GOVERNMENT OF INDIA
MINISTRY OF WATER RESOURCES

ANNUAL REPORT
2007 - 08

CENTRAL WATER COMMISSION

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NEW DELHI

INDIA – LAND AND WATER RESOURCES : FACTS

•	Geographical Area & Location	328.7 M ha Latitude 80 –4' & 370-06' North Longitude 680 – 7' & 970 – 25' East
•	Population 2006 (Estimated On 2001 Census)	1128.52 Million
•	Rainfall Variation	100 mm in Western most regions to 11000 mm in Eastern most region
•	Major River Basin (Catchment Area more than 20,000 Sqkm)	12 Nos. having catchment area 253 M ha
•	Medium River Basin (Catchment Area between 2000 and 20,000 Sq km)	46 nos. having catchments area 25 M ha
•	Total Navigable Length of Important Rivers	14464 km

WATER RESOURCES

•	Average Annual Rainfall (2001-2005)	3693.6 BCM
•	Mean Annual Natural Run-Off	1869 BCM
•	Estimated Utilisable Surface Water Potential	690 BCM
•	Total Replenishable Ground Water Resources	433 BCM
•	Ground Water Resources Available for Irrigation	369.6 BCM
•	Ground Water Potential Available for Domestic, Industrial And Other Purposes	71 BCM (approx.)
•	Ultimate Irrigation Potential	140 M ha
•	Irrigation Potential from Surface Water	76 M ha
•	Irrigation Potential from Ground Water	64 M ha
•	Storage Available Due to Completed Major & Medium Projects (Including Live Capacity less than 10 M.Cum)	225.14 BCM
•	Estimated Additional Likely Live Storage Available due to Projects Under Construction / Consideration	171.43BCM

LAND RESOURCES (2000-01)

•	Total Cultivable Land	182.8 M ha
•	Gross Sown Area	190.6 M ha
•	Net Sown Area	141.3 M ha
•	Gross Irrigated Area	79.5 M ha
•	Net Irrigated Area	58.5 M ha

HYDROPOWER

•	Ultimate Hydropower Potential (As per reassessment)	148701 MW
•	Potential Developed by 31st March, 2008	30873 MW

From Chairman's Desk

It is our pleasure to bring out this Annual Report of the Central Water Commission (CWC) for the year 2007–08. The Report gives an insight into the organisation structure, functions and activities of CWC highlighting the contribution made in the development and management of Water Resources of the country.

CWC continued to forge ahead in providing the necessary leadership and guidance for the development of the water sector and provided necessary support to the Ministry of Water Resources on all technical and policy matters during the year 2007-08. Officers of CWC headed several committees and contributed substantially on various issues. CWC provided technical assistance to the Ministry for the Baglihar and other projects of Indus basin in respect of issues related to Indus Waters Treaty provisions. Regular activities of appraisal of major and medium irrigation projects and other water resources development schemes, monitoring of major, medium and extension/renovation/modernization (ERM) projects, environmental issues related to projects, design of hydraulic structures, hydrological observations and studies and flood forecasting services were successfully carried out during the year. Some of the important achievements of CWC during the period are:

Consultancy & Advisory Services

- Design Consultancy in respect of 137 Water Resources Development projects in India and neighbouring countries like Afghanistan, Bhutan, Nepal, etc.

Monitoring & Appraisal of Water Resources Projects

- Techno-economic appraisal of water resources development projects and clearance for multi-purpose/irrigation/flood control projects.
- Monitoring of 69 Major, 26 Medium and 9 ERM Projects and CAD works of 133 projects.
- Examination of proposals for release of Rs. 4483.95 crore of Central grant under AIBP programme.
- Examination of proposals under the scheme for renovation, restoration and revival of water bodies.
- Monitoring storage position of 81 reservoirs in the country.

Flood Management

- Timely issue of 8214 flood forecasts (with 97.22% accuracy) during the monsoon period of 2007 to help effective flood management, particularly in Assam, Bihar, Maharashtra, Karnataka, Gujarat which faced severe floods.
- Techno-economic evaluation of 35 schemes of Flood Management/Master Plans for Flood Control.

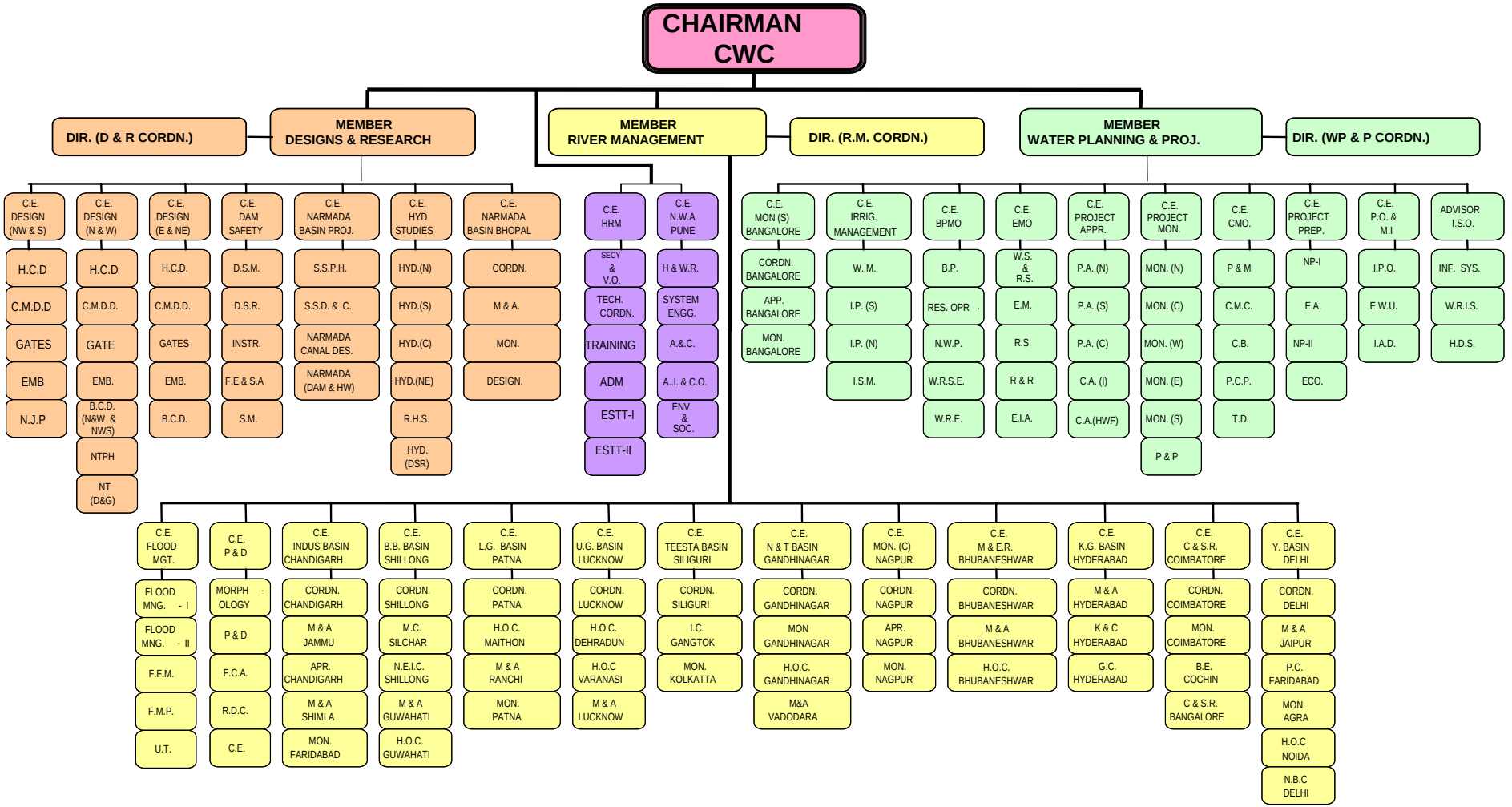
(A K BAJAJ)
CHAIRMAN
CENTRAL WATER COMMISSION

HIGHLIGHTS OF THE YEAR 2007-08

- **DESIGNS:**
  - Design units of CWC undertook detailed designs and drawings of various types of hydraulic structures for 137 water resources development projects. DPR's of 103 projects submitted by various State Govts. and other agencies were technically examined in D&R wing during 2007-08.
- **RIVER MANAGEMENT:**
  - Carried out Hydrological Observations at 878 sites spread over the country.
  - Operated 175 flood forecasting stations (including 28 inflow forecasting sites) spread over 9 major river basins. During the flood season 2007, 8214 flood forecasts were issued out of which 7996 (97.22%) were within prescribed limits of accuracy. Daily flood bulletins and weekly flood news letters were issued during the flood season. 89 Red Bulletins (for Unprecedented Flood Situation) and 124 Orange Bulletins (for High Flood Situation) were issued.
  - Completed installation of satellite based telemetry system at 147 stations upto March, 2008 in addition to existing 55 stations in Chambal and Mahanadi Basins.
  - Provided assistance to Royal Government of Bhutan for maintenance of 35 Hydro-meteorological sites in Bhutan.
  - 13 (11 in India and 2 in Nepal) Hydro Electric Projects were under investigation in North-Eastern region.
  - 57 Minor Irrigation Schemes were under investigation in Mizoram. DPR for 43 schemes have been submitted and investigation work/ preparation of reports in respect of balance 14 schemes is under process.
  - 35 Flood Management Schemes/Master Plans for Flood Control were examined/ appraised during the year 2007-08 upto March, 2008.
  - Processed 126 flood management schemes for release of funds to Government of J&K and Orissa during 2007-08 under "Flood Management Programme".
  - The Technical Expert Group (TEG) headed by Member (RM), CWC constituted by MOWR in September,2007, to prepare a National Perspective Plan for Controlling Floods and Mitigating their Impacts.
- **WATER PLANNING:**
  - 63 new major irrigation projects, 25 revised major irrigation projects, 53 new medium irrigation projects and 21 Hydroelectric power schemes were under appraisal in CWC. 37 projects comprising 15 major, 16 medium irrigation projects and 6 flood control projects were accepted for investment clearance by the Advisory Committee.
  - Monitored 104 Major, Medium and Extension/Renovation/Modernization (ERM), irrigation projects receiving CLA under AIBP and 133 CAD projects.
  - 81 important reservoirs with total live storage of 151.77 BCM were monitored on weekly basis.
  - Examination of proposals for release of Rs.4483.95 crore of Central grant under AIBP programme.
  - Provided technical assistance to MoWR in respect of the inter-State water disputes such as Cauvery Water Disputes, Mandovi Water Disputes, Krishna Water Disputes and the Ravi-Beas Water Disputes.
- **HRM:**
  - 167 in service officers were sponsored for training, attending seminars/ workshops, etc. within the country and 27 officers participated in various programmes abroad. NWA, Pune conducted 34 training programmes and 2 workshops for 882 officers of Central / State Governments and Public sector undertakings.

C O N T E N T S

Organogram of Central Water Commission 2007 - 08



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CHAPTER-I

INTRODUCTION

1.1 History of CWC

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

1.2 Organisation

CWC is headed by a Chairman, with the status of Ex-Officio Secretary to the Government of India. The work of the Commission is divided among 3 wings namely, Designs and Research Wing (D&R), Water Planning and Projects Wing (WP&P) and River Management Wing (RM). Allied functions are grouped under respective wings and each wing is placed under the charge of a full-time Member with the status of Ex-Officio Additional Secretary to the Government of India. Each wing comprising of a 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 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 2007-08 were:

1.	Chairman, CWC	:	Shri S.K.Das (1.4.2007 to 31.7.2007) Shri B.S.Ahuja *(1.8.2007 to 31.3.2008)
2.	Member (D&R)	:	Shri B. S. Ahuja * (01.04.07 to 09.04.2007) Shri A. B. Pal (11.04.2007 to 31.08.2007) Dr. D V Thareja (12.02.2008 to 31.03.2008)
3.	Member (WP&P)	:	Shri B. S. Ahuja* (01.04.2007 to 31.03.2008)
4.	Member (RM)	:	Shri A. B. Pal (01.04.2007 to 10.04.2007) Shri R N P Singh (11.04.2007 to 31.07.2007) Shri M L Goyal* (13.08.2007 to 12.11.2007) Shri R C Jha (12.02.20008 to 31.03.2008)

* Additional Charge (Current Duties)

1.3 Broad Functions

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

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

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

- To conduct and coordinate research on the various aspects of river valley development schemes such as flood management, irrigation, navigation, water power development, etc., and the connected structural and design features;
- To promote modern data collection techniques such as remote sensing technology for water resources development, river forecasting and development of computer software;
- To conduct studies on dam safety aspects for the existing and future dams and standardize the instruments for dam safety measures;
- To initiate morphological studies to visualise river behaviour, bank erosion/coastal erosion problems and advise the Central and State Governments on all such matters;
- To conduct experiments, research and to carry out such other activities to promote economic and optimum utilization of water resources; and
- To promote and create mass awareness regarding the progress and achievements made by the country in the water resources development, use and conservation.

1.4 Headquarters

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

1.5 Regional Offices

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

1.6 Personnel Management

The staff strength of CWC in position as on 1.3.2008 was 3545 as against the sanctioned posts of 5115. The details of posts (sanctioned and filled) at the headquarters and at the Regional offices are given in Table 1.1. Summary of sanctioned and filled posts in different groups is given in Table 1.2.

Table 1.1
Staff Strength

Category	Sanctioned	Filled
Headquarters	1995	}
Regional Offices	3120	3467 }
Total	**5115**	**3467**

Table 1.2
Group-Wise Details of Posts Sanctioned and Filled

Sl. No.	Category	Sanctioned	Filled
1.	Group "A"	709	504
2.	Group "B"	1028	618
3.	Group "C"	2406	1572
4.	Group "D"	972	773
	Total	**5115**	**3467**

1.7 Plan Schemes & Annual Budget

1.7.1 Plan Schemes

Details of the Plan Schemes during the year 2007-08 are given below:

(Rs. in Crore)

S. No.	Name of Schemes	Objective / Scope of Works	XI Plan outlay	FY 2007-08 (CWC Component)		
				BE	FE	Exp.
1	National Water Academy	●Training for in-service engineers from State and Central organisations in the area of water resources development	15.00	2.00	1.97	1.71
2	Hydrology Project (Phase II)	●To extend and promote the sustained and effective use of Hydrological Information System (HIS) by all implementing agencies concerned with water resources planning and management in 13 States and 8 Central Agencies.	Total cost - Rs. 631.83 crore, CWC component - Rs. 29.60 crores	4.60	0.46	0.29
3	Development of Water Resources Information System	●To develop information system on water resources at national level by linking the concerned State & Central Departments for collection and exchange of data	234.30	22.32	15.52	14.4
4	Investigation of Water Resources Development Schemes	●To carry out the activities related to survey and field investigation. ●Preparation of pre-feasibility / feasibility reports and DPR of various water resources development schemes including the schemes for interbasin transfer of water.	Rs 40.00 crore out of Rs. 290.00 crore	4.00	3.14	3.31
5	Dam Safety Studies & Planning	Setting up of Instrumentation Demonstration Centre (spillover works of Xth Plan Scheme). ●Environmental & Social Assessment (ESA) Studies. ● Risk Analysis Studies and other specialized studies for identified projects. ●Training and development of special purpose packages on dam safety	10.00	1.00	0.63	0.48

		activities. ●Balance payment for Generalized PMP Atlases prepared for Indus & Krishna Basins. ●Digitization of Generalized PMP Atlases for Krishna Basin (Spillover works of Xth Plan Scheme). ●Preparation and digitization of Generalized PMP Atlases for Ganga & Brahmaputra basins. ●Up gradation & digitization of atlases prepared under Dam Safety Assurance & Rehabilitation Project (DSARP),				
6	Flood Forecasting	● Balance works of X Plan. ●Continuing activities of data collection, transmission, flood forecast formulation / dissemination. ● Installation of telemetry system at additional 222 stations.	130.00	16.00	14.30	13.71
7	River Management Activities & Works related to Border Areas	River management activities on boarder rivers which include: ● hydrological observations ● investigations and necessary flood control measures in cooperation with neighbouring countries wherever necessary.	Total outlay Rs. 601.00 crore, CWC outlay Rs. 118.95 crore)	10.67	6.50	6.28
8	Infrastructure Development	●Scheme includes activities related to (i) land& building of CWC, (ii) lands & buildings of CGWB, (iii) IT development of MoWR and (iv) up gradation and modernisation of computerisation and information system of CWC.	Total cost - Rs. 115.00 crore, CWC component (i) Land & Building- Rs. 57.00 crore (ii) Up gradation and modernisation of computerisation and information system of CWC – 6.00 crore.	6.15	2.32	2.59

1.7.2 Annual Budget

The non-plan budget outlays and expenditure for the year 2007-08 are given in Table 1.3.

Table 1.3

CWC (NON-PLAN) SCHEMES - OUTLAY AND EXPENDITURE

2701- MAJOR & MEDIUM IRRIGATION			
			(Rs. in crores)
SL.NO.	**NAME OF THE SCHEMES**	**BE-2007-08**	**EXP. UPTO MARCH,08**
1	Direction & Administration	14.05	13.78
2	Data Collection	43.75	46.35
3	Research	1.10	0.87
4	Training	0.55	0.49
5	Survey & Investigation	6.35	5.54
6	Consultancy	15.4	13.87
7	Exhibition & Trade Fair	0.30	0.13
8	Cell for Mon. externally aided Project	0.42	0.44
9	Mod. Of Equip. CWC Offset Press	0.28	0.19
10	Water Planning Wing	0.90	0.92
11	Hydrological Obs. In Chenab Basin	1.40	1.20
12	Seminars and Conferences	0.004	0
13	Contribution to International Bodies	0.015	0
	Total:	**84.52**	**83.78**
2711- FLOOD CONTROL & DRAINAGE			
SL.NO.	**NAME OF THE SCHEMES**	**BE-2007-08**	**EXP. UPTO MARCH,08**
1	Flood Control	34.1	36.48
2	Payment to Government of Bhutan for Maintenance of Flood Forecasting & Warning Centres	0.74	0.71
3	Strengthening & Modernisation of FF and Hyd. Obs. Network in Brahmaputra and Barak Basin	1.40	1.58
	Total:	**36.24**	**38.76**

1.8 Consultancy Services

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

1.9 Progressive Use of Hindi in Official Work

The official language policy is being implemented in all the offices of CWC.

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

1. With a view to review the progressive use of Hindi and also to keep a watch on the compliance of orders, instructions etc. field offices located at Shimla, Jaipur, Gangtok, Dehradun, Chandigarh, Chennai and Jammu were inspected and effective steps were taken for rectifying shortcomings noticed during the inspection.

2. To generate awareness on Hindi and to give practical knowledge of the Official Language provisions and incentive schemes etc. four Hindi workshops were organised at CWC headquarters, and one at Chennai in which 68 and 30 officials participated respectively.

3. Apart from translation of documents falling under section 3(3) of the Official Language Act, the Annual Report of CWC, 2006-07 and Central Guidelines for Water Audit and water conservation, Annual Report of Ministry of Water Resources for the Year 2006-07, technical reports, Website of CWC (HQ), theme paper for World Water day and other routine materials were translated into Hindi.

4. CWC has won the Rajbhasha Vaijayanthi shield (2nd prize) of the MoWR for the year 2005-06 for doing maximum work in Hindi.

5. Hindi fortnight was organised in September, 2007. 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 2006-07 were awarded for doing their maximum work in Hindi during the year to the CWC offices situated at region A,B,C viz. Middle Ganga Division-3, Varanasi, Tapi Division, Surat and Sikkim Investigation Division, Sikkim and Establishment-IX Section and Dam Safety & Rehabilitation Directorate within the Commission for doing their maximum work in Hindi during the year.

6. Meeting of the Hindi Salahakar Samiti was held on 04.01.2008 under the chairmanship of Hon'ble Minister of State for Water Resources, at Pune. Chairman, CWC participated from Central Water Commission (HQ).

7. To monitor the progress of Hindi, the 2nd sub-committee of the Parliamentary Committee on Official Language visited CWC (HQ) and field offices of CWC at Hyderabad and Raipur. The Committee suggested various measures for progressive use of Hindi. These are being implemented effectively.

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 1-1-2008)

Category	No. of Filled posts	No. of SCs	No. of STs	No. of OBCs
Group A	504	58	19	8
Group B	618	101	12	4
Group C	1572	190	42	51
Group D	773	222	79	11
Total	**3467**	**571**	**152**	**74**

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 the cadre controlled by Deptt. of Economic Affairs & Deptt. of Statistics.

1.11 Status of Filling up of Vacancies Reserved for Disabled Persons

In pursuance of Section 33 of Persons with Disabilities (Equal Opportunities Protection of Rights and Full participation) Act, 1995 posts for disabled persons have been identified and the position of Disabled Persons in position as on 31.12.2007 is given in Table 1.5. Efforts are being made to fill up the backlog vacancies.

Table 1.5
Number of Disabled Persons in Position

(As on 31.12.2007)

GROUP	OH	VH	HH	TOTAL
'A'	3	-	-	3
'B'	1	-	1	2
'C'	5	-	-	5
'D'	2	4	1	7
Total	**11**	**4**	**2**	**17**

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

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

1.12 Welfare Measures and Incentives

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

1.12.1 Benevolent Fund

The Central Water Commission Benevolent Fund set up in 1966 aims at providing prompt financial assistance to the deserving members to take care of damages at the

time of natural calamities or to meet expenses of medical treatment for their own prolonged illness such as Cancer, TB,, etc. and surviving family members of those who died while in service. The financial assistance is provided in two ways:

- Immediate Relief upto Rs. 15,000/-
- Long Term Relief upto Rs. 10,000/- payable in ten 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. 10/- (ten) per month. During the year 2007-08 there were six cases of immediate relief and two cases of long term relief approved by the Governing Body of the Benevolent Fund.

1.12.2 Co-Operative Thrift And Credit Society

Department of Irrigation Co-operative Thrift & Credit Society Ltd., has been functioning with its registered office at West Block – I, R.K. Puram, New Delhi since March 1959 for the welfare and benefit of the officers and staff of the Ministry of Water Resources, Central Water Commission, Central Soil & Materials Research Station, Department of Power, 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. 1,00,000/- and emergency loan of Rs. 8,000/-, 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. It has won several awards of Best cooperative society of Delhi.

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. Shri Ashwani Kumar while representing India in the 14th Asia Master Athletics championship held at Bangalore won Bronze Medal in 4x100meter relay race. CWC Hockey Team won the Team Championship in the Inter-Ministry Hockey tournament 2007-08. Shri Satish Kumar won Silver Medal in 100mtr and 200mtr race in the Delhi State Masters Athletics Championship 2007-08. CWC officials also participated in Swimming, Badminton and Table Tennis in Inter-Ministry tournaments 2007-08. The "Jal-Tarang" staff members of Central Water Commission participated in the Inter-Ministry Music & Dance and Short Play Competition, 2007-08 in the events of Instrumental Music, Folk Dance, Folk Music, Carnatic Light Music and Hindustani Light Music.

