo-Bangladesh JRC, the two Ministers (chairman and co-chairman of JRC) decided to personally undertake visits to all the concerned sites of river bank protection and minor lift irrigation and drinking water supply schemes along concerned common/border rivers to assess the situation on the ground to take final decision in this regard. Government of India offered to Bangladesh to provide the water level, flow/discharge data and forecast of Brahmaputra at Guwahati enhancing warning time from 42 hours to 67 hours in Bangladesh. Similarly advisory forecast of Farakka along Ganga enhancing warning time from 41 hours to 67 hours in Bangladesh has also been offered, faster communication/exchange of data through e-mail was also proposed in the meeting. In addition to above issues relating to sharing of water of other six common rivers, dredging of Icchamati river in common/border stretch, Tipaimukh dam project, interlinking of river project also came up for discussion during the meeting.

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 has so far held two meetings with the Parties, the first one at Paris in June 2005 and the second one at Geneva in October, 2005. The process is in progress.

13.6 Visits of Foreign Delegates to CWC

13.6.1 Czech Republic

A delegation consisting of Directors of River Basins Authorities of the Czech Republic visited CWC on 21st November, 2005 to discuss and share the experiences on the water resources management practice in India with special emphasis on river basin management. A presentation on Water Management Practices in India with special emphasis on River Basin Development was made from CWC side.

13.6.2 Bhutan

A delegation of 14 members from Bhutan comprising of senior officers of the Royal Government of Bhutan, local NGO representatives and Asst. Representative of UNDP, Bhutan visited CWC on 16th January 2006 to discuss the initiatives undertaken by Govt. of India in the field of disaster management, flood control & management, etc.

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 centralised data bank of hydrological data for non-classified basins has been created by Hydrological Data Directorate under Information System Organisation to ensure quick availability of the data to the users interested in further analysis of the data. The data bank was updated.

Under Hydrology Project I, modernisation and computerisation 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 set up. The meta data of the various peninsular basins is available online.

An add-on Flood Forecasting module for the WISDOM catalogue was developed to make the flood forecasts, including inflow forecasts, available on the web site: www.india-water.com on which WISDOM catalogue has been already hosted. The main objective of add-on FF module is to make flood forecasts available to the user as soon as they are generated by the concerned offices of CWC.

14.2.2 Water and Related Statistics

Database containing information on Water and Related Resources such as rainfall in different meteorological sub-divisions 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 Central Water Commission, flood damages - area affected has been created in CWC. The information is updated and published on yearly basis.

14.3 Computerisation Activities in CWC

A scheme namely "Up-gradation & Modernisation of Computerisation / Information System in CWC" is operating under the X five year Plan. During the year 2005-06 the first stage of development of CWC intranet "Sangam" was completed.

The integration and assimilation of CWC's numerous competencies is envisaged through establishment and gradual expansion of CWC Intranet. This intranet will be made available to all CWC officers across the length and breadth of the country, and it will provide pathways to several (existing and proposed) administrative, financial, technical and monitoring modules. It will also provide appropriate information links to other organizations pertaining to water resources sector for synergizing the information competencies of all. With such intents, Intranet Portal of CWC is given the name "**SANGAM**", meaning convergence of diverse information streams.

The development of first stage of *Sangam* Intranet, intended to fulfill e-governance objectives of CWC, has been completed. The work was accomplished by M/s CDAC four months after the renewed efforts that started in January 2006. In the renewed efforts, basic forms of various modules and tables have been retained from the earlier programming version, but large-scale changes are introduced to capture concepts of office, seat, hierarchy, manage-roles, work-flow etc. Several user oriented value-addition tools have also been provided and the program has been made scalable and dynamic in terms of structure and contents. It is now a customizable-software capable of capturing large diversities of CWC, and its implementation is possible in a phased manner across all CWC offices. Special features of its different modules are listed as under:

1. **Technical Information Highway** - This module provides tools for: (a) dynamic assimilation and indexing of technical and managerial information in three different channels (namely Technical, Human Resources, and Information Technology) enabling evolutionary growth of techno-managerial information for enhancing knowledge driven competencies of CWC; (b) dynamic album of project photographs as visual information aid; (c) *Sangam* ***Mat*** (poll) as HR tool and *Sangam* ***Sandesh*** (Message) for developing managerial competencies of officers; (d) dynamic Organogram capturing all hierarchies of CWC organization; (e) converter for handling a wide range of measurements pertinent to CWC.

2. **Personal Information System** - This module provides tools for: (a) auto generated employee ids; (b) scalable establishment roles and auto shifting of roles; (c) historically and auto-updatable personal and service records; (d) master based data capturing; (e) tools for transfers, promotions, increments, service disruptions, seniority fixation etc; (f) civil lists and seniority scenario generation tool; (g) application and processing of leave, accommodation, advances, pension etc; (h) circulars, application, administration, and record keeping of trainings.

3. **Financial Management System** - This module provides tools for: (a) scalable income and deduction items of payroll, criteria & formula based tool for global pay, salary interface for individual pay parameters; (b) multiple financially empowered offices with linkages to other offices; (c) distributed pay bills with two-tier role managers; (d) regular payrolls, pay interruptions, supplementary payrolls, pay arrears, manual paybills; (e) reports of bills, schedules & online pay-slips; (f) actual and estimated annual income, income tax projection, planned deductions; (g) provident fund accounting.

4. **Office Administration** - This provides tools for: (a) scalable office directory; (b) calendar, holiday list and upcoming holidays; (c) Bulletin board and posting of individual contents; (d) circulars, current events and uploading of attachments; (e) discussion forum, suggestion book and complaint book; (f) hierarchical progress reporting and review; (g) tools for work assignment, file tracking; (h) multiple-filter employee locator.

5. **Parliament Query System -** This module provides tools for: (a) capturing full particulars of parliament questions; (b) splitting of questions in to parts/ action-sequences, and routing them to multiple users; (c) tool for forwarding answers and file-attachments; (d) compilation of part/ full answers with relevant attachments; (e) particulars based search.

6. **Library Information System -** This module provides tools for: (a) multiple libraries with separate role managers; (b) inter-library book transfers; (c) cataloguing, serialization, circulation; (d) membership to CWC employees and others; (e) online public access catalogue; (f) acquisition, billing and accounting.

7. **Budget Information System** - This module provides tools for: (a) estimation and distribution of budget; (b) booking of expenditure & recoveries; (c) pay and allowances; and (d) debit notes.

8. **Software Administration & Security -** This provides facilities for: (a) login management, password change, multiple seats for individuals, manage-role assignments to seats, and multiple role managers; (b) seat-based mails and auto generated mails from different events; (c) home page - attuned to assigned roles with auto capturing of user's identity - for all users; (d) assignment of manage-roles for scalable sections/ offices/ functions; (e) deactivation of data rather than its deletion; (f) log of changes for important data.

After its *alpha* testing, *Sangam* software has been deployed in CWC-HQ server. Some of the pertinent data (such as: employee IDs, basic employee information of group-A, B officers, offices and seats of CWC-HQ, pay bills parameters of employees at HQ, login-ID/ passwords, parameters of various masters etc) have also been ported. The *Beta* testing of software has also been completed from user-end premises using realistic data by a 12 member team of Directors and Deputy Directors.

Implementation of *Sangam* (covering issues of data gathering, data porting, manage-role-assignments and training) has been initiated in HQ, and will be gradually expanded to cover all field offices of CWC. Full implementation of *Sangam* will help in substantial automation of CWC's administrative and managerial function.

CHAPTER - XV

TRAINING

15.0 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.

15.1 Induction Training

Induction training to Assistant Directors recruited through UPSC is also being conducted by Training Directorate and National Water Academy (NWA), Pune. The 20th Induction training course of 20 weeks duration for the newly recruited Assistant Directors was organised in which 18 officers participated. This course commenced at NWA, Pune on 9th Jan, 2006 for 14 weeks duration and remaining 6 weeks duration was organised at CWC headquarters.

15.2 National Water Academy

National Water Academy (NWA) which was upgraded from Central Training Unit (CTU) during the IX 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.

The training and other related activities have increased manifold with the development of infrastructure like installation of additional computers, additional classrooms, 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 2005-06, 25 training courses and 2 workshops (Annex-XV-2) have been conducted for the benefit of 589 officers with a total man-weeks of 1491.

Among the 26 training programmes, following five programmes were newly introduced at NWA during the year 2005-06.

- Training Programme on “Sedimentation Planning for Water Reservoirs”.
- Training Programme on “C and C++”.
- Training Programme on “Design of Weirs and Barrages on Permeable and Flexible Foundations”.
- Training Programme “Repair, Renovation and Restoration of Water Bodies”.
- Training Programme “Advanced Modelling Techniques using IDEAS software”.

The Advisory Board of NWA under the Chairmanship of Chairman, CWC has been broad based and reconstituted during 2003. This committee consists of the Chairman, CWC as its Chairman, Member (WP&P), CWC, Commissioner (PP), MoWR, Financial Advisor, MoWR, Director General, WALAMTARI, Govt. of AP, representative of Planning Commission, Director, NERIWALM, Tezpur, Assam, Director WRDTC, Roorkee, Director, NIH, Roorkee, Chief Engineer, Bureau of Design and Hydraulics Institute M.P., Director, Gujarat Engineering Research Institute, Chief Engineer and Principal, Engineering Staff College, Nashik, Representative from IIFM, Faridabad, Vice Chairman, Action for Agriculture Renewal in Maharashtra (AFARM), Vice Chancellor, University of Pune, Executive Director, MKVDC or his Representative and Chief Engineer, NWA, Pune as members. The committee has been formed for monitoring overall functioning and progress of NWA and to advise on its development. Chairman, CWC chaired the 12th Advisory Board meeting of the National Water Academy at Pune on 24.06.2005.