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

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

1.13 Restructuring of Central Water Commission

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

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

The draft report was submitted by ASCI in September, 2002. Thereafter interactive work shops were held with CWC officers to finalise the recommendations of the study as per the terms of reference. The final report of the ASCI was submitted on July 2007.

1.14 Citizen's Charter for CWC

As per the guidelines issued by Department of Administrative Reforms & Public Grievances (AR&PG), a Task Force under the Chairmanship of Member (WP&P), CWC and Chief Engineer (BPMO), CWC as Member-Secretary & Nodal Officer was constituted for formulating Citizen's Charter for CWC. The Citizen's Charter was finalised with the concurrence of MoWR and has been published on CWC website.

1.15 Right to Information Act

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

During 2007-08, 179 requests were received for information under RTI Act. Information was provided in all the cases.

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CHAPTER-II

WATER RESOURCES DEVELOPMENT

2.1 Water Resources in India

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

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

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

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

2.2 Highlights of Water Resources Sector

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

periods. Expansion of irrigation facilities, along with consolidation of the existing systems, has been the main strategy for increasing production of food grains.
Irrigation support is provided through major, medium and minor irrigation projects and command area development.

2.2.1 Irrigation Potential: Major & Medium Irrigation Sector

The ultimate irrigation potential of the country is estimated as 139.9 mha. of which irrigation potential from major and medium irrigation projects is assessed as 58.47 mha. Irrigation potential created in the country from major and medium irrigation projects, which stood at 9.7 mha. in 1951, has risen to 42.277 mha. till the end of X Plan(anticipated). The target for Eleventh Plan is to achieve an additional irrigation potential of 9 mha in the MMI sector. The cumulative figures of potential created in the successive plan periods are given in Figure 2.1

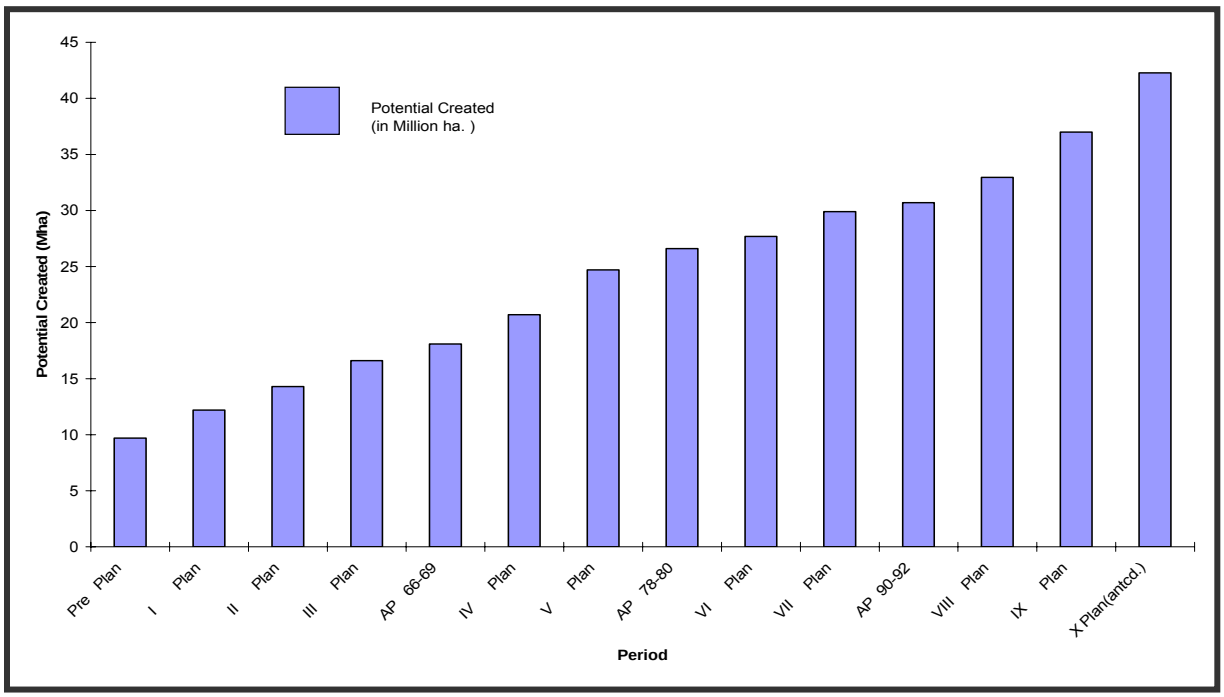


Fig 2.1 - Growth of Irrigation Potential Created During Pre-Plan and Plan Period (Cumulative) (Major and Medium Irrigation Sector)

2.2.2 Major and Medium Irrigation Projects

In 1951, during launching of the First Five Year Plan, there were 74 major and 143 medium irrigation projects in the country. During the plan period since 1951 to end of X plan in 2007, as per available information, total No. of projects taken up are 368 major, 1087 medium and 215 ERM schemes out of which 202 major, 865 medium and 126 ERM projects have been anticipated to be completed by end of X Plan as given below in Table 2.1. The cumulative irrigation potential created till the end of X Plan is anticipated as 42.277 mha and target kept for XI Plan is 9 mha. State wise cumulative potential created through major and medium projects upto end of IX Plan and anticipated cumulative achievement upto X Plan are given in Table 2.2. Growth of irrigation potential

created through major and medium irrigation projects and corresponding outlays/ expenditure in various plan periods is given in Table. 2.3.

Table 2.1

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

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

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

Table 2.2

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

(Thousand ha.)

Sl. No.	State	Ultimate Irrigation Potential	Potential created upto IX Plan (1997-2002)	Target of Potential creation during X Plan	Potential created upto X Plan
1	Andhra Pradesh	5000.00	3303.22	3051.59	3742.66
2	Arunachal Pradesh	0.00	0.00	1.20	1.20
3	Assam	970.00	243.92	174.37	312.90
4	Bihar	5223.50	2680.00	1714.83	2959.00
5	Jharkhand	1276.50	354.47	230.45	603.97
6	Goa	62.00	21.17	15.33	37.65
7	Gujarat	3000.00	1430.37	1300.83	2218.50
8	Haryana	3000.00	2099.49	1849.97	2191.36
9	Himachal Pradesh	50.00	13.35	7.51	15.45
10	Jammu & Kashmir	250.00	179.69	168.75	203.30
11	Karnataka	2500.00	2121.12	1844.82	2127.75
12	Kerala	1000.00	609.49	558.87	1090.47
13	Madhya Pradesh	4853.07	1386.90	875.63	1451.90
14	Chattisgarh	1146.93	922.50	760.74	1810.68
15	Maharashtra	4100.00	3239.00	2147.24	3494.15

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

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

Table 2.3

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

Period	Outlay/ Expenditure (Rs. Crore)	Cumulative Expenditure (Rs. Crore)	Potential created (m ha)		Potential Utilized (m ha)
			During	Cumulative	
Pre-plan period	--		9.70	9.70	9.70
I Plan (1951-56	376	376	2.50	12.20	10.98
II Plan (1956-61)	380	756	2.13	14.33	13.05
III Plan (1961-66)	576	1332	2.24	16.57	15.17
Annual Plan (1966-69)	430	1762	1.53	18.10	16.75
IV Plan (1969-74)	1242	3004	2.60	20.70	18.39
V Plan (1974-78)	2516	5521	4.02	24.72	21.16
Annual Plans (1978-80)	2079	7599	1.89	26.61	22.64
VI Plan (1980-85)	7369	14968	1.09	27.70	23.57
VII Plan (1985-90)	11107	26075	2.22	29.92	25.47
Annual Plans (1990-92)	5459	31534	0.82	30.74	26.31
VIII Plan (1992-97)	21072	52606	2.21	32.95	28.44
IX Plan (1997-2002)	49289	101895	4.03	36.98	31.01
X Plan (2002-2007) *	71213	173108	5.30	42.28	34.42

***Provisional**

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

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

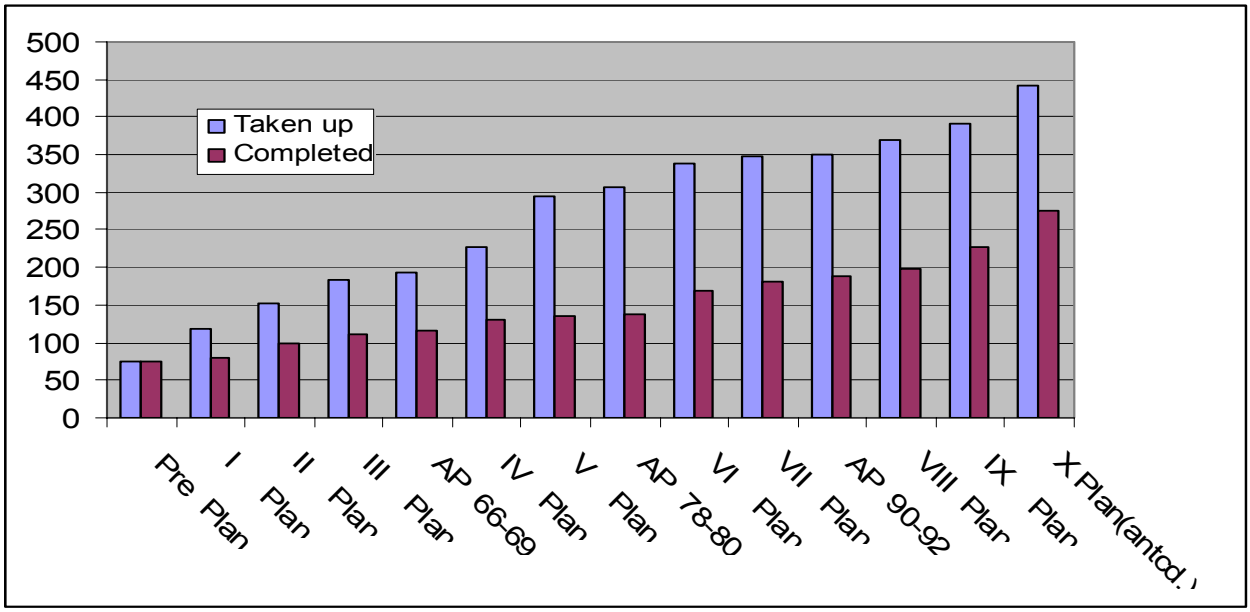


Fig 2.2 - MAJOR Irrigation projects
Taken up and completed during pre-plan and plan period (Cumulative)

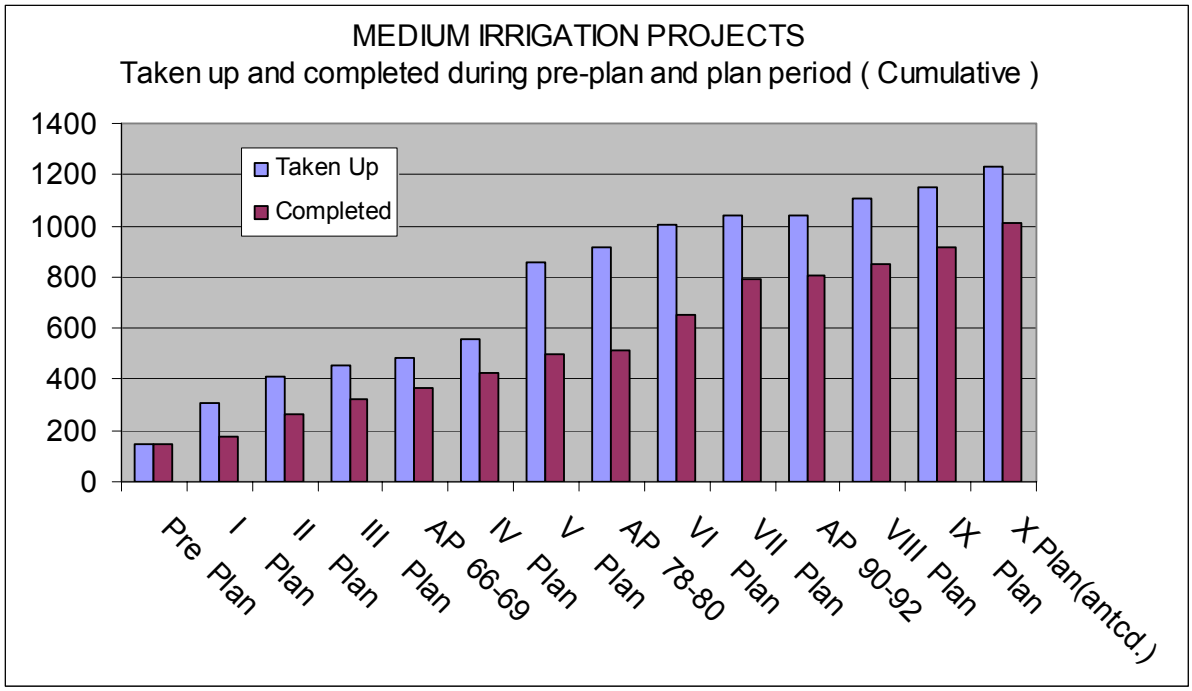


Fig 2.3 - Medium Irrigation projects
Taken up and completed during pre-plan and plan period (Cumulative)

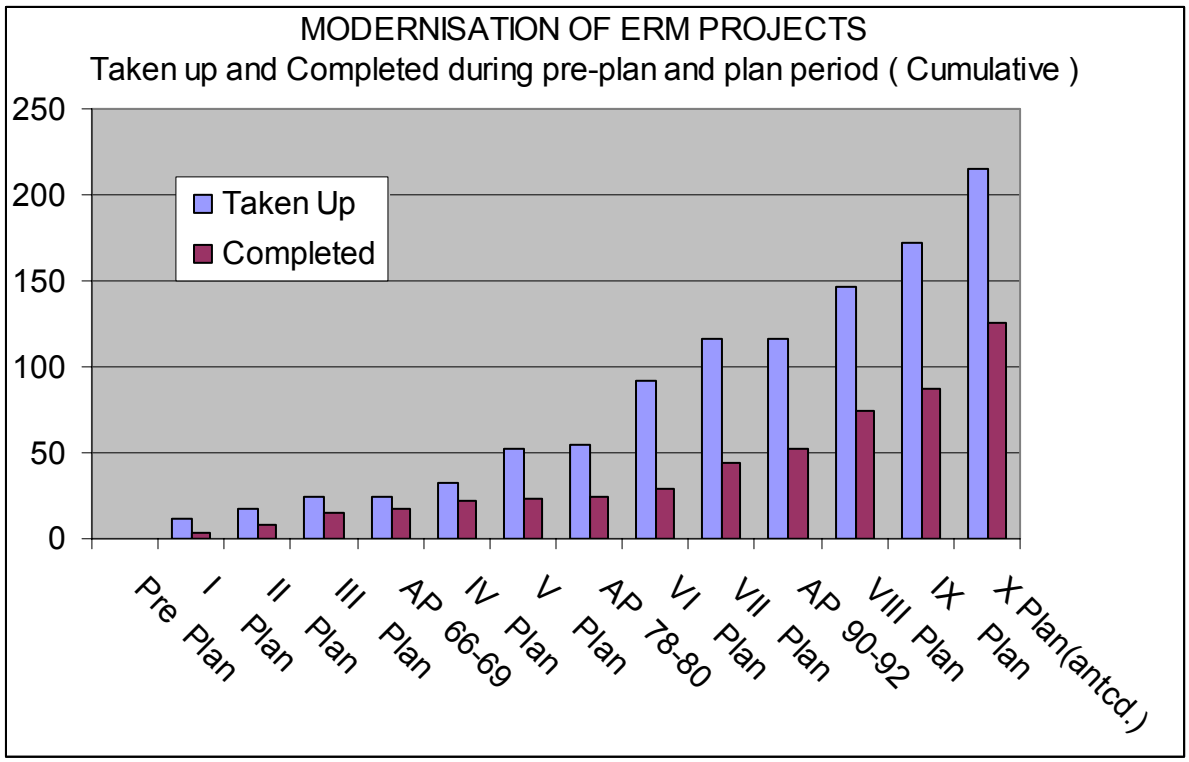


Fig 2.4 - Modernisation of ERM Projects
Taken up and Completed during pre-plan and plan period (Cumulative)

2.2.3 Irrigation Development under Tribal Sub-Plan districts

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

3

CHAPTER-III

RIVER MANAGEMENT

3.1 Systematic Collection and Storage of Hydrological Data

Central Water Commission at present operates National Network of 878 Hydrological Observation Stations. Out of these 878 stations, 300 are Gauge Stations, 200 are Gauge and Discharge Stations, 123 are Gauge Discharge and Water Quality Stations, 32 are Gauge Discharge and Silt Stations, 3 are Gauge and water quality, 2 Snow Hydrology Observation Stations and 218 Gauge Discharge Silt & Water Quality Stations. The basin-wise distribution of these stations is detailed below in Table 3.1.

Table 3.1
Basin-wise number of Hydrological Observation Stations

Sl.No.	Name of Basin	No. of Sites
1	Indus	34
2	Ganga,Brahmaputra, Meghna/Barak	450
3	Subarnrekha	12
4	Brahmani-Baitarni	12
5	Mahanadi	37
6	Godavari	67
7	Krishna	56
8	Pennar	8
9	Cauvery	34
10	Tapi	18
11	Narmada	25
12	Mahi	12
13	Sabarmati	13
14	West Flowing rivers of Kach, Saurashtra & Loni	15
15	West Flowing Rivers to South of Tapi	55
16	East Flowing Rivers between Mahanadi & Godavari	12
17	East Flowing rivers between Krishna and Pennar	1
18	East Flowing rivers between Pennar and Cauvery	17
	Total	**878**

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

P&D Organisation is maintaining hydrological data pertaining to Ganga, Brahmaputra and Barak Basins in computerized format. The data of these basins being of classified nature is provided to the bonafide users on request following a set procedure and guidelines for release of classified data. Computerized data is now available for other regions also after the implementation of the Hydrology Project Phase-I. The users of the data include Central/State Government offices, Public Sector Undertaking and Institutions / Societies working under the direct control of Central/State Governments and IIT's and 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. Under the project, Hydrological Information System (HIS) has been established to provide reliable data sets for long term planning, design and management of water resources and water use systems and for research activities in the related aspects together with improvement in the infrastructure for data collection.

Central Water Commission has got developed software (WISDOM) for all surface and ground water participating agencies for data storage and dissemination in respect of hydrological and meteorological data under the Hydrology Project. A combined catalogue containing Meta Data (information about availability of data) of various data storage centres have been hosted on the web (www.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.

Hydrology Project-II has been launched after implementation of Hydrology Project-I. 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 eight central agencies for utilization of data.

The components of Central Water Commission under Hydrology Project Phase-II are 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 extension component the major activities envisaged by the Central Water Commission is Development of Hydrological Design Aids Software including standardization of methodology /protocols.

The estimated cost of the proposal is Rs. 2962.98 lakh.

I. Institutional Strengthening:

Under this component it is proposed to consolidate the gains made under HP-I by way of strengthening of capacities through training, upgradation /replacement of hardware /software acquired during HP-I, maintenance of web site; data dissemination and knowledge sharing, workshop/ seminars/ study tours, etc.

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

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

II. Vertical Extension:

Development of Hydrological Design Aids

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

Following activities are proposed under the project:

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

Status of HP-II

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

- TOR and EOI for the development of Hydrological Design Aids (Surface Water) have been approved by world Bank. The EOI has been published in news papers and also on UNDB online in the month of March 2008. EOI proposals received from various agencies/firms have been opened on 28-3-2008. Evaluation of the same is under process.
- Request for proposal for the Hydrological Design Aides has been prepared and in process for its approval from the World Bank.
- Estimates for providing the additional facilities at NWA, Pune have been submitted to MoWR.
- **Development on Purpose Driven Studies:** Three meetings of participating agencies were held to discuss the concept notes of PDS-SW received from Andhra Pradesh (1), Gujarat(4), Orissa(2), Madhya Pradesh (2), Maharashtra (4), NIH(5) and BBMB(1).

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 flood of certain magnitude while the floods of higher magnitude 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 as also better planning of rescue/ relief operations. Inflow Forecast also helps in optimum regulations of (multipurpose) reservoirs with or without flood cushion.

Flood Forecasting activities in India made a beginning in a scientific manner in 1958 when the erstwhile Central Water and Power Commission (CW&PC) set up a Flood Forecasting Unit (FFU) for issuing flood warnings for the river Yamuna at the National Capital, Delhi. This service has since been expanded by CWC to cover almost all major flood prone inter-State river basins of India. At present there are 175 flood forecasting stations, of which 147 are level forecasting and 28 are inflow forecasting stations on major dams/barrages. It covers 9 major river systems in the country, including 71 river sub-basins spread over 15 States viz. Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tripura, Uttarakhand , Uttar Pradesh, West Bengal; one Union Territory of Dadra & Nagar Haveli and the National Capital Territory of Delhi.

On an average, over 6000 forecasts are issued every year by Central Water Commission during flood season. Normally, these forecasts are issued 12 to 48 hours in advance, depending upon the

river terrain, the locations of the flood forecasting sites and base stations. For the purpose of Flood Forecasting, hydrological data is being observed at 878 Gauge and Discharge sites, and hydro-meteorological data at 500 rain gauge stations and communicated through a network of 550 wireless stations. Synoptic weather situations, weather forecast /heavy rainfall warnings etc. are also being collected from FMOs. (Flood Meteorological Offices of IMD).

3.2.1 Flood Forecasting Performance during 2007

During the flood season 2007 (May to Oct.) 8214 flood forecasts (6515 level forecast and 1699 inflow forecasts) were issued out of which 7996 (97.22%) forecasts were within accuracy limit. During the flood season, the real time hourly data of over 250 stations (most of flood forecasting stations and few base stations) was collected through web and compiled, analysed and used to generate flood reports of the regions.

During the flood season of 2007 (May to October), out of 147 level forecasting sites, unprecedented flood situations (where the highest flood level attained during the flood season exceeded their respective previous H.F.L.), were witnessed at 8 flood forecasting stations viz. Subernarekha at Rajghat (Orissa), Jiabharali at NT Road Xing, Puthimari at NH Road Bridge Xing, Sankosh at Golakganj, Kushiyara at Karimganj and Katakhal at Malizuri (all in Assam), Ghaghra at Ayodhya (U.P.), Jaldhaka at Mathabhanga (West Bengal).

In addition to monitoring of forecasts, hourly level data of over 200 stations in few basins (most of them are Base stations) were also monitored, collected and analysed and used for inferring long range forecasts (advisory nature) of flood situation along major rivers like Godavari, Yamuna, Brahmaputra, Ganga etc. using web-enabled software which connected each Divisional Data centre with FFM Directorate's Central Control Room, Sewa Bhawan, New Delhi. The vital information was disseminated to National Disaster Management Authority (Min. of Home Affairs) on real time bases, in addition to various User Agencies from each Division.

3.2.2 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 Governments and its own field formations. During the year 2007, a total of 213 Special Flood Bulletins (Unprecedented-89 and High flood situations-124), were issued, mostly on 3 hourly basis. In addition, 154 ordinary daily bulletins were issued; which included both level and inflow forecasts information.