15.3 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 2005 – 2006 are given below.

Sl. No.	Name of activities	No. of Participants
1	Sponsoring officers for training, attending seminars/ workshops, etc. in India organised by other organisations	284
2	Sponsoring officers for training, attending seminars/ workshops, etc. abroad	18

15.4 Other Activities

(i) CWC engages certain number of graduate/diploma/10+2 passed vocational trainees for a period of one year under Apprenticeship Act 1961. During the year, 33 graduate engineers /Diploma holders/Vocational Certificate holders were imparted training.

(ii) As part of interaction with academic institutions, 90 engineering and secretarial practices students from various institutions were imparted on the job practical training of 4 to 6 weeks.

(iii) Organised lectures on various subjects for the benefit of CWC officers under study circle.

(iv) One CWC officer was deputed for undergoing "33rd Postgraduate Diploma Course in Hydrology" at IIT, Roorkee. In addition, 3 officers were permitted to continue their study for another one year to complete M.Sc. Degree on study leave.

Annexure XV-1

Training Programmes organized by Central Water Commission during the year 2005-06

Sl. No.	Training Programme	Duration	Venue	No. of Officers/ officials nominated
1.	Wireless Installation Operation And Maintenance	4-6 May, 05	Lucknow	29
2.	Hindi Workshop	4-6 May, 05	New Delhi	50
3.	Hydrometry	16-21 May, 05	Burla	20
4.	Hydrological Observation Methods	24-26 May, 05	Kalindi Bhawan, New Delhi	32
5.	Wireless operation	6-8 June, 05	Bhubaneshwar	16
6.	Appreciation course on Flood Forecasting	14-16 June, 05	Lucknow	26
7.	River Basin Planning and Management	12-15 July, 05	CWC Hqrs, New Delhi	34
8.	Intranet	16-18 Aug, 05	CWC Hqrs, New Delhi	12
9.	Hindi Workshop	6-8 Sep, 05	CWC Hqrs, New Delhi	18
10.	Basic concepts of MS Office	18-21 Oct, 05	Hyderabad	32
11.	Water Quality	7-10 Nov, 05	Sites under Kochi Division	20
12.	SWDES	7-11 Nov, 05	Bangalore	19
13.	SWDES	21-25 Nov, 05	Silchar	25
14.	Flood Forecasting using Modern and Conventional Methods	28-30 Nov, 05	Kalindi Bhawan, New Delhi	30
15.	SWDES	7-9 Dec, 05	Lucknow	25
16.	MS Office and Hindi Word processing	12-16 Dec, 05	Delhi	9
17.	Computer and MS Office	12-16 Dec, 05	Guwahati	21
18.	Hindi workshop	29-30 Dec, 05	Delhi	15
19.	Hindi workshop	5-7 Jan, 06	Guwahati	30
20.	Wireless Operation and Maintenance	9-13 Jan, 06	Guwahati	30
21.	Hydrological Aspects in Project Planning and Preparation of DPR	16-20 Jan, 06	New Delhi	36
22.	Use of Computer and Software Management	16-20 Jan, 06	Chandigarh	15

23.	O&M Workshop	23-24 Jan, 06	Kalindi Bhawan, New Delhi	30
24.	Use of Computer and related software	7-11 Feb, 06	Bangalore	15
25.	Use of MIKE 11 for Flood Forecasting	13-17 Feb, 06	Patna	10
26.	Hindi Workshop	23-24 Feb, 06	New Delhi	21
27.	Mike 11 for Flood forecasting	3-6 Mar, 06	Varanasi	10
28.	Use of Computer and related Software	20-24 Mar, 06	Bangalore	17
29.	Hindi Workshop	23-25 Mar, 06	Bhubaneshwar	30
			Total	677

List of officers deputed abroad for various training/ seminar/ symposia/ conferences, etc. during 1st April, 2005 to 31st March, 2006