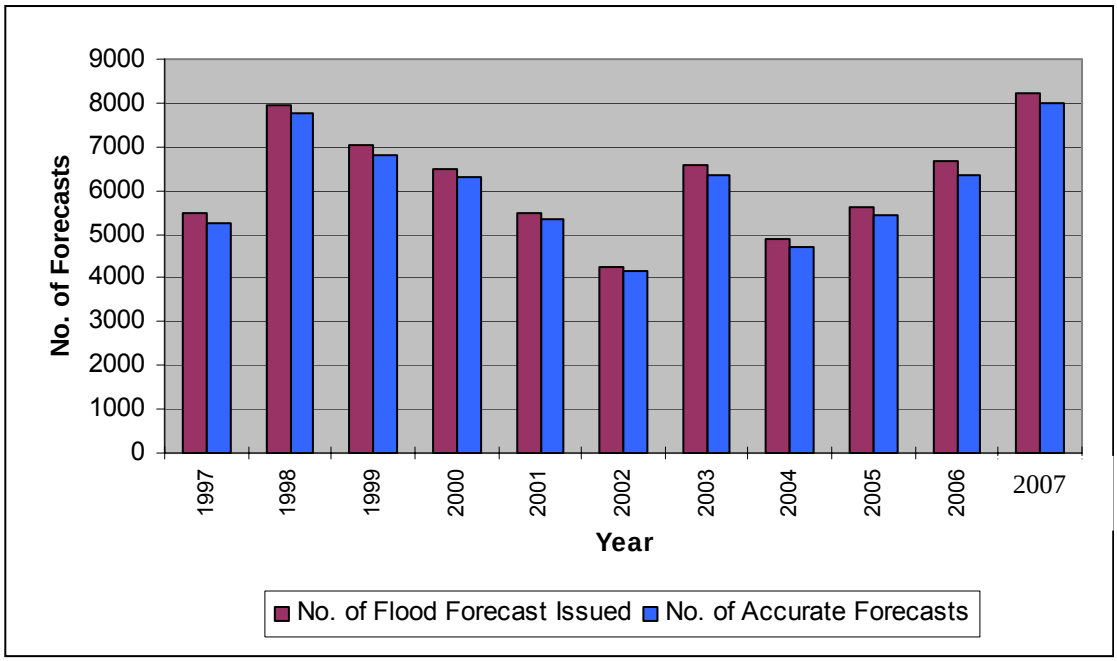


Fig 3.1 - Flood Forecasting Performance (1997-2006)

3.2.3 Modernisation of Flood Forecasting Services

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

During 9th Plan, telemetry system was installed at 55 stations in Chambal (20 nos.) and Mahanadi (35 nos.) basins for real time data collection and its transmission. During 10th Plan, installation of telemetry system was undertaken at 168 stations in Lower Ganga Basin (Damodar River), Krishna Basin, Godavari basin, Pennar basin, Lower Mahanadi Basin, Upper Brahmaputra Basin and Yamuna Basin. Out of this, the works were completed at 147 stations upto 31-3-2008 and the works on remaining stations are in progress.

The work of setting up of 11 modeling centers at Dibrugarh (Assam), New Delhi (UYD), Agra, Hyderabad(LKD), Hyderabad (LGD), Kurnool, Bhadrachalam, Bhubaneswar, Guwahati, Asansol and Maithon, undertaken in X Plan, is also in progress; where the hourly data will be transferred from existing earth stations located at Jaipur (Rajasthan) and Burla (Orissa) through VSAT.

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 CWCFFL were acquired under UNDP and Central Water Commission-DHI

Schemes. Recently, Window based MIKE-11 modeling software has been procured under World Bank aided DSARP Scheme.

Under USAID assisted Disaster Management Project of Ministry of Home Affairs-Climate Forecasting, work for development of Decision Support System for flood forecasting and inundation forecast model of Mahanadi basin and issue of flash flood forecasting for Sutlej basin are under progress.

3.3 Flood Situation Assessment and Flood Damages

The data on Flood damages was collected and compiled from various field offices of CWC and from State authorities. Flood damage data of last 10 years is given below:

Table 3.1: Damage due to floods during last 10 years

Year	Area affected (m.ha)	Population affected (million)	Total damages (Rs. crore)
1998	10.845	47.435	8860.721
1999	7.765	27.993	3612.760
2000	5.382	45.013	8864.544
2001	6.175	26.463	7109.416
2002	7.090	26.323	2574.543
2003	6.503	34.466	4434.354
2004	8.031	34.215	3336.591
2005	3.376	29.684	2822.155
2006	0.437	28.015	662.095
2007	3.549	41.462	3939.898

3.4 Flood Management Works

Out of India's total geographical area of 329 mha, the flood prone area was assessed as 40 mha by National Flood Commission (Rashtriya Barh Ayog) as per its Report-1980, out of which an area of 32 Mha was assessed as protectable. An area of about 16.7436 Mha has been provided with a reasonable degree of protection upto March 2006. The protection has been offered by means of construction of embankments (34398 km), drainage channels (51318 km.), town protection works (2432 Nos.) and by raising of villages (4984 Nos.) upto March 2006.

3.5 Flood Management Programme:

The Government of India has launched "Flood Management Programme", a State Sector scheme under Central Plan, to provide Central assistance amounting to Rs. 8000 crore to States during XI plan for taking up flood control, river management, drainage development, flood proofing and anti-sea erosion works. The schemes for central funding would be decided by an Empowered Committee headed by Secretary (Expenditure), Ministry of Finance, GOI, depending upon the critical emergent situation and availability of funds with the GOI.

The works under this scheme would be implemented generally by the Flood Control / Irrigation Departments of the State Government. In exceptional cases, the works can be entrusted to the Central Government Organizations / Undertakings also in exigency of work. The scheme would be monitored by Central Water Commission (CWC), Ganga Flood Control Commission (GFCC) and Brahmaputra Board, in their respective jurisdiction.

The appraisal of schemes for the States other than Ganga Basin and appraisal of all schemes for drainage development and

anti-sea erosion is done by CWC. Under "Flood Management Programme" proposals of the States other than North Eastern States and Ganga Basin States as well as the proposals of all States for anti-sea erosion works are processed and coordinated by CWC for release of funds. Under the above plan scheme, the spill over works of J&K approved in X Plan under various plan schemes, 22 new works of J&K and 102 new works of Orissa were processed in CWC.

3.6 Technical Expert Group (TEG)

The Ministry of Water Resources constituted vide order dated 8th Sept, 2007, a Technical Expert Group (TEG), headed by Member(RM), Central Water Commission for preparation of " National Perspective Plan for Controlling Floods and Mitigating their Impacts". The TEG has representatives from various flood affected states besides Members from various Central Organisations.

The TEG has met three times in New Delhi to discuss the flood problem in States and measures undertaken / proposed by them for controlling floods and mitigating their impacts. 1st draft report was circulated to the Members of the Group during third meeting of Group held on 29-1-08. Based on the decision taken during third meeting, various States have been requested to supply requisite information for incorporating in the report.

3.6 Flood Plain Zoning

The need for enactment of Flood Plain Zoning legislation has been emphasized in various National fora since 1975. A model bill for Flood Plain Zoning was prepared by CWC and circulated in 1975 to all the States for enactment of legislation by the States.

Central Water Commission has been continuously impressing upon the States for necessary follow-up action to implement Flood Plain Zoning approach. To facilitate this effort, CWC has prepared pamphlets depicting essential features of flood plain management and circulated it to all the State Governments. Manipur enacted flood plain zoning legislation in 1978, but the demarcation of flood zones is yet to be done . The State of Rajasthan also enacted legislation in the State, however, enforcement thereof is yet to be done. The Governments of Uttar Pradesh, Bihar and West Bengal have initiated the process for enactment of legislation. Other States have yet not taken any action for enactment of legislation.

The Central Water Commission initiated the work of the preparation of large scale (1:15,000) topographic maps with close contours to enable the State Governments to identify the flood prone areas liable to flooding in different frequency floods and regulate the developmental activities therein. Out of 1,06,000 sq. km of priority area identified for preparation of topographical maps an area of about 56,000 sq. km. was surveyed by Survey of India as a deposit work of CWC and maps sent to the State Governments for necessary action. However, the scheme was discontinued in 1991 due to poor response from the States.

In pursuance of the decision taken in the 14th meeting of Ganga Flood Control Board, the above activity was revived and an MOU

had been signed between CWC and SOI in March, 2006 for updating and digitization of available maps of flood affected area (54,740 sq km) in the States of U.P., Bihar, West Bengal, Punjab, Haryana , Delhi, Assam and J&K by the SOI. The work is in progress.

3.8 River Morphology

The study of river morphology and implementation of suitable river training works as appropriate have become imperative for our nation as large areas of the country are affected by floods every year causing severe damage to life and property in spite of existing flood control measures taken both by Central and State Governments. Problems are aggravating mainly due to large quantity of silt/sediment being carried and deposited in down stream reaches. The special behaviour of the river needs to be thoroughly understood for evolving effective strategies to overcome the problem posed by it. Monitoring of morphological behaviour has also been recommended in the Seminar on "Silting of Rivers : Problems and Solutions" which was held on 12th and 13th February 2004 at India International Centre, New Delhi. Considering the seriousness of the problem, CWC has taken up the Morphological studies of 6 flood prone rivers viz. Brahmaputra, Kosi, Gandak, Ghaghara, Sutlej and Ganga (in reach from Allahabad to Buxar) using remote sensing techniques in addition to field surveys and collection of related data during the period of 10th Five Year Plan. With a view to having a multi disciplinary approach, a 'Standing Committee for Morphological Studies of Himalayan rivers of India' having members from MoWR, CWC, Brahmaputra Board, CWPRS, Roorkee, NRSA, Hyderabad, Space Application Centre, Ahmedabad, GSI, IWAI, Water Resources/Irrigation Departments and Space Application Centres of State Government of the Basins concerned was constituted by MoWR in June 2006. Member (RM) is the Chairman of the Committee and Director (Morphology) is its Member Secretary. The first meeting of the Standing Committee was held on 11th December 2006. Follow up actions of the minutes of the 1st meeting of the "Standing Committee for Morphological Studies of Himalayan Rivers of India" are being taken up. During XI Plan, morphological studies of 16 rivers namely Brahmaputra, Gandak, Ganga, Ghaghara, Kosi,.Sutlej, Mahananda, Mahanadi, Yamuna, Tapi, Krishna, Tungbhadra, Sarda, Rapti, Kosi, Bagmati & its tributaries, Subansiri and Pagladia tributaries of Brahmaputra are proposed to be taken up under the plan scheme "R&D Programme in Water Sector" and the EFC Memo for the scheme has been approved.

3.9 Water Quality Monitoring

Central Water Commission is monitoring water quality at 371 key locations covering all the major river basins of India with a three-tier laboratory system for analysis of the parameters. The level-I laboratories are located at 258 field water quality monitoring stations on major rivers of India where physical parameters such as temperature, colour, odour, sp. conductivity, total dissolved solids, pH and dissolved oxygen of river water are observed. There are 24 level-II laboratories located at selected Divisional Headquarters to analyse 25 nos. physico-chemical characteristics and bacteriological

parameters of river water. 4 Level-III/II+ laboratories are functioning at Varanasi, Delhi, Hyderabad and Coimbatore where 41 parameters including heavy elements/toxic parameters and pesticides are analysed periodically. The data generated are computerized in the data base system and disseminated in the form of Hydrological Year Book, Status Reports and Bulletins. Water Quality Year books are published and WQ Bulletins are issued regularly.

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

The Working Group to advise WQAA on the minimum flows in the rivers to conserve eco system headed by Member (RM), has submitted the recommendations to WQAA. In the 5th meeting of WQAA Chairman suggested to modify the report by incorporating the Water Quality aspects in deciding the minimum flows and accordingly the report was modified by incorporating Water Quality aspects and submitted to WQAA on 2-8-2007 for approval. A committee under the Chairmanship of Chief Engineer (EMO) has been set up to work in to the legal & institutional aspects for adopting minimum flows recommended in the report.

3.10 Coastal Erosion

Coastal erosion is a phenomenon experienced all over the world and 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.

The following schemes are under implementation/consideration for protection of vulnerable coastal areas of maritime States/Union Territories from sea erosion.

3.10.1 National Coastal Protection Project

The National Coastal Protection Project for protection of coastal areas of maritime States / UTs from sea erosion is under formulation with a view to explore possibilities of funding through external resources or other domestic resources. The proposal of Karnataka, Kerala, Maharashtra, Orissa, Tamil Nadu, West Bengal and UT of Puducherry have been found acceptable for inclusion in the Project, while the compliance of CWC comments is awaited from the coastal States of Andhra Pradesh, Goa, Gujarat and UT of Lakshadweep. The compliance of comments received from Gujarat Govt. in February, 2008 is under examination. The UT of Andaman & Nicobar Islands has not submitted any proposal so far.

3.10.2 Centrally Sponsored Scheme

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

During XI Plan, the anti-sea erosion works are being funded under "Flood Management Programme" approved in principle for providing central assistance of Rs. 8,000 crore to States.

3.10.3 Sustainable Coastal Protection and Management Project

As an out come of the discussions between the Government of India and the Asian Development Bank (ADB) relating to coastal protection, ADB has approved the provision of Technical Assistance for an amount not exceeding US $ 1 million for preparing a Sustainable Coastal Protection and Management Project for the States of Goa, Karnataka and Maharashtra. The Technical Assistance will be financed by a grant provided by the Government of Japan and administered by ADB. The Technical Assistance Project, which will be used to prepare an investment project for Sustainable Coastal Protection and Management in the States of Maharashtra, Goa and Karnataka, is likely to start in April, 2008.

4

CHAPTER-IV

BASIN PLANNING

4.1 National Water Planning

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

4.2 National Water Resources Council

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

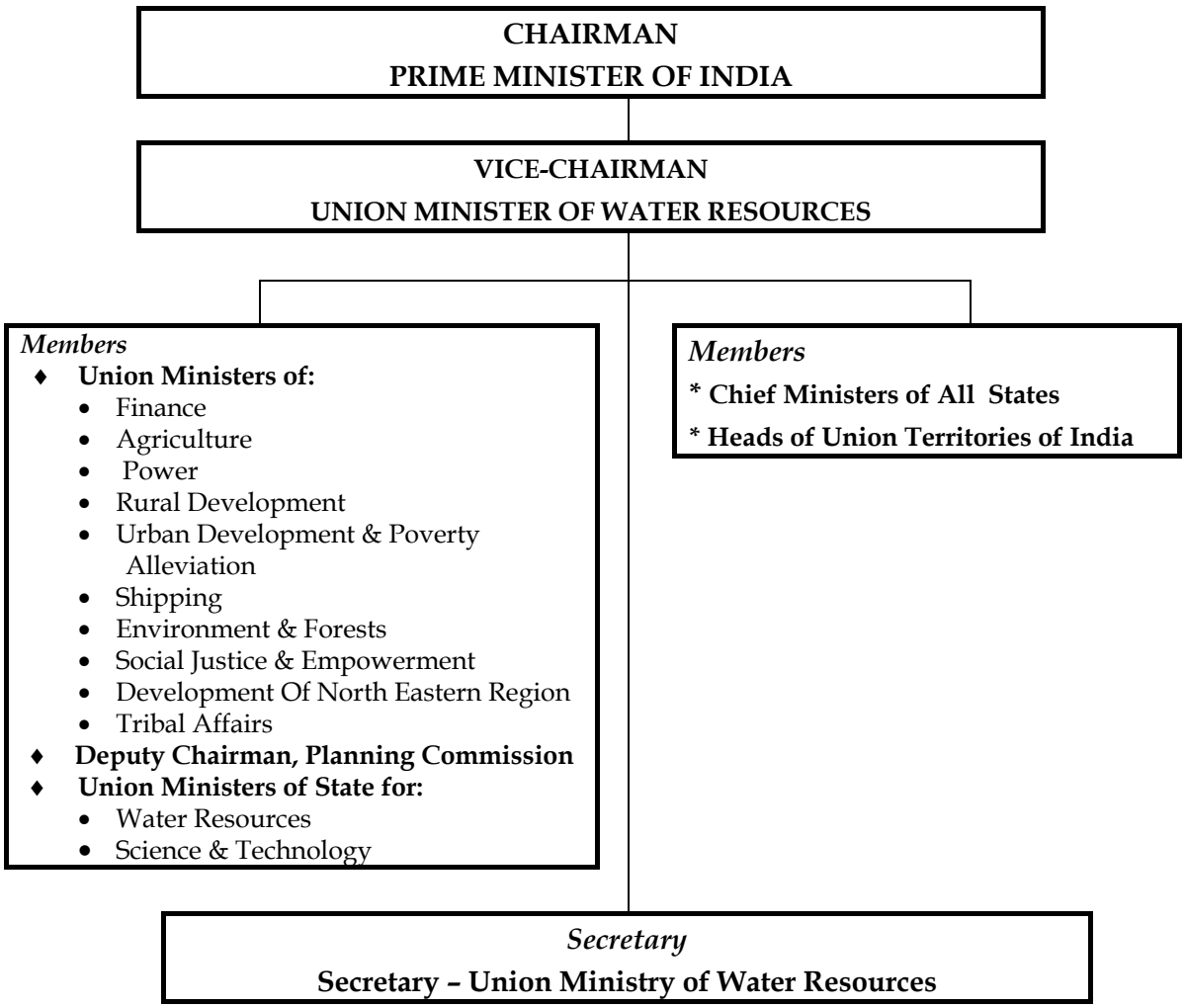


Fig. 4.1 – Composition of National Water Resources Council

After deliberations and subsequent emergence of consensus in the 5th meeting of the National Water Resources Council held on 1st April, 2002, the National Water Policy (NWP), 2002 was adopted by the Council.

Follow-Up Action of NWP

Consensus was reached during the fifth meeting of NWRC for the followings:-

- Formulation of water policy for individual states.
- Formulation of an operational action plan with an aim to achieve the desired objectives of the policy.

Accordingly, the Action Plan for implementation of National Water Policy 2002 was adopted in 12th National Conference of Water Resources and Irrigation Ministers held on 5th February 2003 under the chairmanship of the Hon'ble Union Minister of Water Resources. The Action Plan broadly includes the proposed action points for every provision of the National Water Policy (2002) and identifies the Ministries/Departments who are to provide vital inputs towards its implementation. The proposed time frame for implementation of the Action points is also indicated.

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). The organizational structure of Board is shown in Fig.4.2.

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

- Follow up Action on the decisions taken in the Eleventh Meeting of the National Water Board
  - a) Report in respect of State Water Policies.
  - b) Report of the Committee Constituted under the Chairmanship of Additional Secretary (Water Resources) for recommending appropriate model of River Basin Organisations.
- Implementation of Irrigation Projects in the Time Bound Manner
- Ground Water Management
- Participatory Irrigation Management
- Need for Regulatory Mechanism to ensure Sustainability of the Resources and Facilities created.

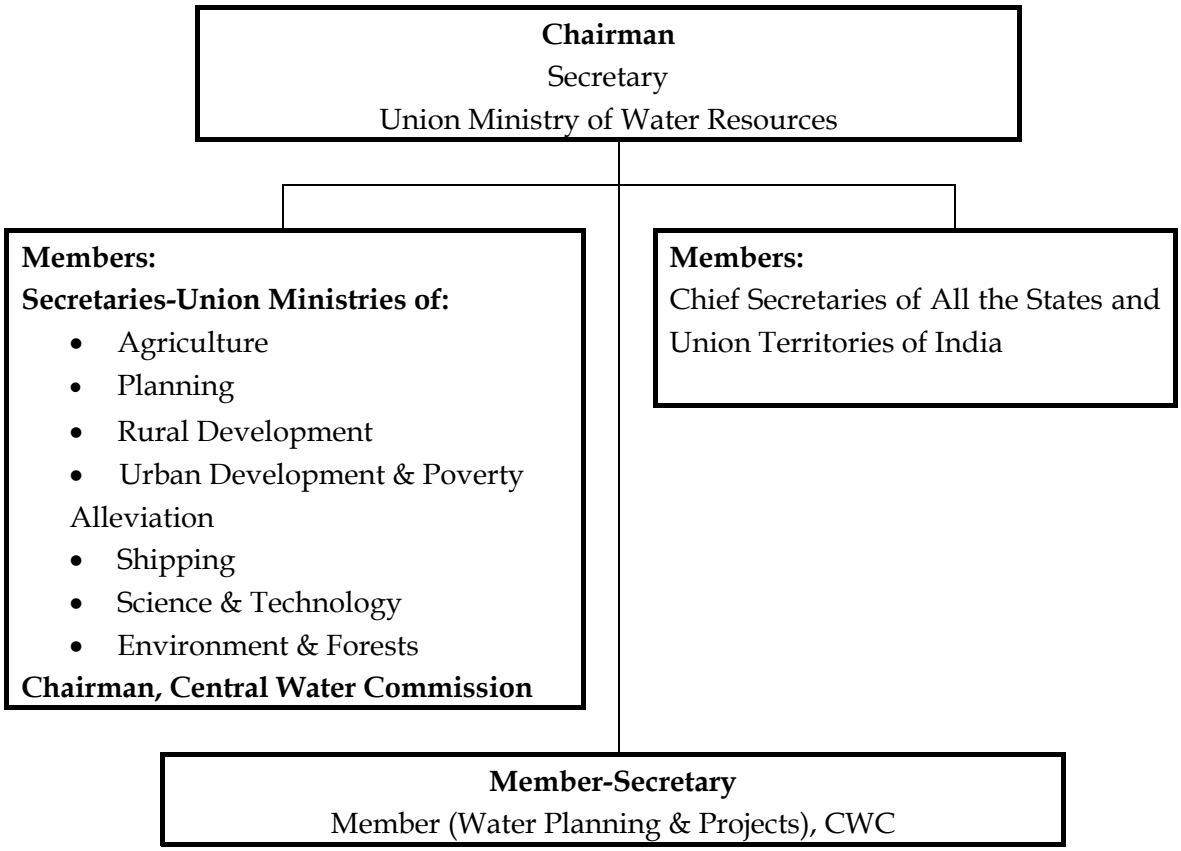


Fig. 4.2 - National Water Board

4.3.1 Formulation/Adoption of State Water Policy

In the meeting, the States of Goa, Himachal Pradesh, Karnataka, Madhya Pradesh, Maharashtra, Orissa and Uttar Pradesh informed that they have already adopted the State Water Policy. Union Territories of Daman and Diu & Dadar and Nager Haveli informed that they are following National Water Policy, 2002. In respect of Andhra Pradesh, Assam, Bihar, Chattisgarh, Gujarat, Kerala, Punjab, Puducherry, Rajasthan, Sikkim, Uttarakhand, Tamil Nadu and Tripura it was indicated that their Water Policy is under formulation/adoption. Representatives from other States/UTs mentioned that they are in the process of formulation of their Water Policy.