Sl. No.	Topic of the programme /Venue / Period	Participant
1	Deputed to USA for consultative meeting in connection with the USAID funded project on Disaster Management- Climate Forecasting, USA, 18th to 30th June, 2005	SK Agarwal, CE SK Sengupta, CE Rajesh Kumar, SE RK Gupta, Dir Navin Kumar, SE
2	MSc in Hydropower Development at Norwegian University of Science and Technology (NTNU) under Quota Fellowship Programme, Norway, 11th August, 2005 to 10th August, 2007 (On study leave)	AK Shukla, AD
3	56th International Executive Council (IEC) Meeting of International Committee on Irrigation and Drainage (ICID) and 19th International Congress on Use of Water and Land for Food Security and Environmental Sustainability, Beijing (China), 10th to 18th September, 2005	R Jeyaseelan, Chairman (12-16 Sep 2005) BS Ahuja, Member (13-17 Sep 2005) BD Pateria, CE (13-16 Sep 2005)
4	UNEP Dams and Development Project Meetings, Nairobi (Kenya), 4th to 8th October, 2005	VK Jyothi, CE
5	15th Meeting of Technical Coordination (TCC), Gedu (Bhutan), 6th to 9th October, 2005	IK Chugh, Dir SK Sibal, Dir
6	Six Week Training in connection with Tehri/ Koteshwar HE Project, Hydro Project Institute (HPI), Moscow (Russia), 45 days from 7th November, 2005	Sarbjit Singh Bakshi, DD Atul Kumar Nayak, DD
7	Deputed to Germany for inspection works on hydraulic cylinders for procurement to Tala HE Project, 28th November, 2005 to 2nd December, 2005	Ramesh Grover, Dir
8	33rd Session of WMO/ESCAP Panel on Tropical Cyclones, Dhaka (Bangladesh), 30th January to 4th February, 2006	AK Sinha, Dir
9	International Workshop on Innovations in Water Conservation, UNDP/ UNESCAP, Tehran (Iran), 21st to 23rd February, 2006	SM Hussain, Dir
10	4th World Water Forum, Mexico City, 18th to 22nd March, 2006	R Jeyaseelan, Chairman

Annexure – XV-2

Training programmes and workshops conducted at NWA during the year 2005-06

Sl. No.	Training Programme	Dates	Duration (Weeks)	No. of officers
1.	Application of FEM/FEA in Designing Water Resources Structures	26 Apr '05 to 6 May '05	2 Weeks	38
2.	Training programme on Basic Surface Water Data Processing using HYMOS Software	9th May '05 to 20th May '05	2 Weeks	20
3.	Training programme on Sedimentation Planning of Reservoir"	30th May '05 to 3rd June '05	1 Week	13
4.	Training of Trainers in Participatory Irrigation Management	6th June '05 to 10th June '05	1 Week	31
5.	Training Programme on Rainwater harvesting and ground water recharging including recycling and reuse of waste water	13th June '05 to 22nd June '05	2 Weeks	42
6.	Training course on IWRM on River Basin Scale	12th July '05 to 22nd July '05	2 Weeks	14
7.	Training programme on Analysis & Design of Hydropower Structures	19th July '05 to 29th July '05	2 Weeks	16
8.	Training programme on Watershed Management	16th Aug '05 to 20th Aug '05	1 Week	21
9.	Training Programme on application of Geoinformatics in water sector	22nd Aug '05 to 2nd Sept '05	2 Weeks	20
10.	Third Induction Training Programme for newly recruited engineers of NTPC	6th Sept '05 to 6th Jan '06	18 Weeks	38
11.	Training programme on Environmental Management and Social Aspects for River Valley Projects	12th Sept '05 to 16th Sept '05	1 Week	19
12.	Training Programme on Construction Aspects of Hydropower projects	26th Sept '05 to 7th Oct '05	2 Weeks	10
13.	National Workshop on "Geo-informatics in Water Sector"	22-23 Sept' 05	2 days	16
14.	Training programme on Flood Management	21st Nov '05 to 25th Nov '05	1 Week	17

15.	Training Course on FEM	28th Nov '05 to 9th Dec '05	2 Weeks	12
16.	Training programme on Economic Analysis of irrigation projects	13th Dec '05 to 21st Dec '05	1.5 Weeks	19
17.	Training Programme in C and C++	3rd Jan '06 to 13th Jan '06	2 Weeks	20
18.	Twentieth Induction Training Programme for the newly appointed officers of CWES (Group A)	09th Jan '06 to 13th Apr '06	14 weeks	17
19.	Training course on "Use of Geo-informatics in Water Sector"	10th Jan '06 to 20th Jan '06	2 Weeks	24
20.	Training Programme on "Design of Weirs/barrages on permeable and flexible foundations	17th Jan '06 to 19th Jan '06	3 days	26
21.	Training Course on Command Area Development and Water Management with special emphasis on improving irrigation system efficiency	30th Jan '06 to 3rd Feb '06	1 Week	21
22.	Training programme on Analysis & Design of Dams	14th Feb '06 to 24th Feb '06	2 Weeks	32
23.	Training programme on Repair, Renovation and Restoration of Water Bodies directly linked to agriculture	21st Feb '06 to 24th Feb '06	1 Week	9
24.	Training Programme on Artificial Neural Network	6th Mar '06 to 14th Mar '06	2 Weeks	14
25.	Training programme on IDEAS	20th Mar '06 to 24th Mar '06	1 Week	18
26.	Management Development Programme	20th Mar '06 to 23rd Mar '06	4 days	12
27.	Workshop on World Water Day	22 Mar '06	1 day	50
			Total number of Officer trained	589
			Total man weeks of training	1491

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 2005-06, 23 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:-

Category of Officers/Staff

	Particulars	**Gr.A**	**Gr.B**	**Gr.C**	**Gr.D**
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, 2005.