4.3.2 River Basin Organisation

National Water Board formed a Committee on River Basin Organisation (RBO), under the Chairmanship of Additional Secretary, MoWR with Commissioner (PP), MoWR as the Member-Secretary. The representatives from eight states namely Maharashtra, Tamil Nadu, Uttar Pradesh, Jharkhand, Madhya Pradesh, Gujarat, West Bengal and Orissa were its members. The report of the Committee finalized in its fourth meeting held in June 2004, has been submitted and was subsequently discussed in 12th NWB meeting. The Members agreed to examine the report and send their comments/views. The establishment of RBOs as recommended by the Committee was broadly agreed. However States/UTs requested for some more time for

examination and submission of comments/observation on the proposed setup. After deliberation it was agreed that they would submit their comments/observations latest by 31st March 2007.

Under the XI Plan, it has been proposed to set up three river basin organisations, for which the draft SFC memo has been put up for the approval. In this connection, as desired by the Secretary (WR) a draft concept paper on the RBO has also been prepared to send to the States in which the aforesaid identified three basins / sub-basins are situated. The three proposed river basin are namely Brahmani - Baitarni, Sabarmati and Pennar.

4.3.3 Implementation of irrigation projects in time bound manner

The States endorsed the actions/points brought out in the agenda for time bound completion of irrigation projects. Several issues were highlighted by the States regarding the implementation of irrigation projects in a time bound manner. The suggestions put forward by the States include need for fixing milestones, devising suitable mechanism to resolve inter-state matters in a time bound manner, easing norms for environmental and forest clearance of water resources development projects, relaxation of the norms under AIBP, reviewing the norms of AIBP for the North Eastern States, changing the time of release of CLA to April-May and November–December instead of October and March, expediting the process of appraisal and clearance, funding of projects under AIBP on the pattern of Pradhan Mantri Gramin Sarak Yojna etc. It was also suggested that the central grant under AIBP needs to be stepped up substantially.

In regard to the resettlement issues and the environment & forest problems the State of Maharashtra informed that the State has constituted a State Resettlement Authority and also a team for looking into forest and environment problems of the projects.

4.3.4 Ground Water Management

The issue of stage of ground water development, over-exploitation of ground water resources and the status of progress on the enactment of legislation for regulation were deliberated during the meeting. The States of Arunachal Pradesh, Manipur and Mizoram informed that there is presently no over exploitation of ground water and therefore there is no need for ground water legislation. Some of the States/UTs like Andhra Pradesh, Goa, Himachal Pradesh, Kerala, Tamil Nadu, West Bengal, Puducherry and Lakshadweep informed that necessary act/legislation have been enacted and implemented. The States of Orissa, Uttar Pradesh informed that formulation/enactment of the act/bill is under progress. The remaining States/UTs were requested to expedite the same in a time bound manner. The State of Punjab expressed that they are not in favour of ground water legislation. The Board requested the States/UTs with similar opinion to revisit their position, considering the necessity for such legislation. Some of the States mentioned the need for artificial recharge of ground water and diverting surplus flood water to deep aquifers.

4.3.5 Participatory Irrigation Management (PIM)

The States of Andhra Pradesh, Haryana, Karnataka, Madhya Pradesh, Manipur, Orissa, Puducherry, Punjab, Rajasthan and Tamil Nadu informed that a large number of Water Users' Associations (WUA) have been formed. The States of Chattisgarh, Goa, Gujarat and Maharashtra mentioned that necessary act has been passed and implementation is under progress. The States of Arunachal Pradesh, Himachal Pradesh, Uttar Pradesh informed that formulation of PIM legislation has been initiated. The State of Kerala indicated that considerable amount of work is needed to make PIM more effective and indicated that the case would be addressed suitably. The State of Uttarakhand stated that imparting training to farmers for implementation of PIM is in progress. The role of stakeholder/farmers in the overall development of water resources and necessity of PIM was well appreciated by the Board and the States agreed to expedite the process of enactment of the legislation/amendment of existing Irrigation Acts.

4.3.6 Need for Regulatory Mechanism to ensure sustainability of the resources and facilities created.

The State of Maharashtra informed that Maharashtra Water Regulatory Authority (MWRA) has already been formulated and is functional. The States of Himachal Pradesh, Madhya Pradesh, Orissa, Rajasthan, Tamil Nadu and Uttar Pradesh stated that the process of setting up of regulatory mechanism is under formulation. The Board impressed upon the States the necessity for setting up of appropriate regulatory mechanism for optimum, judicious and equitable management, allocation and utilisation of water resources in a time bound manner.

4.4 Inter – Basin Transfer of Water & Interaction with NWDA

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

4.4.1 Technical Advisory Committee (TAC) of NWDA

The Governing Body of the NWDA Society has constituted the Technical Advisory Committee (TAC) for the Agency under the Chairmanship of the Chairman, Central Water Commission, for examination and scrutiny of the various technical proposals framed by the Agency. Member (D&R), CWC and Member (WP&P), CWC are the members of the TAC of NWDA.

36th TAC meeting was held on 19th July, 2007 and the technical aspects of the following reports have been discussed:

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

(ii) Feasibility report of Par- Tapi-Narmada link project
(iii) Feasibility report of Parbati-Kalisindh-Chambal link project
(iv) Feasibility report of a link system of Mahanadi-Godavari-Krishna-Pennar-Cauvery-Vaigai-Gundar linkage
(v) Feasibility report of Daman ganga-Pinjal link project
(vi) Status of studies pertaining to Himalayan rivers Development Component of NPP
(vii) Prefeasibility report of jogighopetist farakka link project
(viii) Status of studies pertaining to Peninsular rivers Development Component of NPP
(ix) Finalization of water balance studies of NWDA in consultation with central water commission.

4.4.2 Consensus Group

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

The Consensus Group has, so far, held nine meetings. The 9th meeting of the, Consensus Group were held on 28th June, 2007 to discuss the various issues regarding Parbati - Kalisindh – Chambal (P-K-C).

4.4.3 Committee for expediting work of Inter Linking of Rivers

MOWR has constituted the following committees to expedite work of Inter-linking of rivers.

1) Committee of Environmentalists & Social Scientists and other experts on inter-linking of rivers, under Secretary, Water Resources. Chairman, CWC is a member of the Committee. The 4th meeting of the Committee was held on 8.1.2008 under chairmanship of Secretary, MOWR.

2) Ken-Betwa Link Detailed Project Report (DPR) Monitoring Committee under the Chairmanship of Chairman CWC to monitor and supervise the overall work of preparation of Detailed Project Report (DPR) of Ken-Betwa link project. The 5th meeting of the Committee was held on 20th February, 2008. The present status of various works for preparation of detailed Project Report of Ken-Betwa Link project and PERT/CPM charts were reviewed.

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

4.5 Reservoir Operation

4.5.1 Joint Operation Committee of Rihand Reservoir

The 20th meeting of Joint Operation Committee of Rihand Reservoir was held in New Delhi on 28th March 2008 under the

chairmanship of Member (WP&P) in which the operation plan for 2007-08 was finalized and the issue of restoration of MDDL to the designed level was discussed.

4.5.2 Decision Support System (Planning)

Preparation of a Decision Support System (Planning) is in process under World Bank funded Hydrology Project-II. National Institute of Hydrology, Roorkee is the nodal agency for this work**.** Till now six meetings of Steering Committee (Focal Group) have been held to consider the procurement of consultancy and Major Technical Works of DSS (Planning). CE (BPMO), CWC is the member of this Steering Committee.

4.6 Integrated River Basin Planning Development And Management

As per National Water Policy 2002, "Water is a scarce and precious national resource to be planned, developed, conserved and managed as such, and on an integrated and environmentally sound basis, keeping in view the socio-economic aspects and needs of the States. Efforts to develop, conserve, utilise and manage this important resource in a sustainable manner, have to be guided by the national perspective". In consonance with this objective, a Core Group for Comprehensive System studies (CSS) of Damodar Barakar basin was formed with Director(WSE), CWC as Group-Leader; two members each from CWC; I&W Deptt., Government of West Bengal; Water Resource Department , Government of Jharkhand and Damodar Valley Corporation (DVC) with SE (HOC), CWC, Maithon & Member Secretary as Group Coordinator. The Comprehensive System Studies (CSS) of Damodar Barakar basin have been completed and circulated to co-basin states and Damodar Valley Corporation through Member – Secretary, DVRRC.

4.7 Standing Sub-Committee for Assessment of Availability and Requirement of Waters for Diverse Uses in the Country.

A Standing Sub-Committee has been constituted by MOWR for Assessment of Availability and Requirement of Water for Diverse Uses in the Country. Member (WP&P), CWC is the Chairman and Chief Engineer (BPMO), CWC is the Member-Secretary. The sub-committee is represented by officers of the rank of Joint Secretary of various Ministry/Department concerned with water.

This committee has to provide necessary assistance to the Standing Committee for overall National perspective of water planning and coordination in relation to diverse uses of water under the Chairmanship of Additional Secretary, MOWR with Commissioner (PP) as Member-Secretary and members from various Ministries/Department concerning water. The final Report of the Sub-committee was sent to the Member-Secretary of the Standing Committee for its consideration.

4.8 Steering Committee on water resources availability and requirement

A Steering Committee under the Chairmanship of Secretary (Water Resources) has been constituted for preparation of Status Report on "Water Resources Requirement and its Availability in Urban Area with population exceeding

one million as per 1991 census. Chairman, CWC is Co-Chairman of the Steering Committee and Chairman, CGWB, Member (RM), CWC, Joint Secretary (UD), MOUD. Director (NIH), Director (HUDCO) and Commissioner (PP), MOWR are the members and Chief Engineer (BPMO), CWC is the Member-Secretary of this Committee. The draft status report on 35 Urban Agglomerations (UAs) having population of more than one million as per 2001 census has been prepared and sent to MOWR.

4.9 Technical Papers/Reports

During the year the following technical papers/reports were prepared:-

(a) Theme paper for World Water Day-2008 on "Integrated Water Resources Development and Management" was prepared.

(b) Technical paper titled" Conservation of Water Resources-Role of Stakeholders"

(c) Technical paper "Methodology for Assessment of Water Resources" were prepared and presented.

(d) A factual note on the utilizable water resources of the country vis-à-vis the research account published in current Science was prepared.

5

CHAPTER–V

DESIGN & CONSULTANCY

5.1 General

Designs and Research wing of CWC plays a pivotal role in providing design and consultancy of water resources projects. Various units of the wing are actively associated with Design Consultancy, Technical Studies and Research & Development activities in the water resources sector. In addition to above, technical appraisal of water resources development projects planned by different agencies is also carried out in the wing.

Major activities of D&R wing comprises:

1. Planning and design of water resources projects.
2. Hydrological studies.
3. Review of safety aspects of existing dams and monitoring.
4. Technical appraisal of multipurpose river valley projects.
5. Coordination of research, development and training.

5.2 Composition of Design & Research Wing

The Design & Research Wing is composed of the following four design units to cater to specific requirements and to attend to special design related problems of the water resources projects located in different regions of the country:

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

Each of the above units have specialised Directorates such as Hydel Civil Design (HCD), Concrete & Masonry Dam Design (CMDD), Embankment Design (EMB), Gates Design (GD) and Barrage & Canal Design (BCD) etc.

5.3 Functions of D&R Wing

5.3.1 Planning & Design of Water Resources Projects

Design consultancy work in respect of 137 projects in different stages was carried out in the design units of D&R wing during the year 2007-2008 as under:

Sr No.	Category	
1.	Projects at construction stage	97
2.	Projects at investigation and planning stage (for which detailed project reports are being prepared)	33
3.	Projects with special problems	7
	Total	137

The break up of all the 137 projects is shown in Fig. 5.1 and list of projects is given in Annex 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 joint project)

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

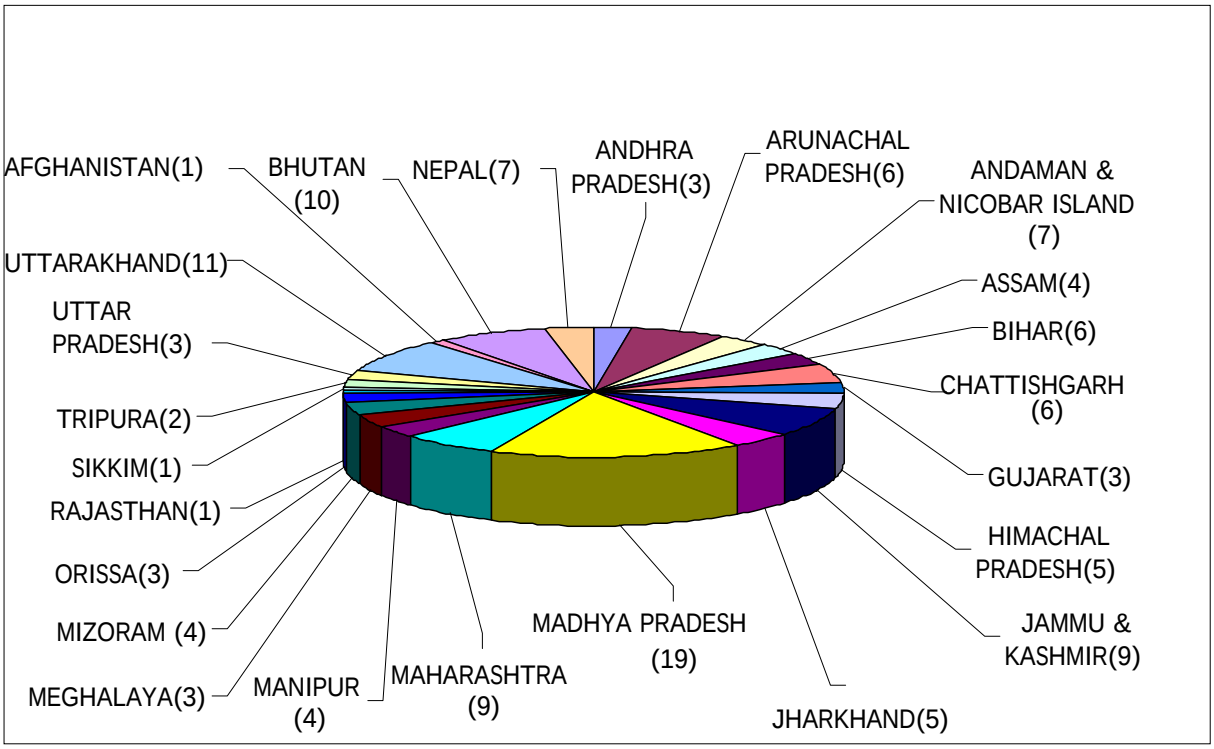


Fig.5.1- Consultancy projects dealt in D&R wing during 2007 - 08

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

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

Rupaligad Project are being carried out and the DPR will be prepared after receipt of the results of geo-physical investigations. However, draft DPR has already been prepared taking Re-regulating dam at Poornagiri.

ii) Sapta Kosi High Dam Multipurpose Project (Indo-Nepal joint project)

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

iii) Sardar Sarovar Project (Gujarat)

Sardar Sarovar project envisages construction of 163 m high & 1210 m long concrete gravity dam across the river Narmada and two power houses with total installed capacity of 1450 MW. It also envisages construction of 458 km long Main Canal for irrigation of 17.92 lakh ha and for drinking water to 8215 villages and 135 urban centers. Consultancy for complete planning, design and construction drawings for 6x200 MW Right Bank Power House(RBPH) and 5x50 MW Canal Head Power House (CHPH) under Sardar Sarovar Project, Gujarat is being provided. The spillway has been raised upto El.121.92 m (crest level) by virtue of which all units (5 units of 50 MW each) of CHPH and 6 units of RBPH of 200 MW each have been commissioned in June, 2006. Central Water Commission is involved in identifying bottlenecks and suggesting remedial measures and advice to Sardar Sarovar Construction Advisory Committee, Dam Safety Panel, Project Review Panel, Narmada Control Authority. CWC is also involved in the design related issues pertaining to raising of dam height in phases. A sub-committee has been set up to review the backwater levels of Sardar Sarovar Project.

iv) Tehri Dam Project (Uttarakhand)

Tehri Dam Project is the first multi-purpose river valley project, which is taken up for construction on the river Bhagirathi to tap its vast potential and is being executed by Tehri Hydro Development Corporation (THDC). A 260.5 m high earth and rock fill dam has been constructed, which is the fourth highest dam in the world. The design engineering and consultancy including construction drawings for dam and appurtenant structures, such as Chute Spillways, Shaft Spillways, Intermediate Level Outlets, etc. are being handled in

D&R wing. An inspection gallery has been provided in the core of rock fill dam joining left and right abutments, which is a unique feature for rock fill dam undertaken for the first time in India. Controlled filling of the reservoir had started on 29th October, 2005 and the project was set for generation mode. Unit IV was commissioned on 17-07-2006, Unit III on 5.10.2006, and Unit II on 30.01.2007. The last Unit was commissioned in the middle of March, 2007.

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.

v) Koteshwar Hydro-electric Project (Uttarakhand)

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

As per a Memorandum of Understanding (MoU) signed between Central Water Commission and Tehri Hydro Development Corporation, the D&R wing is providing design consultancy services for Koteshwar dam, spillway, powerhouse, intake and tail race including instrumentation. Construction drawings of dam, spillway, powerhouse, substructure, service bay, Intake and Tail-race have been issued to the project authorities.

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

A MoU for complete design engineering including pre-award engineering & assistance during construction for technical and site related issues for the 600 MW Lohari Nagpala and 520 MW Tapovan Vishnugad H.E. Projects had been signed between NTPC and CWC during the year 2004. CWC had issued complete tender stage drawings of different components of both the projects during the year 2005-06. Both the projects are under construction stage. Construction drawings for layout, excavation etc. have been issued during the year 2007-08.

5.3.2 Water Resources Development Projects in North Eastern Region

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

NEEPCO, State Govt. departments, etc. Technical appraisal of PFRs and DPRs are also being carried out.

At present, there are 18 projects at construction stage for which design consultancy is being provided by D&R wing of CWC. In addition, there are 11 projects for which DPRs are under preparation.

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

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

	Tripura	
26.	Kalasi Barrage	Construction stage
27.	Manu Medium Irrigation Project	Construction stage
28.	Champaichera Dam Project	Construction stage
29.	Howrah Dam Project	Construction stage

5.4 Hydrological Studies

The Hydrological Studies Organisation (HSO), a specialized unit under D&R Wing, carries out hydrological studies in respect of most of the projects in the country. During the year 2007-08, HSO has dealt with 103 projects from hydrological point of view, wherein 12 projects were for consultancy, 91 projects were for technical examination/study of hydrology. In addition to above, HSO unit is also carrying out other specialized work related to hydrology as detailed below.

5.4.1 Flood estimation model for ungauged catchment

The economy and time constraints do not allow the water resources planner to collect hydro-meteorological data at all locations. The small and medium catchments, where cross drainage structures, roads & railway bridges, minor hydraulic structures are planned, need estimation of design flood. HSO has come up with Indian version of regional models for rational estimation of design flood. The country has been divided into 7 zones and further 26 hydro-meteorologically homogeneous sub-zones. So far 21 flood estimation reports covering 24 sub-zones have been published.

5.4.2 Generalised Probable Maximum Precipitation (PMP) Atlas

Design precipitation estimates, which are basic inputs in computing design flood magnitudes are presently calculated on a case –by-case of new dams under planning and design, but is cumbersome for the reassessment of large number of existing dams. Estimation of design storm depths has been found to be a major bottleneck in design flood studies since necessary data and expertise is available with only a few organizations like IMD and CWC. To overcome this, it was decided to publish generalized PMP Atlases covering the whole country to give a first estimate of design storm depths. The Generalised PMP Atlases have been prepared and published for river basins, viz, Cauvery and other east flowing rivers, south of Krishna, Godavari and adjoining river basins, Mahanadi, Brahmini, Baitarani, Subernarekha and other adjoining rivers, Sone, Betwa, Chambal, Mahi, Narmada, Tapi, Sabarmati, Luni and other adjoining rivers and west flowing rivers of western ghats area. During 2007-08, the work of preparation of PMP atlases has been taken up through consultancy. It is also proposed to conduct training course on the use of PMP atlases so that state engineers will be capable of using these in their studies.

5.4.3 World Bank Aided Hydrology Project – II

Development of Hydrological design aids, a component of Hydrological Studies Organisation, CWC under World Bank Aided Hydrology Project – II is being handled by Hydrology (S) Directorate. Under this component, 3 Hydrological Design Aids are planned which will cover all aspects of hydrology.

5.5 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.

5.5.1 Plan Schemes under Dam Safety Organisation

(I) Dam Rehabilitation & Improvement Project (DRIP)

Based on the performance and benefits obtained from the Dam Safety Assurance and Rehabilitation Project (DSARP) which was assisted by the World Bank (Credit 2241-IN), it was proposed to extend the dam safety activities to the other States owning significant number of large dams. On the basis of details received from the 11 participating States namely, Andhra Pradesh, Bihar, Chattisgarh, Gujarat, Jharkhand, Kerala, Maharashtra, Tamilnadu, Uttar Pradesh, Uttrakhand and West Bengal, a scheme Dam Safety Assurance, Rehabilitation & Disaster Management Project "DSARDMP" now renamed as Dam Rehabilitation & Improvement Project (DRIP), has been framed. The States of Madhya Pradesh and Orissa have subsequently been included in the project on specific request from them. The total expenditure envisaged under this plan towards State component is Rs. 2019.73 crore. This project aims to improve the safety and optimum sustainable performance of selected existing dams and associated appurtenances by setting up a Dam Safety and Improvement Fund (DRIF). For smooth co-ordination amongst participating State Governments and the Central Government in respect of various activities of DSARDMP, MOWR constituted the following two committees on 2nd May, 2005 :

i) National Level Steering Committee (NLSC) under the Chairmanship of the Secretary to Govt. of India, Ministry of Water Resources.

ii) Technical Committee (TC) under the Chairmanship of Member (D&R), CWC.

During the year 2007-08, the 4th meeting of National Level Steering Committee was held on 20th April, 2007 to discuss various issues related to the project, including funding mechanism.

World Bank teams (Preparation mission) visited the States of Andhra Pradesh, Chattisgarh, Gujarat, Madhya Pradesh, Maharashtra, Orissa, Tamilnadu and West Bengal during 20th September to 16th November, 2005. A second World Bank mission visited the States of Madhya Pradesh, Maharashtra, Tamilnadu and West Bengal from January 16 to February 3, 2008.

As a follow-up to the decisions taken in the 4th meeting of NLSC, M/s Consulting Engineering Services (India) Pvt. Ltd. have been engaged in June, 2007 for conducting Environmental and Social Assessment Studies for 10 existing Projects in Gujarat, Maharashtra, Madhya Pradesh and West

Bengal. The consultants have so far submitted three reports as per Terms of References (TOR). The third report, i.e. Draft Final Report is under scrutiny in CWC.

(II) Dam Safety Studies & Planning under XI Plan

SFC memo for a new scheme titled "Dam Safety Studies & Planning" at an estimated cost of Rs. 10.00 crore has been sanctioned by MOWR for XI Five year Plan. This scheme envisages to continue the present Dam Safety activities and to improve the technical expertise of Dam Safety in CWC.

(III) Infrastructure Development for Director (SMD) under XI Plan

An effort had been started by Central Water Commission to adopt advancement in the field of Information Technology through sanctioned plan schemes. The proposed works are essential for full implementation of CWC's IT vision and involve activities that are in natural progression to the activities initiated under plan scheme. The budget estimate for 2007-08 is Rs. 1.70 crore.

5.5.2 Dam Safety Act

The draft Dam Safety Act had been circulated to various State Governments in 2002 for enactment. The Government of Bihar has passed the Dam Safety Act 2006 and the same was published in Gazette on 4.05.2006. The Govt. of Andhra Pradesh has adopted a Resolution on 24.03.2007 that the Dam Safety Legislation should be regulated in the State of Andhra Pradesh by Parliament by Law. The Govt. of West Bengal has also passed a Resolution on 24.07.2007 empowering the Parliament of India to pass the necessary Dam Safety Act. The Govt. of Kerala had passed the Kerala Irrigation & Water Conservation Act 2003 which was subsequently amended through the Kerala Irrigation & Water Conservation (Amendment) Act 2006. The States of Madhya Pradesh, Maharashtra, Orissa and Uttar Pradesh are also actively processing the proposal for passing the Resolution in their respective State Assemblies. Govt. of India has already initiated action to pass a Central Act on Dam Safety.

5.5.3 National Committee on Dam Safety

The National Committee on Dam Safety (NCDS) was constituted by the Government of India in October 1987. It acts as a forum for exchange of views on techniques adopted for remedial measures to old dams in distress and provides guidance to Dam owning States/Agencies. Chairman, CWC is the Chairman of this Committee. The 28th meeting of National Committee on Dam Safety was held on 3.07.2007.

5.5.4 Technical examination of projects for seismic and foundation aspects

Detailed Project Reports of 29 river valley projects in various states namely Andhra Pradesh, Uttrakhand, Arunachal Pradesh, Sikkim, Uttar Pradesh, Karnataka, Tamil Nadu West Bengal, Meghalaya and Kerela were studied for techno- economical appraisal with respect to foundation engineering and seismic aspects.

5.4.5 Consultancy Services on Instrumentation in Hydraulic Structures

During the year, planning and preparation of Instrumentation construction drawings have been completed for **Earthen Dam of Salma Dam** (Afghanistan), Left and Right Dam of Kutni Feeder Reservoir Project (Madhya Pradesh), Over flow and Non-Overflow sections of Masonary Dam of Kutni Feeder Reservoir Project (Madhya Pradesh), and De-silting chambers of Loharinagpala H.E. Project (Uttarakhand).

In addition to above, technical examination of Project Report of Integrated Nguiki Irrigation Project (Nagaland), Lower Jurala H.E. Project(Andhra Pradesh), Teesta Stage-II H.E. Project (Sikkim), Panan H.E. Project (Sikkim), Yagachi Reservoir Project (Karnataka), Sripada Sagar Project (Andhra Pradesh), New Umtru Project (Meghalaya), Hippargi Irrigation Project (Karnataka), Hemavathy Reservoir Project (Karnataka) and Re-revised report of Malaprabha Irrigation Project (Karnataka) have been carried out .

5.4.6 National Committee on Seismic Design Parameters

"Standing Committee to suggest Design Seismic Coefficient of Hydraulic Structures in River Valley Projects" was constituted formed by the then Ministry of Irrigation, Govt. of India in June, 1969 comprising of experts from the different technical institutions and Govt. Organisations. The same was renamed and reconstituted as "National Committee on Seismic Design Parameters (NCSDP)" in October, 1991 and further on 11-02-04. Member (D&R), CWC is the Chairman of this Committee. The meetings of this Committee are convened normally once a year to finalise the seismic design parameters for the various river valley projects referred to the NCSDP.

The 18th meeting of NCSDP was held on 5.07.2007 at CWC, New Delhi in which design seismic parameters for 14 projects were discussed. The committee approved the coefficients and response spectra for 8 projects and accorded conditional approval to 2 projects. With a view to standardize the procedure, the "Draft Guidelines for Site Specific Seismic Study for River Valley Projects" have been prepared which are likely to be discussed in the next meeting to be held shortly.

5.5 Special Studies

Dam Break Analysis is carried out to prepare the inundation map and disaster management plan in the unlikely event of a dam failure. It estimates the maximum water level at the downstream locations of the dam in the event of a hypothetical failure of the dam. The dam break analysis is being carried out in CWC on consultancy basis using one dimensional mathematical model MIKE 11 developed by Danish Hydraulic Institute (DHI), Denmark. During the year, the draft studies for Tulbul Navigation Lock Project(J&K), Back Water Studies for Polavaram Project(Andhra Pradesh) and flow distribution and water profile studies for Indravathi Project (Chattisgarh)have been completed.

5.4.6 Central Water Commission Library

Library and Information Bureau, CWC is one of the most prestigious technical reference library on the subject of Water Resources Engineering and other related allied subjects with huge collection of over 1.25 lakh books including reports of various organizations in the field of water resources and 3.5 lakh journals and other publications including bulletins, newspapers and periodicals, etc.

The Library is regularly subscribing 67 Nos. of National and International Journals for the past many years and is also receiving nearly fifty numbers of technical and non-technical journals /bulletins /newsletters /publications from various Govt./Non-Govt. and educational institutions/societies on complimentary basis. During the year Hindi publications were purchased for the Library.

The Library has been shifted to newly constructed multistoried library building in the month of March, 2008. The new building has adequate space and improved facilities for the users. One floor is exclusively reserved for Map Record Section. The Library building also has an auditorium and conference room for holding seminars, workshops, meetings etc.

Annexure – 5.1

List of Active Consultancy Projects in D&R Wing during 2007-08

Sl. No.	State/name of projects	Sl. No.	State/name of projects
	Andaman & Nicobar Islands	34	Raoli H.E. Project (DPR)
1	Raising of Chaudhary Nallah Earth Dam (DPR)	35	Shahnehar Irrigation Project (Const.)
2	Indira Nalla Water Supply Scheme (Cons)	36	Rampur H.E. Project (Const.)
3	R.K. Pur (Const.)		**Haryana**
4	Bamboo Flat Water Supply Scheme(Const.)	37	Western Yamuna Canal H.E. Project, Stage-II (Const.)
5	Chaudhary Nallah Project (Const.)		**Jammu & Kashmir**
6	Kamsarat Water Supply Scheme (Const.)	38	Parnai Hydel Project(Const.)
7	Kamsarat Nalla Water Supply Scheme (DPR)	39	Kirthai H.E. Project- Stage – II (DPR)
	Arunachal Pradesh	40	Pakal Dul H.E. Project(Const.)
8	Kameng H.E. Project (Const.)	41	Tulbal Navigation Project (Const.)
9	H.E. Projects on Nuranang Chu River (DPR)	42	Baglihar Project (Const.)
10	Nyukcharang Chu H.E. Project (DPR)	43	Upper Sindh H.E. Project, (Const.)
11	Tawang Chu H.E. Project (DPR)	44	Chenani H.E. Project(Const.)
12	Lohit Dam Project (DPR)	45	Igo-Mercellong H.E. Project(Const.)
13	Jiadhal Multipurpose Project (DPR)	46	Lower Jhelum Project((Const.)
	Assam	47	Sewa Hydel Project. Stage-3 (Const.)
14	Barbhag Drainage Dev. Scheme-Sluice Regulator(Const.)	48	Ujh Level Crossing(Const.)
		49	Uri H.E. Project, Stage-II(Const.)
15	Karbi Langpi H.E. Project(Const.)	50	Kishan-Ganga H.E. Project(DPR)
16	Amjur Drainage Dev. Scheme(Const.)		**Jharkhand**
17	Pagladia Dam (Const.)	51	Amanat Barrage(Const.)
	Bihar	52	Garhi Reservoir Project(Const.)
18	Durgavati Reservoir Project(Const.)	53	Punasi Reservoir Project(Const.)
19	Western Kosi Main Canal(Const.)	54	Tenughat Dam Radial Crest Gates(Automation) – Const.
20	Sone Western-Eastern Link Canal (Const.)	55	Gumani Barrage (Const.)
21	Tenughat Bokaro(Konar Irr. Project)– Const.	56	Balpahari M.P. Project(DPR)
22	Trihut Main Canal (Valmikinagar)- Const.		**Karnataka**
23	Eastern Gandak Canal H.E. Project((Const.)	57	Lakiya Tailing Dam (Const.)
	Chattisgarh	58	Kochige Hole Earth Dam (Const.)
24	Mongra Irrigation Project(Const.)		**Madhya Pradesh**
25	Sukha Nalla Barrage (Const.)	59	Ban Sagar Project(Const.)
26	Karra Nalla Barrage(Const.)	60	Mahi Main Dam(Const.)
27	Ghumaraiya Nalla Barrage(Const.)	61	Mahi Subsidiary Dam(Const.)
28	Kelo Irrigation Project (DPR)	62	Indira Sagar Project (Const.)
29	Sutiapat Medium Irr. Project(Const.)	63	Kutni Feeder Reservoir Dam (Const.)
	Delhi	64	Samoha Pick-up Weir(Const.)
30	Palla Barrage (Const.)	65	Gulab Sagar (Mahan) Project(Const.)
	Goa	66	Kushalpura M.P. Project(Const.)
31	Opa Barrage (Const.)	67	Sindh Project(Phase–II)-Madikheda Dam (Const.)
	Gujarat	68	Upper Beda Project(Const.)
32	Sardar Sarovar Project(Const.)	69	Halon Project (Const.)
	Himachal Pradesh	70	Upper Narmada Project (Const.)
33	Seli H.E. Project(DPR)	71	Pench Diversion Scheme(DPR)

Sl. No.	State/name of projects	Sl. No.	State/name of projects
72	Bargi Diversion Project(RBC) Canal Syphon (Const.)	108	Tapovan Vishnugad H.E. Project (Const.)
73	Malanjkhand Tailing Dam (Const.)	109	Koteshwar H.E.Project(Const.)
74	Gandhi Sagar Dam(DPR)	110	Loharinag Pala H.E. Project(Const.)
75	Lower Goi Project (Const.)	111	Tehri Pumped Storage Scheme (Const.)
76	Ken-Betwa Link Project (DPR)	112	Maneri Bhali H.E. Project (Const.)
77	Jobat Project (Const.)	113	Kishau H.E. Project(Const.)
78	Sanjay Sagar Project (DPR)		**Foreign Projects**
79	Yashwant Sagar Dam(Const.)		**Afghanistan**
80	Man Project (Const.)	114	Salma Dam Project(Const.)
	Maharashtra		**Bhutan**
81	Totladoh H.E. Project (DPR)	115	Punatsangchu Stage-I HE Project (Const.)
82	Sapan Medium Irrigation Project(DPR)	116	Punatsangchu Stage-II H.E. Project(DPR)
83	Aner Project(DPR)	117	Chenary Mini Hydel Scheme (Const.)
84	Lendi Project(DPR)	118	Gyetsa Mini Hydel Scheme (Const.)
	Manipur	119	Khalanzi Mini Hydel Scheme (Const.)
85	Khuga M. P. Project(Const.)	120	Khailing Mini Hydel Scheme(Const.)
86	Thoubal M.P. Project(Const.)	121	Lhuntshi Mini Hydel Scheme (Const.)
87	Irang H.E. Project (DPR)	122	Chukha Damchu Highway Project (Const.)
88	Dholaithabi Barrage Project (Const.)	123	Thimpu Mini Hydel Scheme (Const.)
	Meghalaya	124	Wangdi Mini Hydel Scheme (Const.)
89	Myntdu H.E. Project (Const.)		**Nepal**
90	Myntdu H.E. Project Stage - II (DPR)	125	Sapta Kosi Sun Kosi Project(DPR)
91	Kulsi Multipurpose Project(DPR)	126	Sapta Kosi High Dam(DPR)
92	Jadukata Dam Project (DPR)	127	Kamla Dam Project (DPR)
93	Ganol H.E. Project (Const.)	128	Pancheshwar M.P. Project (DPR)
94	New Umtru H.E. Project (Const.)	129	Poornagiri Re-regulating Project(DPR)
	Mizoram	130	Rupaligad Re-regulating Project(Const.)
95	KolodyneH.E. Project(Stage - I) (Const.)		
96	Kolodyne H.E. Project(Stage - II) ((DPR)		**Special Problem Projects**
97	Tuivawl H.E. Project(Const.)		**H.P**
98	Tuirini H.E. Project (Const.)	1	Pandoh & Pong Dam
99	Tuichang H.E. Project (DPR)		**J&K**
	Orissa	2	Upper Sindh H.E. Project Stage= II
100	Anandpur Barrage Project (Const.)	3	Sawalkot H.E. Project
101	Control Structures across Jouranalla & Indravati Rivers (Const.)		**Maharashtra**
	Rajasthan	4	Bembla Irrigation Project
102	Water Supply Project for Bharatpur & Dholpur Distt.(Const.)	5	Khadakpurna Irr. Project
	Tripura	6	Koyna H.E. Project
103	Manu Medium Irri. Project -(Const.)		**U.P**
104	Kalasi Barrage (Const.)	7	Rihand Dam & Power House
105	Champaichera Dam Project (Const.)		
106	Howarah Dam Project(Const.)		
	Uttarakhand		
107	Tehri Dam Project(Const.)		

6

CHAPTER-VI

WATER MANAGEMENT, RESERVOIR SEDIMENTATION AND POST PROJECT EVALUATION

6.1 Monitoring of Reservoir Storage

During the water year 2007-08, CWC monitored storages of 81 important reservoirs of the country having total live storage capacity of 151.77 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	
		2006-07 (upto March, 31)	2007-08 (upto March, 31)
Number of Reservoirs monitored		76	81
Total designed live storage at FRL		133.021	151.77
As on June, 1 *(Start of water year)*	Storage	29.265	31.12
	Storage as percentage at FRL	22	21
	Storage as percentage of 10 years average storage	160	152
As on September, 30 (*End of Monsoon Period*)	Storage	120.747	124.15
	Storage as percentage at FRL	91	82
	Storage as percentage of 10 years average storage	129	124
As on March, 31	Storage	88.576	48.39
	Storage as percentage at FRL	67	32
	Storage as percentage of 10 years average storage	125	125

44 more projects (each having storage capacity of 0.250 BCM or more) have been identified for monitoring. This will raise the number of projects under monitoring to 125 and storage capacity of 151.77 BCM to 166.5 BCM i.e. about 74% of the total capacity of 225 BCM created so far.

6.2 Cauvery Water Bulletin

Daily 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 indicating (i) 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 presented supplemented in the bulletin.

6.3 Watershed Management and Reservoir Sedimentation

6.3.1 Hydrographic Survey of Important Reservoirs

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

An SFC Memo for covering 15 more reservoirs under Capacity Survey was under implementation during X Plan at an estimated cost of Rs. 329.00 lakh, sanctioned by MOWR in February, 2003. Upto end of X Plan, spillover works of 3 reservoirs from IX Plan (finalisation of report) and surveys of 4 reservoirs have been completed in all respect and finalisation of report of another 3 reservoirs are in progress.

During XI Plan, an EFC Memo for covering 20 more reservoirs under capacity Survey at an estimated cost of Rs. 410.00 lakhs has been sanctioned by MoWR vide letter dated 20.02.2008. Out of these 20 reservoirs, a proposal for 5 reservoirs for taking up survey during the year 2007-08 was initiated.

6.3.2 Status Report on Watershed Management and Water Harvesting

Work on second Status Report on Watershed Management and Water Harvesting is in progress.

6.4 Remote Sensing in Water Resources Development and Management

The Remote Sensing Directorate is having one component each in two different plan schemes during 11th Five Year Plan Period as given below:

- "Estimation of sedimentation in Reservoirs using Remote Sensing Technique" under the sanctioned plan scheme "Research & Development Programme in Water Sector".
- "Creation of Watershed Maps and Geographic Information System" under the scheme "Development of Water Resources Information System".

The progress of work done during 2007-08 is as under :

- Satellite Remote Sensing based Reservoir Sedimentation study (spillover) of 15 reservoirs has been completed. Study of 2 new reservoirs (in- house) is under progress. Award of work of

another 25 new reservoirs to outsource agencies out of a total of 100 reservoirs proposed during 11th plan is under process.

- For the development of Water Resources Information System (WRIS) during 11th plan, the Final proposal of the work/component has been submitted to MoWR for approval. The work will be carried out jointly by ISRO-DOS and CWC.

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

In order to update the Status of Water logging, Salinity & Alkalinity, a study on "Assessment of Waterlogged and Salinity and/or Alkalinity affected areas in irrigated Commands of all Major and Medium Projects throughout India using Remote Sensing Technique" has been taken up by Central Water Commission in collaboration with Regional Remote Sensing Service Centre (RRSSC), Jodhpur. In the first & second phases of the study, eleven reports in respect of Rajasthan, Karnataka, Goa, Bihar, Jharkhand, Haryana, Chattisgarh, Madhya Pradesh, Maharastra, Gujarat and Punjab have been prepared. These reports have been circulated to the concerned State Governments for taking up remedial measures for reclaiming waterlogged and /or saline / alkaline affected areas of various irrigation commands.

All the 23 reports in this regard are expected to be completed by June, 2008. A proposal for "Mapping of Waterlogged and salt affected areas in minor irrigation schemes and non-command areas in India" & Use of satellite multi-Sensor Synergy for Augmentation of capability of water-logging and Salinity Mapping in Irrigation Commands-A pilot study to evaluate/operationalise the potential of new sensors in the irrigation management has been kept in XI Plan Schemes.

6.6 Performance Evaluation Studies

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

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

Project (Assam) have been received from the consultants.

TAC meetings on Performance Evaluation Studies of five projects were held during 2007-08. Seven other irrigation projects are proposed to be evaluated during XI Plan out of which three studies are planned to be awarded during 2008-09.

6.7 Benchmarking of Irrigation Projects

Benchmarking in Water Industry is in use in developed countries for quite some time. This concept is now being acknowledged as a management tool in irrigation sector in India as well. Accordingly, a Core Group under the Chairmanship of Member (WP&P), CWC for Benchmarking of Irrigation Systems in India set up by MOWR, is playing an active role as a co-ordinator as well as a facilitator by way of providing technical support to the State Governments. National/ regional/ project level workshops are being organized by CWC in various states to facilitate concerned State Govts to take up Benchmarking of Irrigation Projects in their respective States. First National Workshop on Benchmarking of Irrigation Projects was organized in February, 2002 at Hyderabad and since then, 7 regional workshops and 4 project level workshops have been organized in various parts of the country.

6.8 Study of Water Use Efficiencies

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

The studies cover the following aspects:

i) Reservoir Filling Efficiencies (Inflow and release pattern)

ii) Delivery System / Conveyance Efficiency

iii) On farm Application Efficiency

iv) Drainage Efficiency

v) Irrigation Potential Created and Utilised.

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 consultant mainly through Water and Land Management Institutes/Irrigation Management & Training Institutes/ NERIWALAM. So far, 43 Major and Medium Irrigation Projects across the country have been taken up for these studies. 25 draft final reports and 5 final reports have been received and TAC has accepted 14 studies subject to compliance of the observations of the committee.

6.9 Water Audit and Water Conservation

Water Audit is an important aspect of water management. In view of this "General Guidelines for Water Audit and Water Conservation" have been formulated by CWC taking into consideration, the views of various Central Govt Organisations dealing with Water Resources Development and Management, State Govts, NGOs etc. These guidelines have been placed on the website of CWC (www.cwc.nic.in).

7

CHAPTER-VII

APPRAISAL OF PROJECTS

7.1 Project Appraisal

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

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

7.2 Appraisal of Major Irrigation Projects

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

During the year 2007-2008, 63 new major and 25 revised major irrigation projects were under appraisal in PAO. In principle consent of CWC for DPR preparation was communicated in respect of 4 major irrigation proposals. Fig. 7.1 shows state-wise distribution of new major irrigation projects.

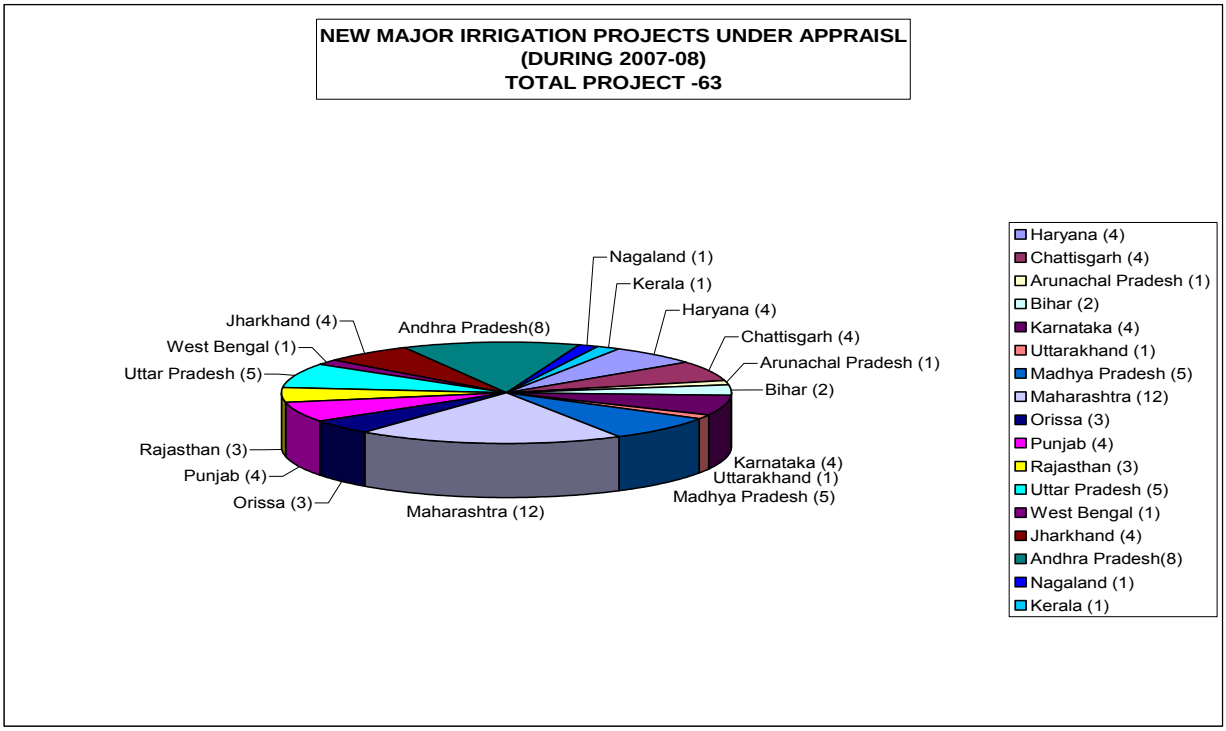


Fig. 7.1 - State wise distribution of New Major Irrigation Projects under Appraisal (as on 31.03.2008)

7.3 Appraisal of Medium Irrigation Projects

For medium irrigation projects (CCA 2,000 to 10,000 ha) in inter-States river basins, State Governments are required to submit only a Performa report to the Appraisal and Monitoring Units of the CWC's field formations. During the year 2007-08, 53 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.

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.