16.2 Redressal of Grievances

Effective measures have been taken to strengthen the machinery for the redressal of 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 31.03.2006, out of 92 grievance cases, 43 cases were disposed off and 49 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.

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 Member (WP&P)	Chairman Member

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 Multi purpose 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 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	Upper Yamuna River Board	Member (WP&P)	Chairman
52	National Environmental Monitoring Committee	Member (WP&P)	Chairman
53	Joint Operation Committee for Rihand Dam	Member (WP&P)	Chairman
54	Contracts Works Sub-Committee of Betwa River Board	Member (WP&P)	Chairman
55	Sub-Committee for processing tenders and proposals for purchase of stores & equipments of Bansagar Control Board	Member (WP&P)	Chairman
56	Sub-Committee of officers to consider the claims of M/s HSCL in Earth Dam- Lot of Rajghat Dam Project	Member (WP&P)	Chairman
57	Committee for settlement of claims of M/s N.P.C.C. Ltd of Betwa River Board	Member (WP&P)	Chairman
58	Sub-Committee to examine and process claim cases of contractors of Bansagar Control Board	Member (WP&P)	Chairman
59	Monitoring committee for non-structural aspects of the proposed Tipaimukh Multipurpose Project	Member (WP&P)	Chairman
60	Technical Advisory Committee on Socio-Economic, Agro-economic and Environmental Impact studies	Member (WP&P)	Chairman
61	Screening Committee for selection of arbitrators on Arbitration Boards.	Member (WP&P)	Chairman
62	Joint regulation committee of Chandil Dam and Galudih Barrage	Member (WP&P)	Chairman
63	Joint Regulation Committee of Kharkai Dam	Member (WP&P)	Chairman
64	Sub-Committee on Irrigation, Performance Assessment History, Education, Training, Research & Development	Member (WP&P)	Chairman
65	Standing Project Appraisal committee of Central Water Commission	Member (WP&P)	Chairman
66	Water Resources Planning Management and evaluation Sectional Committee-WRD-06 (BIS)	Member (WP&P)	Chairman
67	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
68	Task Force for Flood Management in the country (North Western Region)	Member (WP&P)	Chairman
69	Committee for Cost Sharing of Hathnikund Barrage	Member (WP&P)	Chairman

70	Sub-Group-1 for Research topics under invited reserved Category	Member (WP&P)	Chairman
71	Sub-Group-II Rain Water Harvesting	Member (WP&P)	Chairman
72	Committee for the Re-organised UP/ Uttaranchal States	Member (WP&P)	Chairman
73	Committee for Re-organised Bihar/ Jharkhand States	Member (WP&P)	Chairman
74	Upper Yamuna Review committee	Member (WP&P)	Member-Secretary
75	Working Group of INCID on capacity building	Member (WP&P)	Member
76	Working Team on Socio-Economic Impacts & Policy Issues (ICID)	Member (WP&P)	Member
77	Standing Committee for overall National Perspective Water Planning and Coordination in relation to diverse use of water	Member (WP&P)	Member
78	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
79	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
80	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
81	Committee for Eastern River Water of Indus System of River	Member (WP&P)	Member
82	National Watershed Committee	Member (WP&P)	Member
83	Central Loan Assistance under Accelerated Irrigation Benefits Programme	Member (WP&P)	Member
84	Steering Committee of Indian National Committee on Hydrology (INCOH)	Member (WP&P)	Permanent Invitee
85	High Powered Committee-Yamuna Action Plan of Ministry of Environment and Forests	Member (WP&P)	Invitee
86	Technical Advisory Committee for Flood Control, Drainage and Anti-Sea Erosion Schemes (Goa)	Member (RM)	Chairman
87	State Technical Advisory Committee-Floods (Karnataka)	Member (RM)	Chairman
88	Subernarekha Embankment Committee (Orissa, West Bengal & Bihar)	Member (RM)	Chairman
89	Working Group to advise WQAA on the minimum flow in the rivers	Member (RM)	Chairman
90	National Level Steering Committee for Implementation of World Bank assisted Hydrology Project Phase-II	Member (RM)	Chairman
91	Setting up of HISMG (Data and Data dissimination) for Implementation of the World Bank assisted Hydrology Project Phase –II.	Member (RM)	Member
92	Setting up of HISMG (Technical) for Implementation of the World Bank assisted Hydrology Project Phase –II.	Member (RM)	Chairman