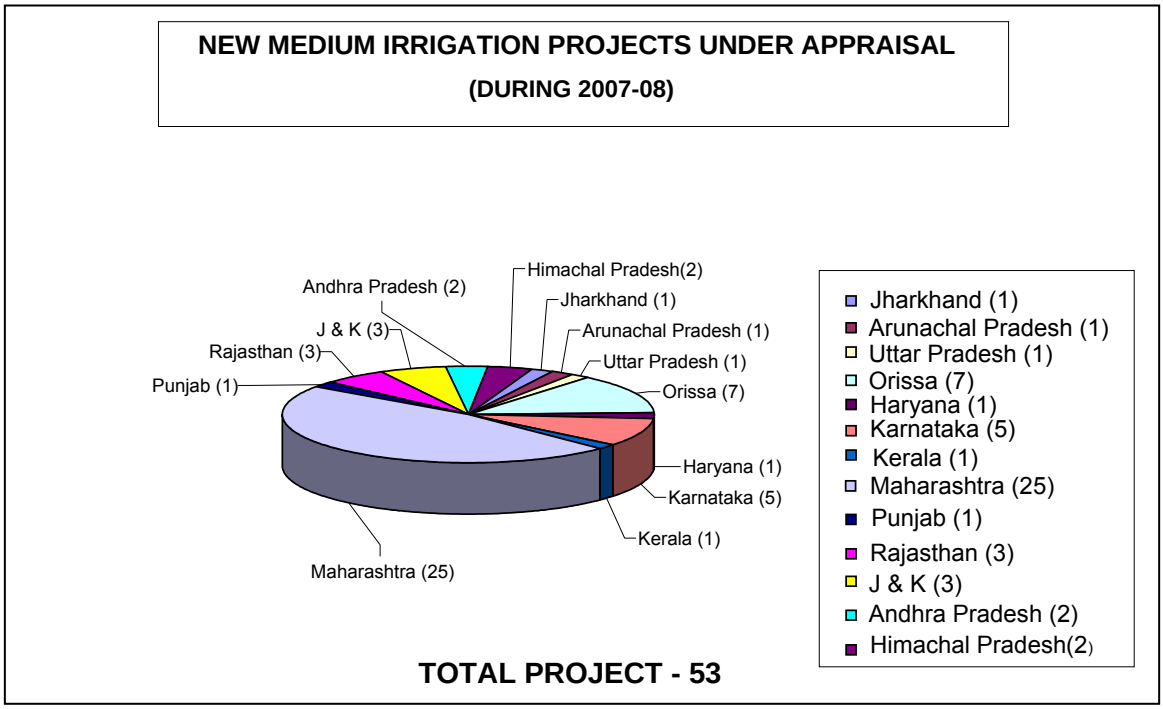


FIG. 7.2 - State wise distribution of New Medium Irrigation Projects under Appraisal (As On 31.03.2008)

7.5 Meeting of the Advisory Committee

In November 1987, MoWR reconstituted the Advisory Committee for Irrigation, Multipurpose and Flood Control Projects with the Secretary, MoWR as the Chairman and the Chief Engineer (PAO), CWC as the Member Secretary. The Committee is entrusted with the function of examining proposals scrutinized in the CWC and conveying the decision on the techno-economic viability of the projects. During the year 2007-2008 the Advisory Committee met on 27.6.2007, 26.09.2007, 07.11.2007 and 27.02.2008 under the Chairmanship of Secretary (WR) and considered 40 projects out of which 37 projects were accepted comprising 15 major, 16 medium irrigation and 6 flood control projects, and 3 medium projects were deferred.

Out of these 37 accepted projects 31 are irrigation projects which will provide additional annual irrigation benefits of 1525728 hectare in the States of Bihar, Chattisgarh, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerela, Manipur, Maharashtra, Nagaland, Orissa, Uttar Pradesh & West Bengal. 6 Flood Control Scheme in the States of Bihar, Jharkhand & West Bengal will provide protection to an area of 142,997 hectare thereby saving on an average about Rs. 270.78 crore annually. The details of the projects are given in Table 7.1

7.6 Appraisal of Power Projects

21 numbers of Hydroelectric Power Project up to March-2008 were appraised, out of which 4 numbers of Projects having total installed capacity of 3470 MW were finally cleared by CEA. During the year 2007-2008, 12 number of Thermal Power Schemes

received from various State Govts /Public Sector undertakings were under appraisal.

7.7 Appraisal and Clearance of Flood Management Projects

The Flood Management Organisation under Chief Engineer (FM) with 5 (five) Directorates covering all aspects of Flood Management of the Country is functioning under River Management Wing of Central Water Commission. One of the important responsibilities assigned to Flood Management Organisation of the Central Water Commission is the examination of proposal formulated and submitted by State Govts. concerning Major, Medium and Minor Flood Management Projects and Multi purpose Projects having flood control aspects to establish their techno-economic feasibility.

In the year 2007-08, 35 numbers of flood management scheme/master plan have been examined/appraised.

7.8 Task Force on Flood Management / Erosion Control and Implementation of its Recommendations

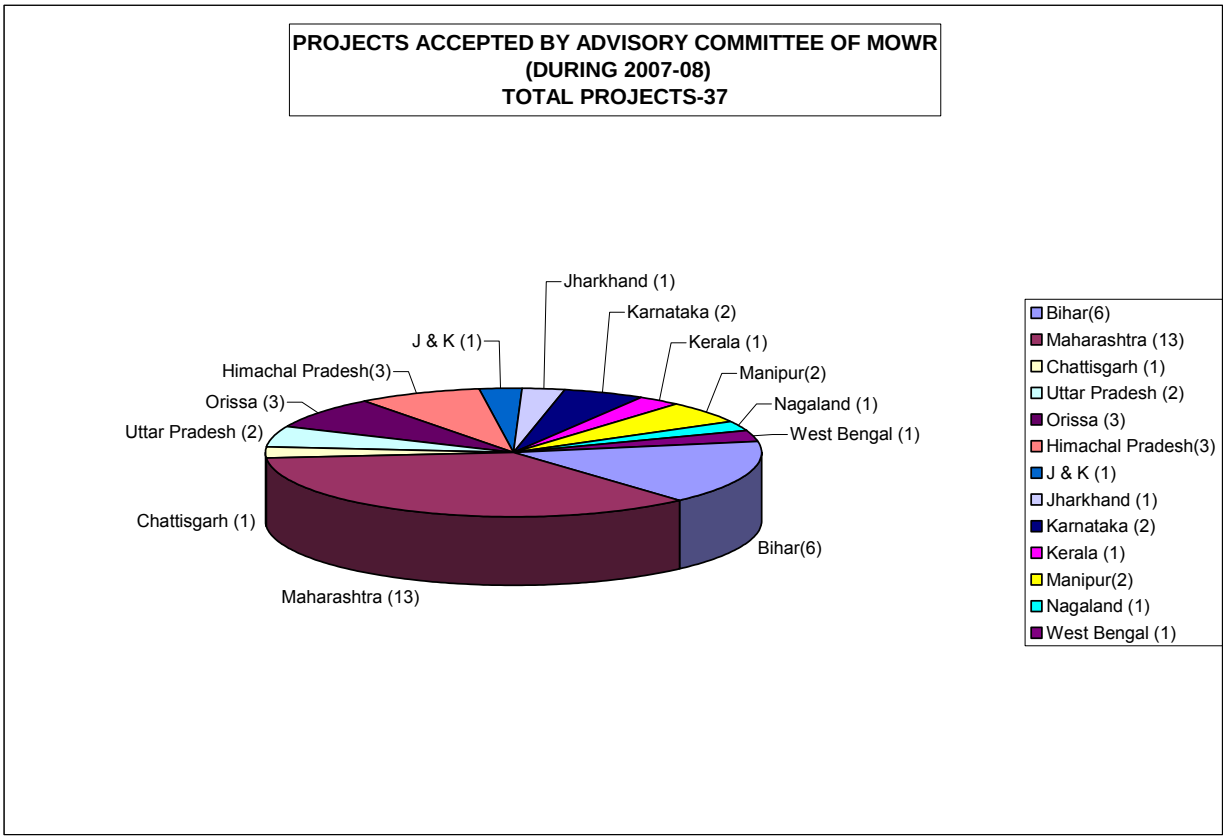
In view of the unprecedented floods during 2004 in Assam, Bihar and some other parts of the country and as a follow up of the announcements made by the Hon'ble Prime Minister during his visits to Bihar and Assam, the Government has set up vide its order dated 11.8.04 a 21 Member Task Force headed by 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 Task Force submitted the report on 31st December, 2004 to MoWR.

As a follow up of the recommendations of the Task Force, jurisdiction of Farakka Barrage Project (FBP) has been extended. The revised schemes namely, (i) Critical flood control & Anti-erosion schemes in Brahmaputra and Barak Valley amounting to Rs.225 crore and (ii) Critical Anti-erosion works in Ganga Basin States amounting to Rs. 305.03 crore, approved by the Government of India during 2006-07 were implemented. The balance works of these schemes have been subsumed in "Flood Management Programme" during XI Plan.

Table 7.1- Details of Projects Accepted by Advisory Committee

Sl. No	Name of Project	Name of State	Category of project	Estimated cost (Rs. cr.)	Benefits (ha)
I.	**89th meeting held on 27.6.2007**				
1.	D'suza Irrigation Scheme	Nagaland	Medium	75.20	10146
2.	Punpun Barrage project (Revised)	Bihar	Major	199.41	13680
3.	Madhya Ganga Canal pariyojana Stage-II,	UP	Major	1095.41	146532
4.	Lower Indira Irrigation Project(Reviseid),	Orissa	Major	521.13	38870
5.	Thoubal Multipurpose Project (Revised)	Manipur	Major	715.81	33449
6.	Chandrabhaga Irrigation Project	Maharashtra	Medium	188.925	8135
7.	Sapan Irrigation Project	Maharashtra	Medium	200.70	7195
8.	Uttarman Irrigation Project	Maharashtra	Medium	123.169	5280/0.5MW
9.	Wang Irrigation Project	Maharashtra	Medium	162.782	7068/3.00MW
10.	Morna (Gureghar) Irrigation Project	Maharashtra	Medium	129.641	3075/0.80MW
11.	Pentakli Irrigation Project	Maharashtra	Major	169.67	14332
12.	Sidhatha Irrigation Project	H.P	Medium	66.35	5348
II.	**90th meeting held on 26.09.2007**				
1.	Shah Nahar Irrigation Project (Revised)	H.P	Major	310.89	24772
2.	Changer Area LIS (Revised)	H.P	Medium	88.09	3041
3.	Bateshwar Sthan Ganga Pump Canal, Phase-I(Revised)	Bihar	Major	389.31	27603
4.	Bansagar Canal Project (Revised)	U.P	Major	1674.11	150132 (Additional)
5.	Parkachik Khawas Irrigation Canal	J & K	Medium	35.44	2262
6.	Improvement of South Saraswati River	West Bengal	Flood Protection	32.10	---
7.	Mahanadi Reservoir Project (Revised)	Chhattisgarh	Major	845.00	264000
8.	Sangola Branch Canal Project	Maharashtra	Major	287.77	11288
9.	Sulwade Barrage	Maharashtra	Medium	290.88	8533
10.	Sarakhade Barrage	Maharashtra	Medium	202.48	11320
11.	Praksha Barrage	Maharashtra	Medium	178.91	10180
III	**91st meeting held on 07.11.2007**				
1.	Component of Bagmathi Multi-Purpose Project	Bihar	Flood Control	135.16	----
2.	Raising & strengthening of existing embankment along Kmla River	Bihar	Flood Control	52.0926	---
3.	Flood control Embankments in Mahananda Basin/Sub-Basin	Bihar	Flood Control	603.88	---
4.	Raising & strenthning and Extension of existing left&R/B in Chandan River system	Bihar	Flood Control	147.6868	---

5.	Raising & strenthning and Extension of existing Right Embankment along Gerua River	Jharkhand	Flood Control	20.123	---
6.	Purna Irrigation Project	Maharastra	Medium	213.10	7530
IV	**92nd meeting held on 27.02.2008**				
1	Gosikhurd Irri. Project, Revised	Maharastra	Major	7777.8525	250800
2	Dudhganga Irr. Project	Maharastra	Major	1460.57	46937
3	Kanhirapuzha Irri. Project (ERM)	Kerala	Medium	30.00	
4	Modernization of Canal System of Bhadra Reservoir Project (ERM)	Karnataka	Major	951.00	177337
5	Hippargi Irrigation Project	Karnataka	Major	1521.78	74742
6	Rengali Sub-Project–RBC (Revised)	Orissa	Major	1290.93	143490
7.	Chhelligada Dam Project (Revised)	Orissa	Medium	201.01	3876
8.	Khuga Multipurpose Project (Revised)	Manipur	Medium	335.15	14775/1.5 MW



8

CHAPTER - VIII

MONITORING OF PROJECTS

8.1 MONITORING OF MAJOR AND MEDIUM IRRIGATION PROJECTS

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

As per the present arrangement in CWC, Inter-State, Externally Assisted and Centrally Sponsored irrigation projects are being monitored by monitoring units at Headquarters (HQ) and the other projects by the respective Regional Offices. During 2007-08, a total of 104 irrigation projects were monitored by CWC (Table 8.1). The list of monitored Projects is reviewed on yearly basis.

Out of 104 major, medium and ERM projects taken up for monitoring 15 projects (9 major & 6 ERM) were monitored from HQ and the remaining 89 projects (60 Major, 26 Medium and 3 ERM) were monitored by the Regional offices.

In the year 2003-04, 30 Major pre-Fifth / Fifth Plan ongoing projects were identified for completion by the end of X Plan and were put on vigorous monitoring. Out of these 30 projects, 12 projects were completed by the end of 2006-07 and remaining 18 projects were included in the list of 104 projects which were monitored during 2007-08.

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

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

		No. of Projects Monitored by CWC								
		Major			Medium			ERM		
S No	State	HQ	RO	Total	HQ	RO	Total	HQ	RO	Total
1	Andhra Pradesh	1	3	4	-	1	1	1	-	1
2	Assam	-	3	3	-	1	1	-	-	-
3	Bihar	-	4	4	-	-	-	-	1	1
4	Chhattisgarh	-	2	2	-	-	-	-	-	-
5	Goa	-	2	2	-	-	-	-	-	-
6	Gujarat	-	-	-	-	1	1	1	-	1
7	Haryana	-	1	1	-	-	-	-	-	-
8	Himachal Pradesh	1	-	1	-	-	-	-	-	-
9	Jammu & Kashmir	-	-	-	-	-	-	-	-	-
10	Jharkhand	1	2	3	-	3	3	-	-	-
11	Karnataka	-	6	6	-	7	7	-	1	1
12	Kerala	-	2	2	-	1	1	-	-	-
13	Madhya Pradesh	1	9	10	-	1	1	1	-	1
14	Maharashtra	2	13	15	-	3	3	1	-	1
15	Manipur	-	2	2	-	-	-	-	-	-
16	Meghalaya	-	-	-	-	1	1	-	-	-
17	Orissa	1	4	5	-	1	1	-	-	-
18	Punjab	-	1	1	-	-	-	-	1	1
19	Rajasthan	1	2	3	-	-	-	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**	**60**	**69**	**-**	**26**	**26**	**6**	**3**	**9**
	Grand Total	**69 (Major) + 26 (Medium) + 9 (ERM) = 104**								

***RO**-Regional Office, **HQ**-Head Quarter*

Figure. 8.1 - Major Projects monitored by CWC (Regional Offices & HQ.)

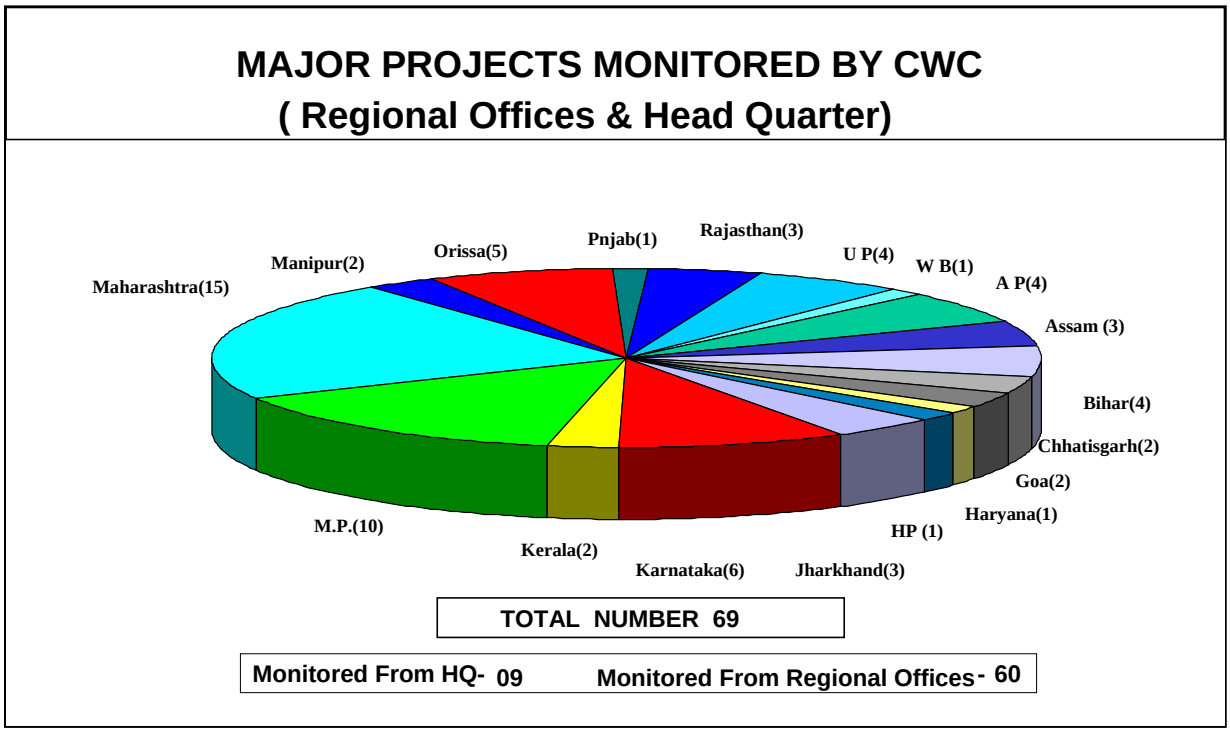


Figure 8.2- Medium Projects monitored by CWC Regional Offices

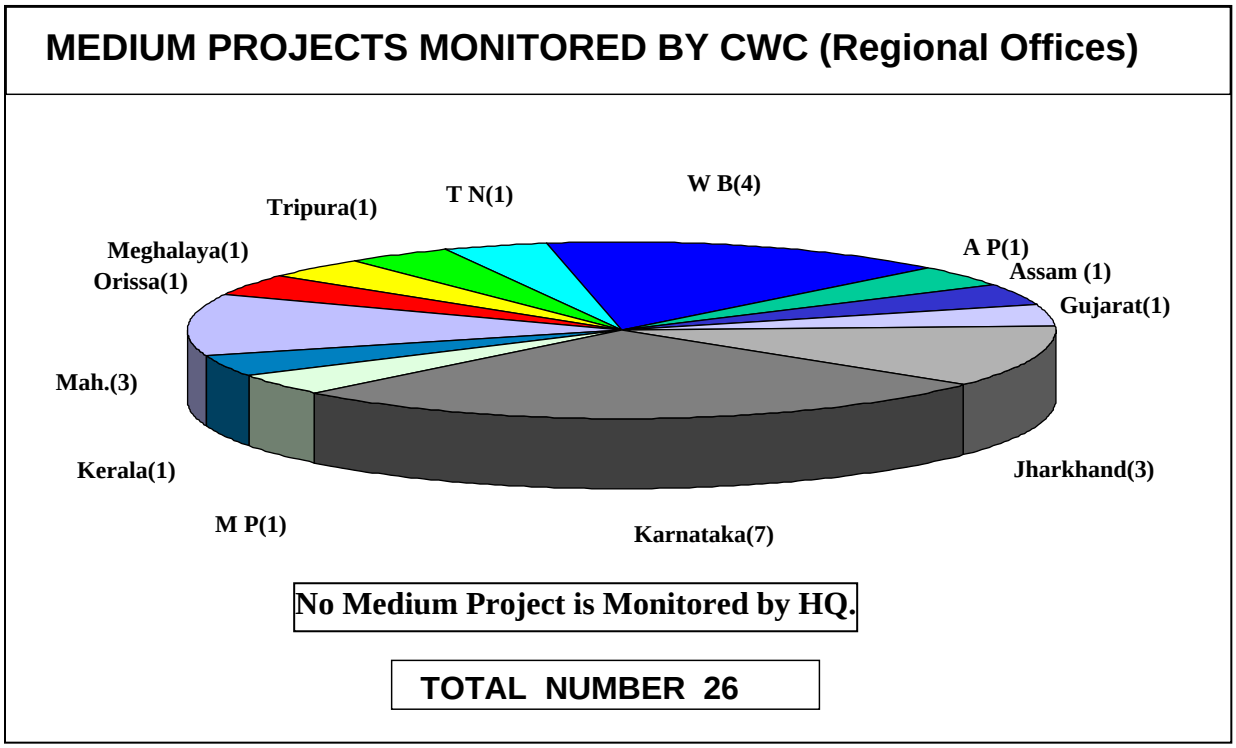
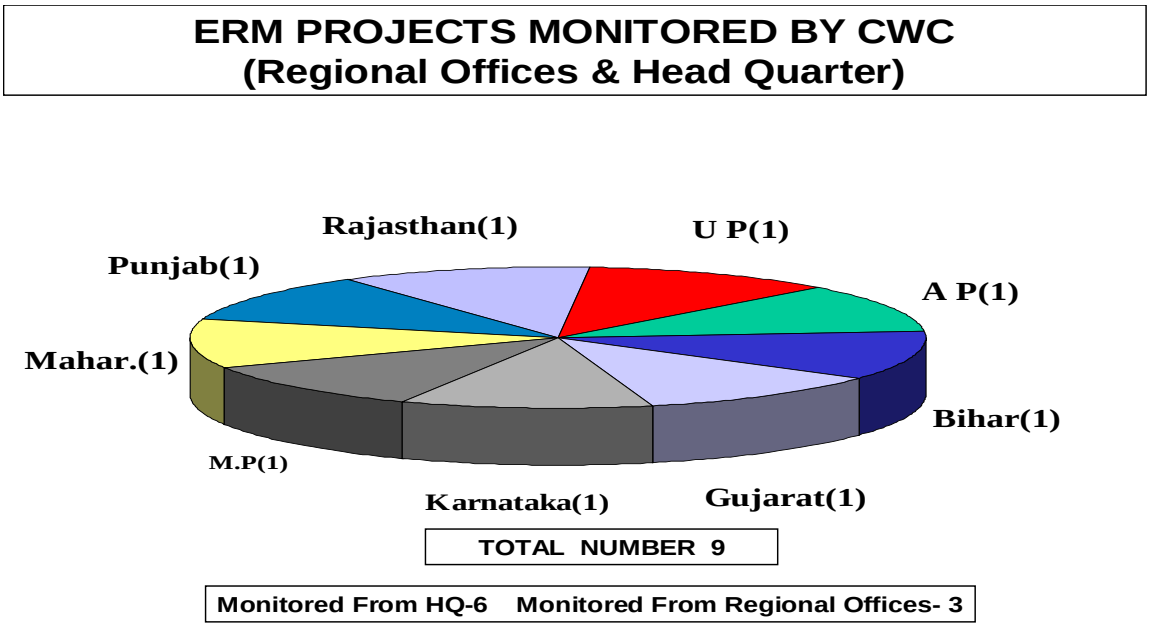


Figure 8.3 - ERM Projects monitored by CWC Regional Office & HQ



8.2 Assessment of Utilization of Irrigation Potential

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

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

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

8.3 Monitoring of Externally Assisted Projects

World Bank through its soft lending affiliate, International Development Association (IDA) & International Bank of Rural Development (IBRD) has been providing credit assistance to major/medium irrigation projects since long. Japan Bank for International Co-

operation (JBIC) has also been funding few major/medium irrigation projects. While these projects are executed by the States, monitoring of all externally aided irrigation projects has been entrusted to CWC in order to evaluate achievements of construction and investment targets as per the criteria laid down by the external funding agencies and to remove bottlenecks, if any, encountered during construction.

8.4 Accelerated Irrigation Benefits Programme

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

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

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

A grant of Rs. 4483.95 crore has been released to 129 major / medium irrigation projects under AIBP during 2007-08 till 31.3.2008. The cumulative total Central Assistance / Grant provided to States is Rs. 25198.209 under AIBP since its inception of the programme till 31.3.2008 to 253 projects. Details given in Table 8.4 & Figure 8.5).

The number of States benefited from the programme is 24 till 31.3.2008. Out of 253 projects, 91 projects have been completed upto 31.3.2008 as a result of AIBP. As reported by the State Governments, 4.46

million hectare of additional irrigation potential has been created under AIBP since the start of the scheme till March, 2007.

The Accelerated Irrigation Benefits Programme is being implemented by MOWR. Central Water Commission has been assigned the responsibility to comprehensively monitor the projects receiving CLA/Grant. Presently, there are 157 ongoing projects under AIBP which are getting grant and are being monitored by CWC. The projects under AIBP are monitored twice a year by CWC officers and thereafter the status reports are prepared and issued to all concerned.

Figure 8.4 - Major, Medium & ERM Projects Under AIBP

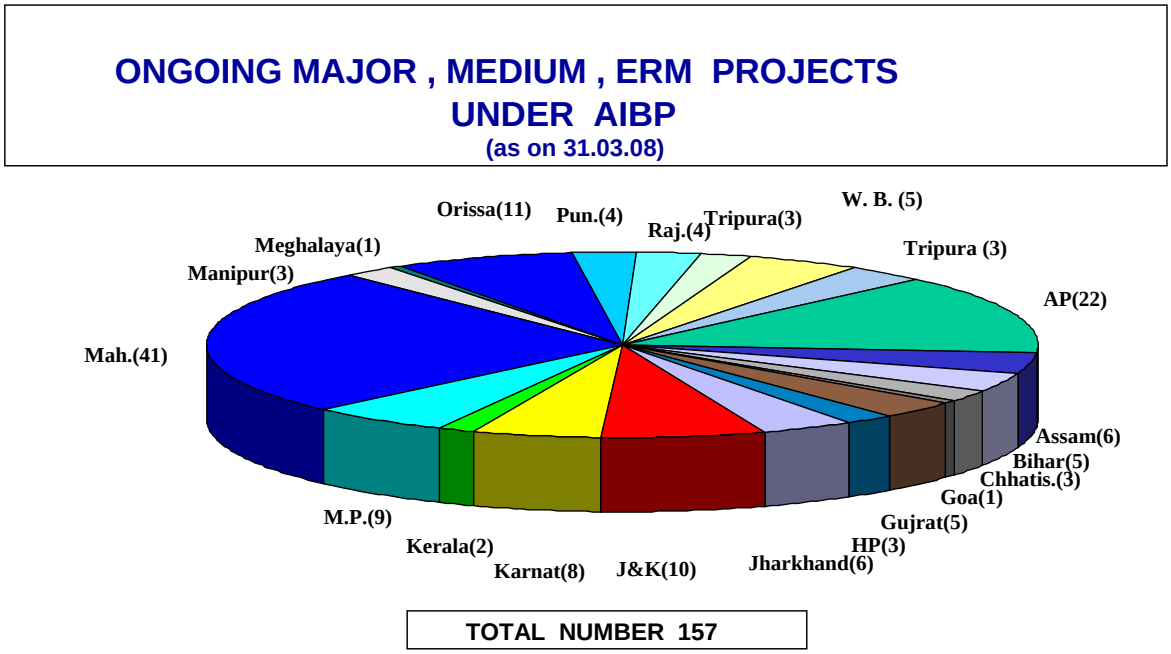


Table 8.3 – State wise Major & Medium projects completed under AIBP

Sl. No.	State	Project	Sl. No.	State	Project
1.	Andhra Pradesh	Cheyyeru (Annamaya)	47.		Marwal Lift
2.		Nagarjunsagar	48.		Lethopora
3.		Sriramsagar St.I	49.		Koil Lift
4.		Madduvalasa	50.		Mod of Pratap Canal
5.		Priyadarshini Jurala	51.		Mod of Kathua Canal
6.		Maddigeda	52.		Igophey
7.		Somasila	53.	Karnataka	Maskinallah
8.		Gundalavagu	54.		Hireballa
9.		Alisagar	55.	Kerala	Kallada
10.	Assam	Bordikarai	56.	Madhya Pradesh	Banjar
11.		Rupahi	57.		Upper Wainganga
12.		Hawaipur lift	58.		Urmil
13.		Kolanga	59.		Bansagar Unit I
14.		Integrated Irrigation Scheme in Kollang Basin	60.		Sindh Ph I
15.	Bihar	Bilasi	61.	Maharashtra	Jawalgaon
16.		Orni Reservoir	62.		Jayakwadi Stage-II
17.		Upper Kiul	63.		Kadvi
18.	Chhattisgarh	Shivnath Div.	64.		Kasari
19.		Hasdeo Bango	65.		Kasarsai
20.		Jonk Diversion	66.		Khadakwasla
21.		Barnai	67.		Upper Tapi
22.	Goa	Salauli	68.		Wan
23.	Gujarat	Damanganga	69.		Vishnupuri (Works)
24.		Deo	70.		Bahula
25.		Harnav-II	71.		Kumbhi
26.		Jhuj	72.		Surya
27.		Karjan	73.		Bhima
28.		Sipu	74.		Patgaon
29.		Sukhi	75.	Orissa	Upper Kolab
30.		Umaria	76.		Potteru
31.		Watrak	77.		Sason Canal
32.		Mukteshwar	78.		Salki Irrigation
33.	Haryana	Gurgaon Canal	79.		Naraj
34.		WRCP	80.		Salandi Left Main Canal - Ambahata
35.	Jharkhand	Latratu	81.	Punjab	Ranjit Sagar
36.		Tapkara Res.	82.		Remodelling of UBDC
37.	Jammu & Kashmir	Mod. of Zaingir Canal	83.	Rajasthan	Gambhiri Mod.
38.		Jaisamand Mod.	84.		Madhya Ganga and Upper Ganga Mod.
39.		Chhapi	85.		Rajghat Dam
40.		Panchana	86.		Sarda Sahayak
41.		Chauli	87.		Providing Kharif Channel in H.K. Doab
42.		Mahi Bajaj Sagar	88.		Tihri
43.		Bilaspur	89.		Jurala Pump Canal
44.	Tamil Nadu	WRCP	90.	West Bengal	Kangsabati
45.	Uttar Pradesh	Gunta Nala	91.		Mod. of Barrage and Irrigation System of DVC
46.		Gyanpur Pump Canal			

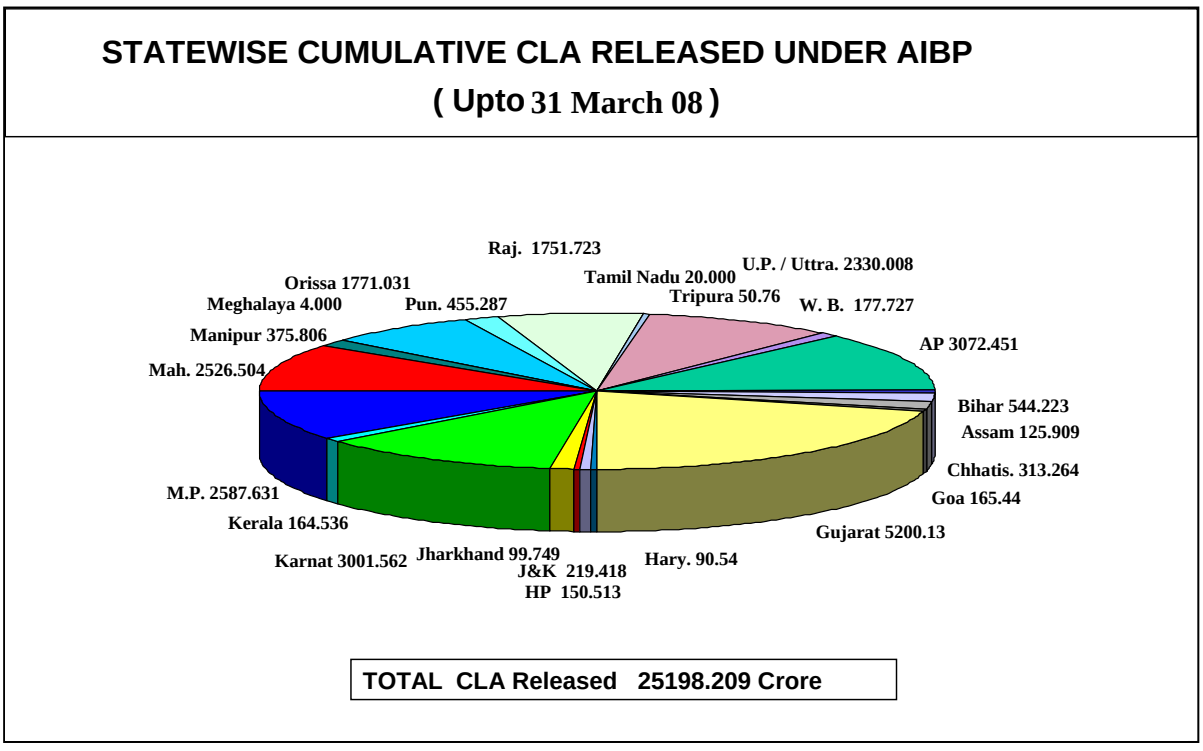
Table 8.4 : Year wise CLA Disbursement under Normal and Fast Track AIBP for major/medium irrigation projects

(Rs. crore)

Year	Total CLA/Grant Disbursed
1996-97	500.000
1997-98	952.190
1998-99	1119.180
1999-2000	1392.065
2000-01	1791.605
2001-02	2554.226
2002-03	3015.138
2003-04	3023.284
2004-05	2773.129
2005-06	1709.225
2006-07	1884.221
2007-08*	4483.947
Total	**25198.210**

(* For Proposals received during 2006-07)

Figure 8.5 - Statewise cumulative CLA released under AIBP



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 Centrally Sponsored CAD Projects

The co-ordination and other related works of monitoring of CAD Programme in respect of 133 projects and monitoring status reports received from the Regional offices were also examined and observations / comments were communicated wherever necessary. The Regional offices have monitored almost all projects allotted to CWC. During the year 2007-08, 54 nos. half yearly status reports were received from the Regional offices and these reports were examined and comments / observations were made wherever necessary.

8.8 Monitoring of Repair, Renovation and Restoration of Water Bodies

The co-ordination and other works related to "Repair, Renovation and Restoration of Water Bodies directly linked to Agriculture" under the Schemes of Minor Irrigation in different States have currently been entrusted to Central Water Commission. The proposed funding pattern for the scheme is : Centre: State :: 75:25. In this regard 1079 proposals of 26 districts in 15 States amounting to Rs. 299.075 crores have been sanctioned by MoWR subsequent to requisite recommendation of CWC after examination of the schemes as per the MoWR guidelines in consultation with field organisations of CWC and concerned authorities of the State Governments.

8.9 Climate Change Cell

A Cell has been constituted in CWC to assess the impact of climate change with special reference to study the contribution of snowmelt and glaciers to river systems in India. The functions of Climate Change Cell are to initiate study for one Pilot Basin and finalise the methodology for contribution of snowmelt and glaciers to the river systems and coordinate all activities and reporting to the Commission/MoWR.

8.10 Study/Examination of report on Surveys of Reservoir Capacities for technical clearance of the Committee for Monitoring of Survey activities of reservoirs

Chief Engineer (P&D) is a Member of the Technical Advisory Committee for monitoring the survey activities of the Reservoirs. One report on Badua Reservoiray was examined and commented upon during the period.

9

CHAPTER-IX

CONSTRUCTION EQUIPMENT PLANNING AND MANAGEMENT

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

9.1 Project Appraisal

During the year 87 project reports of Irrigation, Power and Multipurpose projects of various States were technically examined from plant planning angle. Out of this, 45 project reports were recommended for acceptance with provision worth Rs. 21326.202 lakh in respect of earthmoving and construction equipment. In respect of the remaining 42 project reports, the observations / comments were conveyed to the project authorities for compliance and further review.

9.2 Consultancy

(i) Final report on Construction Methodology and Equipment Planning aspect of Tuiwal Hydro Electric project, Mizoram has been prepared and submitted to Chief Engineer, B&BB Organisation, CWC, Shillong.

(ii) An MOU has been signed on 19.06.2007 between the Director, CMC Directorate. CWC and SE, NWDA, Gwalior in connection with the preparation of DPR of Ken-Betwa Link project by National Water Development Agency, for the following two studies:

(a) Manpower Planning

(b) Construction Methodology, Equipment Planning & Scheduling.

(iii) Preparation of chapter on Construction Methodology and Equipment Planning aspect of Kolodyne Hydro Electric Project-II, Mizoram is under progress.

9.3 Monitoring Performance and Utilisation of Equipment

In order to monitor the utilisation of heavy earthmoving and construction equipment available in river valley projects, CWC collects the data on equipment performance on a quarterly basis. The data are being analysed in P&M Dte. of CMO with a view to identify reasons for low performance/utilisation of equipment.

6 No. quarterly and 1 No. annual returns were received during the year 2007-08 from Punjab State and all have been analysed.

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

The Irrigation Department of Uttar Pradesh and Uttarakhand have large number of earthmoving and construction equipment and their spare parts lying as surplus / unserviceable with various irrigation projects throughout the State. The State Governments of U.P. and Uttarakhand have constituted various Disposal Committees in which an officer of Central Mechanical Organisation i.e. Director (P&M) is a member.

During the year 2007-08, 7 meetings of the Committees were held in which reserve prices for various unserviceable equipment / machinery valued at Rs. 419.90 lakh were fixed. Representatives from CWC attended these meetings. Assistance is also being rendered in fixation of reserve price of equipment, vehicle and other miscellaneous items of the Farakka Barrage Project, West Bengal for disposal.

9.5. Manpower Planning

A special study on "Employment Generation in the Operation and Maintenance stage in Major and Medium Irrigation Projects" has been launched during the year. Data/information from State Governments/Projects authorities in respect of 22 major& medium projects out of 36 projects selected for study, were received/collected through personal visits.

An interim report has been prepared in Manpower planning cell of P&M Directorate based on data collected from 22 major & medium completed irrigation projects.

9.6 OTHER ACTIVITIES :

- Contractual issues on time extension proposal of HPP Civil works, Package I, II and III of Tehri Hydro Project and Koteswar dam project referred to the Committee constituted by Tehri Hydro Development Coroporation(THDC) were finalized and recommendation submitted to THDC Ltd.

- Procurement of stores comprise of stationery, furniture etc. for CWC Head quarters. Procurement/ maintenance of Photo copiers, fax machines, air conditioners, vehicles, water purifier, desert coolers, intercom system etc. and other house keeping activities were carried out by the PCP Directorate. The approximate expenditure for the above during 2007-2008 was to the tune of Rs. 2.80 crore.

10

INTER-STATE MATTERS

10.1 Inter-State River Water Disputes

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

10.1.1 Cauvery Water Disputes Tribunal

The Cauvery Water Disputes Tribunal (CWDT) was constituted by the Government of India on 2 June, 1990 to adjudicate the water dispute regarding inter-State river Cauvery and the river valley thereof. The Tribunal submitted its report with decision on 05.02.2007. CWDT has estimated the 50% dependable yield of Cauvery as 740 TMC at Lower Coleroon anicut at the delta and has apportioned between the basin states as follows:

Tamil Nadu	: 419 TMC
Karnataka	: 270 TMC
Kerala	: 30 TMC
UT of Pondicherry	: 7 TMC
Environmental protection	: 10 TMC
Inevitable escape into sea	: 4 TMC

However, the final decision of the CWDT has not been notified by the Government of India as the party states have sought clarifications from the Tribunal under section 5(3) of the ISWD Act, 1956 besides filing separate SLPs in the Supreme Court. Final award of the CWDT is awaited.

10.1.2 Krishna Water Disputes Tribunal

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

The Tribunal by its order dated 09.06.2006 had declined to grant interim relief on the prayers of all basin States who had filed seven interim applications seeking to restrain other basin states from going ahead with certain projects. Final order of the tribunal is awaited.

10.1.3 Mandovi River Water Disputes

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

sought for constitution of a tribunal for adjudicating the disputes.

Subsequently, Union Minister for Water Resources took an inter-State meeting in December 2002, during which it was decided that Government of Goa and CWC could make joint efforts to reconcile the discrepancies in the data and yield figures and the assessment of yield should be completed by March, 2003. Since Government of Goa wanted to scrutinize the runoff data of CWC site from original records, as a special case, MoWR during July, 2003 permitted to give all the raw gauge data of Gangim site of CWC to Government of 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 hold talks with the officials of Goa and Karnataka but no meeting could take place. Subsequently, a meeting was taken by Hon'ble Union Minister (WR) with the Chief Ministers of the basin states on 4.4.06. Again, negotiated settlement could not be reached. As desired in this meeting, Chairman, CWC, proposed an official level meeting on 26.4.2006, which was postponed since Government of Goa informed their non-participation in the meeting. The State of Goa insists on constituting Tribunal to adjudicate the dispute.

10.1.4 Vamsadhara River Water Disputes

During February 2006, Government of Orissa made a request under Section–3 of the Inter state River Water Disputes Act, 1956 to constitute a Water Dispute Tribunal to adjudicate the water dispute in respect of Inter-state river Vamsadhara and its valley between the state of Orissa and Andhra Pradesh. Issues raised in the request include fresh assessment of available water in the Vamsadhara and its valley at Katragada and Gotta Barrage and whether states of Orissa and Andhra Pradesh share equally the entire quantity of water available in the river Vamsadhara and its valley as agreed to earlier in the agreement dated 30.09.1962

As an attempt to resolve the dispute through negotiations, Secretary (WR), Government of India, convened an Inter State meeting with Secretaries of Irrigation/WR Department of Government of Andhra Pradesh and Orissa on 24.04.2006. It was agreed in the meeting that CWC will reassess the yield of Vamsadhara Basin. States of Orissa and A.P. also agreed to share the yield of the river on 50:50 basis as already agreed on 30.09.1962. It was also agreed that the aspect of shifting of river course due to construction of side weir at Katragada shall be studied by CWC/CWPRS and Andhra Pradesh would provide a set of DPR to Orissa. As decided in the above meeting of April 2006, CWC has reassessed the 75% dependable yield of Vamsadhara basin as 105 TMC at Gotta barrage and a set of DPR has been sent by Andhra Pradesh to Orissa. The model study report submitted by CWPRS, Pune

was found not to have addressed some of the aspects.

On the directions of MOWR, Chairman, CWC convened an inter-state meeting on 17.12.07 at New Delhi in which it was decided that CWPRS, Pune will carry out further studies to assess the quantum of water flowing through Katragada weir considering hypothetical siltation condition. As a follow up action to the decision taken in this meeting an inter-state meeting was held under the chairmanship of Chief Engineer (MERO), CWC, on 22/01/08. Both the states were urged to communicate with each other and cooperate in arriving at an amicable solution. Andhra Pradesh officials were asked to take appropriate action with regard to the additional studies suggested by Orissa for the two options of Katragada weir and Neradi barrage. Andhra Pradesh officials were also asked to prepare detailed proposal for rubber dam in lieu of conventional barrage at Neradi.

10.1.5 Palar Water Dispute

Palar is an inter-state river flowing through Karnataka, Andhra Pradesh and Tamil Nadu. Government of Tamil Nadu had complained to the Central Government in February, 2006 that Government of Andhra Pradesh is proposing a reservoir on Palar river without their consent which would affect the established utilization in the state and is against provisions of 1892 agreement. Tamil Nadu also filed a suit in the Supreme Court in the same month. As such, MOWR took the stand that since the matter was subjudice, it may not be appropriate for the Ministry to intervene.

Supreme Court heard the suit on 7.1.2008 and ordered that the Central Government can consider the representation of Tamil Nadu and try to arrive at a settlement of the issue. Accordingly, the first inter-state meeting was held on 11.3.2008 in which it was decided that both states would make available relevant data for further discussions.

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 and as per 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. An inter-state meeting was convened by Secretary (WR), MOWR on 20.3.2007 for setting a timeframe for the submission of geotechnical data. Accordingly Government of Orissa submitted the requisite geotechnical investigation data by May, 2007 to CWC. CWPRS has also submitted the report of model studies and the same were examined in CWC. On the basis of input received from Government of Orissa and CWPRS, Pune, the specification drawings for the tender purposes for the control structures across Indravati and Jouranalla river have been prepared by CWC and sent to the project authorities during November, 2007.

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 Commission 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 Ministers and Ministers 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 the States of Madhya Pradesh, Uttar Pradesh and Bihar in the ratio of 2:1:1.

The work on the Dam including Crest Gates have been completed in June, 2006 and the reservoir has been filled upto EL 333.40 m against FRL of 341.50 m during the 2007 monsoon. Power generation was 1268.989 lakh unit during the year 2007–2008.

So far, 72 meetings of the Executive Committee have taken place. In 72nd meeting held on 11.9.2007, the Committee deliberated the financial, technical and administrative matters of the Board. The balance work of Dam Project is likely to be completed by June, 2008.

10.5.2. Betwa River Board

In accordance with the inter-State agreement of 1973 between Governments of 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 Ministers-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 Rajghat dam Project has been completed in June, 2005 and the project has now entered into O&M stage. The Executive Committee desired that a model set up for the Joint Board may be formulated on the lines of Tungabhadra Board. Accordingly preparation of a draft proposal is in progress.

The reservoir (FRL 371.00 m) was filled up to 366.75 m during the year2007-08. The three units of Power House have been tested and commissioned during 1999-2000. Power generation was 518 lakh units during the year 2007-2008.

So far 79 meetings of the Executive Committee of BRB have taken place. The 79th meeting of Executive Committee was held on 11.09.2007. The committee discussed/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 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.