93	Steering Committee for the Preparation of Status Report on Water Resources requirements and its availability for Urban Areas	Member (RM)	Chairman
94	Coastal Protection and Development Advisory Committee (CPDAC)	Member (RM)	Chairman
95	National Coastal Zone Management Authority (NCZMA)	Member (RM)	Chairman
96	Ghaggar Standing Committee	Member (RM)	Chairman
97	Yamuna Standing Committee	Member (RM)	Chairman
98	Sahibi Standing Committee	Member (RM)	Chairman
99	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
100	Flood Control Board set up by the Irrigation and Flood Control Department of Govt. of NCT of Delhi	Member (RM)	Chairman
101	Committee for Flood Control Works in Brahmaputra Valley	Member (RM)	Chairman
102	Standing Committee to Brahmaputra Board	Member (RM)	Chairman
103	West Bengal State Committee of Engineers	Member (RM)	Chairman
104	Ganga Flood Control Commission	Member (RM)	Chairman
105	Kosi High Level Committee	Member (RM)	Chairman
106	Damodar Valley Reservoir Regulation Committee	Member (RM)	Chairman
107	WRD 01 Sectional Committee of BIS for Fluid Flow Measurements	Member (RM)	Chairman
108	WRD-22 River and Diversion Works Sectional Committee	Member (RM)	Chairman
109	Sub-Committee-III (Flood Management, Drainage and Environment Impacts) of INCID	Member (RM)	Chairman
110	Joint Group of Experts on Pancheshwar Multi-purpose project	Member (RM)	Special Invitee
111	Joint Team of Experts (JTE) on Sapta Kosi Project	Member (RM)	Team Leader
112	Committee for examination of technical issues regarding Baglihar Hydro-Electric projects on the Chenab Main in J&K	Member (RM)	Chairman
113	TAC to Assam State Brahmaputra Valley Flood Control Board	Member (RM)	Chairman
114	TAC to Cachar Flood Control Board (Assam)	Member (RM)	Chairman
115	High Level Committee to Study the Regulation of Releases from various Hydro-Electric Projects Constructed Along Teesta	Member (RM)	Chairman
116	Committee to study Erosion Problem of Bhutani Diara (West Bengal) and Majauli Island (Assam)	Member (RM)	Chairman
117	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
118	Standing Technical Advisory Committee (STAC) to the Governing Council for CSMRS, New Delhi.	Member (D&R)	Chairman

119	Technical Committee for procurement of Instruments and working models for Instrumentation Centre (IDC)	Member (D&R)	Chairman
120	Governing Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
121	General Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
122	Science and Technology Advisory Committee (STAC)	Member (D&R)	Member
123	Board of Management of Geological Survey of India	Member (D&R)	Member
124	Research Advisory Committee (RAC) of National Council for Cement and Building Materials.	Member (D&R)	Member
125	Board of Consultants for Koyna Dam and its appurtenent works and Generating Equipment/Machinery including Koyna Power	Member (D&R)	Member
126	Indian National Committee on Hydraulic Research (INCH)	Member (D&R)	Chairman
127	R&D Implementation and Monitoring Committee(RIMC)	Member (D&R)	Chairman
128	National Committee on Seismic Design Parameters of River Valley Projects (NCSDP)	Member (D&R)	Chairman
129	WRD 09, Dams & Spillway Sectional Committee of BIS	Member (D&R)	Chairman
130	National Level Steering Committee (NLSC) for Dam Rehabilitation and Improvement Project (DRIP)	Member (D&R)	Member
131	Technical Committee (TC) for Dam Rehabilitation and Improvement Project (DRIP)	Member(D&R)	Chairman
132	Technical Advisory and Review Committee (TARC) for preparation of PMP Atlas	Member (D&R)	Chairman
133	World Meteorological Organization	Member (D&R)	Representative
134	Committee of International Commission on large dams, India	Member (D&R)	Member
135	Board of Directors Satluj Jal Vidyut Nigam Ltd. (SJVNL)	Member (D&R)	Director
136	Board of Directors of Tehri Hydro Development Corporation	Member (D&R)	Part Time Director
137	Indo-French Working Group on Energy	Member (D&R)	Member
138	Group of Implementation of Hydro-Electric Projects in J&K State	Member (D&R)	Member
139	Bureau of Indian standards, WRD-15	Member (D&R)	Chairman
140	Technical Advisory Committee of the Farakka Barrage Project.	Member (D&R)	Chairman
141	Technical Co-ordination Committee (TCC) for Tala HE Project, Bhutan.	Member (D&R)	Co-Chairman
142	Board meeting of Tala HE Project Authority (THPA), Bhutan	Member (D&R)	Invitee
143	Committee of CEA to accord of techno-economic appraisal of Power Schemes.	Member (D&R)	Permanent Special Invitee
144	NHPC Performance Review Committee	Member (D&R)	Member
145	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.

34th TAC meeting was held on 6th Sept 2005 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. The 53rd TAC meeting of NIH was Chaired by Chairman, CWC on 23rd November 2005 at Roorkee. 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), CWC is the Member of the Hydrological Observations and Instrumentation Group. The last meeting of Working Group (Surface Water) of NIH was held on 6-7 October, 2005 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 consists of 17 members drawn from various public institutions and is headed by Chairman, CWC. Member (D&R), CWC is one of the Members of TAC. The 28th Meeting of TAC was held on 9th December, 2005 at Pune under the Chairmanship of Chairman, CWC. One of the important item discussed in the meeting was utilization/expenditure of funds for the ongoing schemes under X Five Year Plan (2002-07).

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. The last meeting of Technical Advisory Committee of Farakka Barrage Project was chaired by Member(D&R) on 8.02.2006.

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 consists of 11 members drawn from various public sector institutions and is headed by Member (D&R), CWC. The 23rd meeting of STAC was held on 28.09.2005 at New Delhi. Research schemes were reviewed and approved to remain in line with the vision document on research approved by MoWR.

17.2.6 Indian National Committee on Hydraulic Research (INCH)

INCH is one of the five Indian National Committees (INCs) constituted by the Ministry of Water Resources to promote research work in the field of hydraulic structure and river hydraulics, environmental 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) is the Chairman of this committee. During the year, one meeting of INCH Sub-Committee on "*Hydraulic Structure and River Hydraulics*", INCH meeting and R&D session were held on 24.06.05 at New Delhi.

14th meeting of INCH and 5th R&D session were held on 10th and 11th February, 2006 at Bhubaneshwar. The state of the art report on "Scour around Bridge Piers" developed under Indian National Committee on Hydraulic Research was released. In the above meeting of INCH, Committee recommended one scheme for funding under R&D programme of MoWR and discussed 15 ongoing research schemes for monitoring and 13 completed research schemes in respect of their Utilisation Certificates.

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 the academic and research organizations besides a few members drawn from non-Governmental professional organisations. 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). During this year two meetings of the committee were held. Chairman, CWC chaired the 29th meeting of Indian National Committee of Hydrology (INCOH) on 15.06.2005 and 30th meeting on 14.12.2005.

The sub-committee meetings of INCOH held during 2005-06 are as follows:

a) Steering Committee – Member(D&R) is the Chairman and Chief Engineer, HSO is the Member of this sub-committee. The 22nd meeting of this sub-committee was held on 3.6.2005 and 23rd meeting was held on 3rd August 2005 at New Delhi.
b) Research Committee (Surface Water) – Director, Hyd(DSR) is a member of this sub-committee. The 13th meeting was held on 9.9.2005 at NIH, Roorkee, which was attended by Director, Hyd(DSR).

The 3rd R&D session of INCOH was held at National Geophysical Research Institute (NGRI), Hyderabad during 26-27 September 2005.

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. These are – Sub Group I to deal with topics of Crop Planning in Flood affected areas, growing paddy with less use of water, micro-irrigation, Sub – Group II on Bio-Drainage to deal with the topic of Rain Water Harvesting & Conservation of Water for supplementing canal water.

The activities of INCID during the year are given below:

- 8th meeting of the INCID Sub-Committee II on Crop Water Use and Draught Management and Mechanical and Micro Irrigation was held on 7th November, 2005 at Water Technology Centre, IARI, Pusa Campus, New Delhi under the Chairmanship of Project Director, WTC. Status of ongoing research schemes and new proposals for funding by MoWR were discussed in the meeting.

- 24th meeting of the newly constituted INCID was held under the Chairmanship of Chairman, CWC & INCID and Vice President, INCID on 12.12.2005 at New Delhi. During the meeting, many important items viz. co-operation with other National Committees, progress of ongoing R&D schemes, participation of Indian nominees to ICID Work Bodies, etc. were discussed.

- The progress of 28 ongoing research schemes were reviewed in the 6th R&D Session held at Bhubaneshwar in February, 2006 which was attended by more than 70 technical personnel.

- During the year, INCID 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 field of irrigation and drainage. The awards namely "JAIN-INCID Krishi Sinchai Puraskar" and "JAIN-INCID Sookshma Sinchai Puraskar" are given to institutions and individuals in alternate year. The "JAIN INCID Krishi Sinchai Puraskar" for 2006 was awarded to Dr. P. S. Minhas, Project Coordinator, CSSRI, Karnal on the occasion of World Water Day-2006.

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.

- **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)	Shri R. Jeyaseelan, Chairman, CWC & INCID
2.	Permanent Committee for Technical Activities (PCTA)	Shri R. Jeyaseelan, Chairman, CWC & INCID
4.	Working Group on Comprehensive Approaches to Flood Management (WG-CAFM)	Shri R. Jayaseelan, Chairman, CWC & INCID
5.	Working Group on History of Irrigation, Drainage and Flood Control (WG-HIST)	Shri B.D. Pateria, Chief Engineer, (PO&MI), CWC
7.	Working Group on Capacity Building, Training and Education (WG-CBTE)	Shri S.K. Das Member (D&R), CWC
8.	Committee on Public Relations and Publications	Sri. B.S. Ahuja Member (WP&P), CWC

- **Executive Council of ICID**

The 56th International Executive Council (IEC) meeting of ICID and 19th Inter National Congress on Irrigation and Drainage were held at Beijing, China from 10th – 18th September, 2005. Delegates from 56 countries met at Beijing during the Congress to discuss on the theme of "Use of Water and Land for Food Security and Environmental Sustainability". Sri R. Jeyaseelan, Chairman, CWC & INCID, and Vice President, South Asia & Oceanic Region covering Australia, Bangladesh, India, Nepal, Pakistan and Sri Lanka along with Sri. B.S Ahuja, Member (WP&P), CWC and Sri. B.D. Pateria, Chief Engineer, CWC participated in these events.

- **Watsave Award 2005**

Search & Selection Committee comprising 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, 2005.

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.

The Second meeting of the reconstituted Joint Panel of ICAR and CWC was held on 7th November, 2005 under the Chairmanship of Chairman, CWC. Director General, ICAR attended the meeting as Associate Chairman of the Panel, along with other officers from CWC.

17.2.12 Bureau of India 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. During the year, 5 draft Indian Standards pertaining to Geological Exploration, In-situ Permeability Test, Measurement of Free Surface Flow in Closed Conduits Pt I and Pt II were approved by Chairman, CWC/WRDC, for adopting and printing. In addition, 11 amendments to standards with respect to fly ash utilization in cement pertaining to WRD-13 i.e. “Canals and Cross Drainage Works” Sectional Committee were approved by Chairman, CWC as Chairman, WRDC. Reaffirmation in respect of BIS Code No. 10386 (Part Nos. 1,2,6,8 & 10) has been sent to BIS.

CHAPTER – XVIII

PUBLICITY AND PUBLICATIONS

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 2005-06 are given below:

Sl. No.	Name of Publication/Job
1.	River Valley Project and Environment concern and Management
2.	Report on Integrated River Basin Planning Development & Management – A demo study on Sabarmati Basin
3.	Executive Summary of Report on Integrated River Basin Planning, Development & Management- A demo study on Sabarmati Basin
4.	Water & Related Statistics 2004
5.	Report on Status of Watershed management and Water Harvesting
6.	Report of the Expert Committee to review the Recommendations of Rashtriya Barh Ayog (National Flood Commission)
7.	Purchase Manual and Tender Document for CWC 2005
8.	Indian Standard-456 Plain and Reinforced Concrete Codes of Practice
9.	Update on state of Art Report on Scour Around Bridge Piers
10.	Broad Guidelines for Irrigation Projects – Guidelines for preparation of Project estimate for river Valley Project
11.	Final Report of the task force for Flood Management/erosion control (The Report)
12.	Flood Forecasting and Warning Net work-performance Appraisal-2003
13.	Final report of the Task Force for Flood Management (Erosion control) (Annexure to the report)
14.	Power intake hydraulic design
15.	Guidelines for procurement in CWC
16.	Model Tender Document
17.	Delegation of Financial Power to CWC officers-purchase manual
18.	विभागीय शब्दावली अंग्रेजी हिन्दी केन्द्रीय जल आयोग 2005
19.	Guidelines for implementation of R&D Programme Part I Guidelines for Investigation (Reprint)
20.	Guidelines for Implementation of R&D Programme Part 2 Guidelines for Investigation (Reprint)
21.	सिंचाई निष्पादन पुनरीक्षा
22.	Terms of Reference for conducting efficiency study – Major & Medium Irrigation Projects
23.	Bhagirath (English) - 2 Nos.
24.	भागीरथ हिन्दी (अप्रेल–जून, जूलाई–सितम्बर, अक्टूबर–दिसम्बर, 2004) – 3 संस्करण
25.	CWC- Annual Report 2004-05 (English Version)
26.	CWC Telephone Directory

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 2005-06, nearly 370 numbers 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 Technical Publications

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

18.5 Publicity and Mass Awareness

Pamphlets on various topics with focus on Water Conservation were prepared and distributed in various exhibitions. In continuation of Fresh Water Year Activities, a comic book – "The story of Water" was published and distributed in IITF, 2005 & the same is also being distributed to various other institutes. CWC organized Quiz competition for school children's at Kalindi Bhawan in Engineering Museum for Six Schools.

18.5.1 Media Plan 2005-2006 of MoWR

As per Media Plan 2005-2006 of Ministry of Water Resources, CWC participated in the following exhibitions along with other departments of MoWR.

- 6th Water Asia-2005 at Pragati Maidan, New Delhi from 13.09.2005 to 15.09.2005.
- IITF 2005 at Pragati Maidan, New Delhi from 14.11.2005 to 27.11.2005.

Besides above CWC also participated in the following events:

- Trissur Pooram Exhibition – 2005 at Trissur (Kerala) from 03.04.2005 to 23.05.2005.
- 93rd Indian Science Congress at Hyderabad from 03.01.2006 to 07.01.2006.

18.5.2 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.