20th Meeting of Ghaghar Standing Committee was held on 11.3.2008 under the chairmanship of Member (RM). In the meeting, it was decided to circulate again the copies of the draft Master Plan so that the views/comments of the Members can be fruitfully discussed in the next meeting. The committee also agreed to the proposal of Government of Punjab for construction of embankment for reach of 2.45 km i.e. upto V.R. Bridge near village Makroor in addition to the 20 km reach already approved in the 17th meeting of Ghaggar Sanding Committee and construction of a new aqueduct adjacent to the existing aqueduct at R.D. 460.793 of Bhakra Main Line.

A Sub-Committee to the Ghaggar Standing Committee was constituted by MoWR on 21.12.2005 to monitor the water quality of

river Ghaggar & to suggest the remedial measures to control the pollutants.

Three meetings of the Sub Committee were held during the period February 2006 to September 2007 and draft report on Pollution in river Ghaggar was prepared and circulated amongst the members of the Ghaggar Standing Committee for concurrence. In the 20th meeting of the Ghaggar Standing Committee held on 11.3.2008 the Committee accepted the report and it was decided to circulate the report amongst the concerned Basin States for implementation.

10.6.2 Yamuna Standing Committee

The Yamuna Standing Committee was constituted to study the interests of Delhi, its suburbs and the Northern Railway Bridge and 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. 73rd meeting of Yamuna Standing Committee was held on 18.3.2008 under the chairmanship of Member (RM), CWC. The minutes of the meeting were finalized and circulated among the members of the Committee.

10.6.3 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 Department of Irrigation, under earst-while Ministry of Agriculture and Irrigation, in 1978 to oversee the implementation of all the elements of the Master Plan of Sahibi Nadi-Najafgarh Nallah and to ensure the regulation of flows at control points for the best interest of all concerned States. There have been no major flood in the basin since 1978.

10.6.4 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. Members from BSF, CPWD and Ministry of Home were co-opted in enlarged the committee in 1996.

Report of the 28th meeting of the "Committee of Special Remedial Works for Flood Protection Embankment on rivers Sutlej and Ravi" held from 16.1.2008 to 19.1.2008 under the chairmanship of Chief Engineer (FMO) was prepared and sent to all the Members of the Committee and Ministry of Water Resources and Ministry of Home Affairs.

10.7 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. Instructions for day to day operations of the reservoirs are provided by the Superintending Engineer, CWC stationed at Maithon.

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CHAPTER XI

ENVIRONMENTAL MANAGEMENT OF WATER RESOURCES PROJECTS

11.1 Environmental Management

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

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

Figure 11.1 - State wise Projects monitored by NEMCRVP

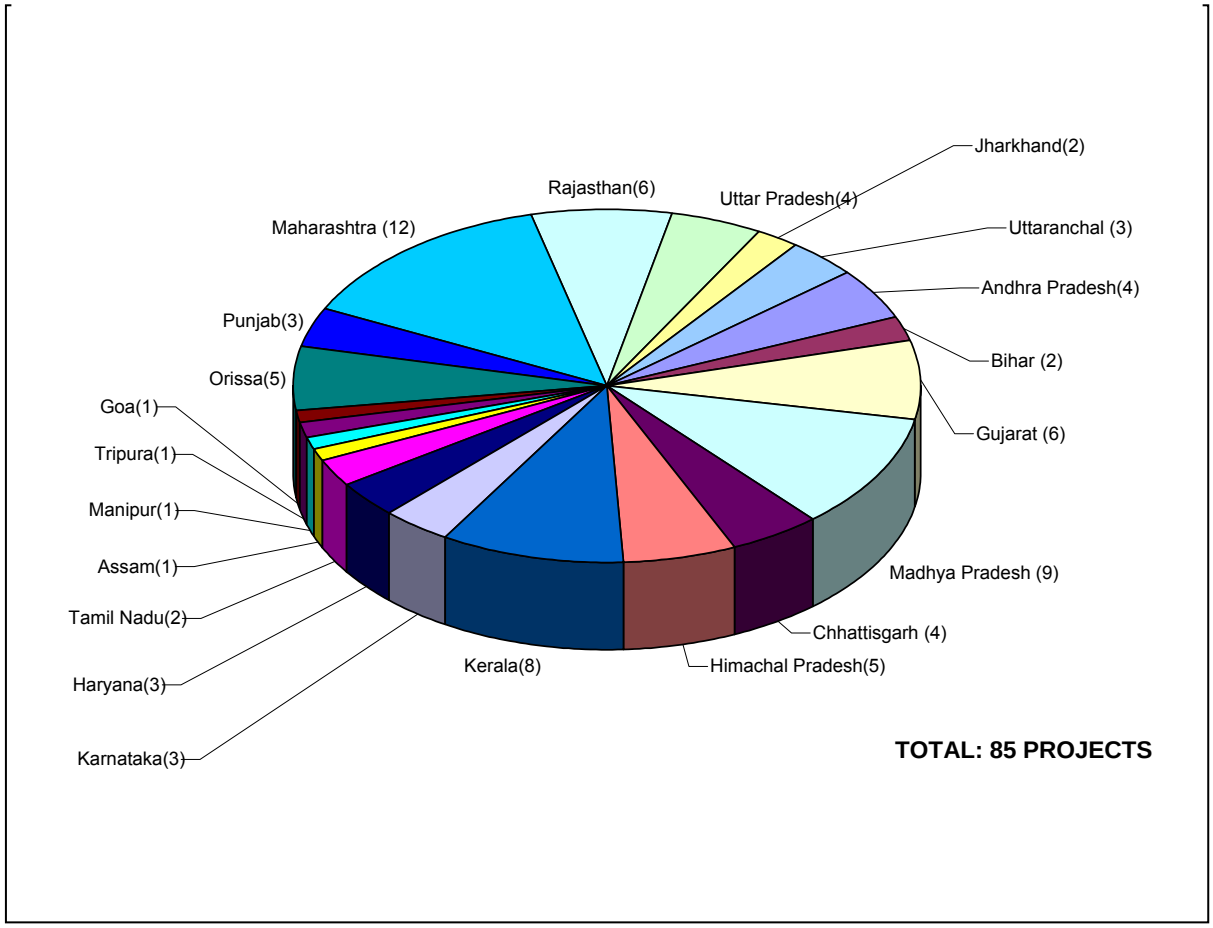
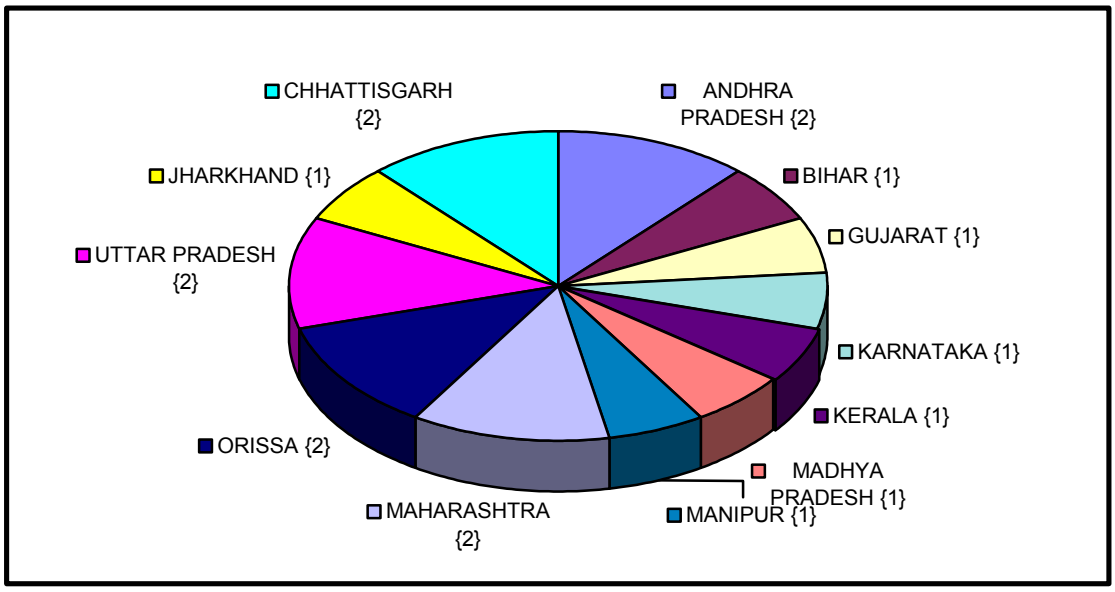


Fig 11.2 - State wise Projects under close monitoring by NEMCRVP



11.1.2 Constitution of NEMCRVP

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

11.1.3 Functions of the Committee

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

& Appraisal/ Monitoring) of Regional office represent CWC in PEMCs.

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

Various publications have been brought out for creating balanced scientific awareness in public about River Valley Projects & environmental concerns in India. It is working to establish the BIS standards with respect to the Environmental Management of the river valley Projects.

The Director, Environment Management is a member of the newly constituted "Climate Change Cell."

11.2 Environmental Impact Assessment

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

EIA/ EMP reports of 57 projects referred to CWC by Ministry of Environment & Forests have been examined and comments forwarded to the Ministry. 12 Meetings of Expert Committee for River valley & HE projects have been held and the Committee has recommended 42 projects for environmental / prior environmental clearance. Feasibility reports/ DPRs of 7 projects have been examined from an environmental angle for grant of "In Principle" consent by CWC.

11.3 Resettlement & Rehabilitation

Central Water Commission is actively involved in monitoring of Rehabilitation and Resettlement (R&R) aspects of Water Resources Projects in various states. In this regard, data on R&R measures being taken by the Project Authorities is being compiled, Norms/Acts/Policies adopted by the State Govt. on R&R of displaced affected persons of major/medium Irrigation and Multipurpose Projects are collected and analysed. In respect of 240 existing /ongoing major & medium reservoir projects, data on rehabilitation measures have been collected and a data base has been generated. Assistance in scrutinizing the National Policy on R&R for Project Affected Families, 2007, framed by Ministry of Rural Development was given. One Irrigation Project report namely Lendi Project (Maharasthra) has been examined from R&R angle for the Screening Committee of CWC to given "in principle consent" to decide their fitness for detailed examination.

Half Yearly progress reports of 18 projects on R&R programmes received from various project authorities were examined during the year.

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CHAPTER-XII

EXTERNAL ASSISTANCE

12.1 External Assistance for Development of Water Resources

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

12.1.1 Role of CWC

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

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

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

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

12.1.2 Techno- economic appraisal & clearance of projects

3 major projects proposed for World Bank funding and 15 medium projects for JBIC assistance were under appraisal in CWC during 2007-08. Details of the project are given in table 12.1 and 12.2.

Table 12.1 Major projects proposed for World Bank Assistance

Sl No	Name of project	Estimated cost (Rs. crore)
1.	Andhra Pradesh Water Sector Improvement Project	4444.41
2.	Master Plan for Drainage Development in Costal Belt of Orissa	856.43
3.	Mahanadi Basin Development Plan Orissa	3493.10

Table 12.2 Medium schemes proposed for JBIC assistance

Sl No.	Name of Project	Estimated Cost (Rs crore)
1.	Wyra	46.00
2.	Taliperu	13.20
3.	Sathnala at Kanpa	48.39
4.	Swarna at Jowly	14.50
5.	Lankasagar	12.00
6.	Malluruvagu	12.00
7.	Lower Sagileru	19.00
8.	Swarnamukhi Anicut System	27.55
9.	Dindi	15.00
10.	Gandipalem	29.30
11.	Gajuladinne	55.00
12	Paleru Bitragunda Anicut System	19.00
13	Cumbum Medium Irrigation Project	16.00
14	Pakhal Medium Irrigation Project	45.60
15	Rallappadu Irrigation Project	34.60

12.2 World Bank Assistance

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

12.2.1 Closed Credit/Loan Agreements

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

Table 12.3 - Details of the Closed Agreements

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

12.2.2 Water Sector Restructuring Projects

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

The main objectives of WSRP are**:-**

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

12.2.3 On-going Credits / Loans Agreements

There are four projects under World Bank funding. The assistance utilized is as given in Table 12.4 :-

Table 12.4 External Assistance to Projects (World Bank)

Sl. No	Name of Project	Credit No/Loan No.	Agency	Time Slice		Est. Cost (Rs. Million)		Assistance (US $ Million)	
				Starting Month	Closing Month	Total (As per SAR)	Latest	Total	Utilized ending 03/08
1	2	3	4	5	6	7	8	9	10
1.	**Maharashtra** Water Sector Improvement Project	L4796-IN	IBRD	09-2005	3-2012	18595.58	18595.58	USD 325.00	USD 43.44
2.	**Rajasthan** Water Sector Restructuring Project	Cr.3603-IN	IDA	03-2002	03-2008	8305.07	8305.07	**(USD 140.00)**	USD 85.67
3.	**Uttar Pradesh** Water Sector Restructuring Project	Cr.3602-IN	IDA	03-2002	10-2008	8351.00	8351.00	(USD 149.20)	USD 44.93
4.	**Madhya Pradesh** Water Sector Restructuring Project	Ln.4750-IN	IBRD	01-2005	03-2011	20402.23	20402.23	USD 394.02	USD 45.47
	TOTAL							**USD 1008.22**	**USD219.51**

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 On-going Agreements

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

Table 12.5 - External Assistance to Project (JBIC)

SL No.	Name of Project	Loan Agreement No.	Loan period		Estimated cost	Total Assistance (M Yen)	Assistance utilized ending 3/07 (M yen	Remarks
			Starting date	Closing date	As per agreement (Rs Million)			
1	Rengali Irrigation Project Left Bank Canal-II Phase-I, Orissa	ID-P-135 & ID-P154	6/04	6/2011	6580	7760	6844.23	Closed
						6342	4042	On-going
2	K..C.Canal Modernisation Project, Andhra Pradesh	ID-P-113 & ID-P155	3/04	3/09	11070	16049	15728.65	Closed
						4773	2350	On-going
3	AP Irrigation and Livelihood Improvement Project	IDP 181	3/07	07/13	11377	23974	38	On-going
	Total					**58898**	**29002.88**	

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CHAPTER-XIII

INTERNATIONAL COOPERATION WITH NEIGHBOURING COUNTRIES

13.1 Introduction

The three major river systems of India namely Ganga, Brahmaputra and Indus cross international borders. The Ministry of Water Resources is responsible for strengthening international cooperation on matters relating to these rivers by way of negotiations with neighbouring countries in regard to river waters, water resources development projects and operation of international treaties relating to water.

13.2 Cooperation between India and Nepal

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

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

A treaty on Integrated Development of Mahakali (Sharda) River including Sharda Barrage, Tanakpur Barrage and Pancheshwar Multipurpose Project was signed between the Governments of India and Nepal in February 1996, which came into force in June, 1997 (Mahakali Treaty). The Treaty is valid for a period of 75 years from the date of its entry into force. Pancheshwar Multipurpose Project is the Centre piece of Mahakali Treaty. Required field investigations for the Pancheshwar Multipurpose Project having an installed capacity of 5600 MW at Pancheshwar with irrigation and incidental flood control benefits and a re-regulating structure to primarily meet the irrigation requirements downstream of Banbasa in Uttar Pradesh, have been completed. The DPR is to be finalised after mutually resolving the pending issues regarding finalisation of re-regulating dam site, cost apportionment between irrigation and power, as well as between India and Nepal. During the 2nd inter-ministerial meeting held under the chairmanship of Secretary (WR) on indo-Nepal Water Resource Development

Projects on 01-10-07 at New Delhi, it was brought out that as per Mahakali treaty, both the Government of India and Nepal are committed to establish Pancheswar Development Authority (PDA) which would be responsible to arranging the financing and implementation of project. PDA would not only resolve related issues but also look beyond DPR stage to expedite the implementation.

- 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 i.e. upto February, 2007. 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. However, due to security concerns and internal political – social conditions in Nepal the progress of work was hampered. An expenditure of Rs. 12.44 crore was incurred during 10th plan due to slow progress of the work. The JCWR entrusted additional work of study of Kamla Multipurpose project and preliminary study of Bagmati Multipurpose project to JPO-SKSKI. A revised CPIB memo amounting to Rs. 70.55 crore for the work has been approved by Government of India.

- In order to prevent spilling of flood waters from Lalbekeya, Bagmati, Khando and Kamla rivers from Nepal side into Bihar, India and Nepal have agreed to extend the embankments along these rivers. Financing of works in Nepal is done through MEA and on the Indian side, through MOWR. In this connection, a Standing Committee on Embankment Construction (SCEC) has been constituted which is responsible for planning, design and construction of these embankments

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, which is utilized in the formulation of flood forecasts by CWC.

  For hydrological information of the Sutlej/Langqen Zangbo river in flood season both the countries had signed a MoU in April, 2005 during the visit of Hon`ble Premier of China in April 2005. As per MoU, the Chinese side has agreed to provide information on any abnormal rise/fall in water level/discharge and other information, which may lead to sudden floods on the

basis of existing monitoring and data collection facilities on real time basis. Further, the Chinese side agreed to build a hydrological station on the Sutlej/Langqen Zangbo River before the flood season of the year 2006 and provide the hydrological information to the Indian side. The Chinese side started providing water level and rainfall data of Tsada station lying on the mainstream of Langqen Zangbo / Sutlej river from flood season of 2007 in accordance with MOU signed between two Governments, pending finalization of implementation plan. Talks with China for establishing sites in Palanzangbu and Lohit are continuing.

- Further, after the incidence of artificial lake on Pareechu River in 2004, two-sites in Tibet (China), and two sites in India, one in J&K and another in Himachal Pradesh have been established for monitoring the water level of Pareechu, and for real time data transmission.

- During the visit of H.E. President of Republic of China to India in November, 2006, a joint declaration was issued, wherein the two sides agreed to set up Expert Level Mechanism for interaction and cooperation on the provision of flood season hydrological data, emergency management and other issues regarding trans border rivers. The first meeting of Expert Level Mechanism was held in Beijing, China, from 19-09-2007 to 21-09-2007 in which various issues regarding trans-border rivers and exchange of hydrological information including draft implementation plan of Langqen Zangbo / Sutlej river were discussed.

13.3 Cooperation between India and Bangladesh

Transmission of data

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

Joint Observation of Ganga Water

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

Indian side had earlier offered to provide free Arsenic testing kits and Arsenic removal plants to Bangladesh as a good will gesture. In this connection Bangladeshi scientists have inspected the equipment at Central Glass and Ceramic Research Institute at Kolkata as per decision taken in the above meeting. It was also agreed that Ministers of Water Resources of both the countries would personally visit the proposed works for bank protection/ minor

Lift Irrigation/ Drinking Water Supply Schemes and would give relevant decision for action by both the Governments.

The existing system of transmission of flood forecasting data on major rivers like Ganga, Teesta, Brahmaputra and Barak during the monsoon season from India to Bangladesh was continued. The transmission of flood forecasting information from India during the monsoon has enabled the Civil and Military authorities in Bangladesh to shift the flood affected population to safer places. During 36th meeting of JRC, The Indian side offered to provide the level, flow and forecast of the river Brahmaputra at Guwahati and advisory forecast of Ganga at Farakka so as to increase the time of advance flood warning.

13.4 Cooperation between India and Bhutan

- A comprehensive scheme titled "Comprehensive Scheme for Establishment of Hydro-meteorological and Flood Forecasting Network on rivers common to India and Bhutan" is in operation since 1979. The network consists of 35 hydro-meteorological / 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 regularly 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 assessment, 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. As part of 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.

13.6 Visit of Foreign Delegates.

13.6.1 South Africa

South African delegation of six members, led by Ms. T. Mbassa, Deputy Director General-Regions, from the Department of Water Affairs and Forestry, South Africa, visited Central Water Commission on May 8th, 2007. A presentation on activities of MoWR, CWC and NWDA was made from CWC side

13.6.2 Kenya

A Kenyan delegation of ten members, led by Mr. James Oduor, Drought Management Coordinator, ALRMP, visited Central Water Commission on June 21st, 2007 as part of their programme to study the for initiatives taken by Government of India flood disaster management and disaster preparedness. A presentation was made on "CWC's Role in Flood Forecasting & Flood Management".

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CHAPTER-XIV

COMPUTERISATION AND MODERNISATION

14.1 System Management

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

14.2 Computerisation Activities in CWC

Information technology is making rapid strides, and the capabilities and facilities becoming available on desktop are reaching levels that could not have been imagined few years back.

A scheme for Modernisation of CWC's infrastructure has been envisaged under the XI five year Plan. Besides, e-governance implementation, the scheme is focused on enhancing the efficiencies and efficacy of CWC in areas of Analysis /Design /Numerical-modeling and dissemination of Water Resources Information. At the end of 1st year of XI Plan period a total of Rs. 46.77 lakh was spent for procurement and maintenance of IT items and expansion of LAN.

The work on implementation of CWC Intranet portal named "Sangam" is going on. In house development of a software for the national level data base management of Dam Safety activities has also been taken up by the Software Management Directorate of CWC.

14.2 Water Resources Data

14.2.1 Hydrological Data

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

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

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

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

The Meta data of the various peninsular basins is available on line.

14.2.2 Water and Related Statistics

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

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

- Production related performance & economic efficiency

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

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

14.2.3 Documentation of Data

The following publications were finalized/ are under finalization.

i. Hand Book on Water & Related Information, January 2007.
ii. Water and Related Statistics – 2006 as updated on July 2007.

(Available on CWC Website) under the hyperlink, "Water Resource Statics")

14.3 Information Support to Management:

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

14.4 Data Bank

A new scheme under Water Resources Information System for the XI Five-Year Plan starting from 2007 has been introduced. Under the scheme, it is proposed to set up a data bank as mandated by the ISWD Act, 1956 for maintaining data on each river basin including data regarding water resources, land, agriculture and related matters. The data bank at CWC head quarters will be connected to the source agencies in the States for online collection and exchange of information.

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CHAPTER - XV

TRAINING

15.1 Training

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

15.2 Induction Training/Orientation Programme

Induction training to Assistant Directors recruited through UPSC is also conducted by Training Directorate and National Water Academy at Pune. First part of the 21st Induction training course was conducted at NWA, CWC, Pune from 3rd July, 2007 to 5th Oct, 2007 whereas the second part at CWC Headquarters from 9th Oct, 2007 to 26th Nov, 2007, in which 12 officers participated.

During the year 2007-08, 1 orientation programme for newly promoted Extra Assistant Directors of CWC was also organized at NWA, CWC, Pune during 21st Jan, 2008 to 15th Feb, 2008 in which 20 officers participated.

15.3 National Water Academy

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

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

The training and other related activities have increased manifold with the development of infrastructure like installation of additional computers,

setting up of library with modern facilities, lodging and boarding facilities for trainee officers and faculties. NWA conducts long term as well as short-term training courses on regular basis and also holds national level seminars and workshops on the emerging technical areas in the field of water resources development and management. The Academy is also one of the nodal agency for conducting training programmes under World Bank Aided Hydrology Project-II.

During the year 2007-08, in all 29 number of training programmes including Workshop/Seminar were conducted by NWA. During the year 691 number of officers from various states/central Govt. organizations, PSUs were trained by NWA with a total number of manweeks accomplished to the tune of 1005. During the year 2007-08, NWA conducted 4 workshops also. Workshop on Financial Reporting under Hydrology Project-II was held by the Ministry of Water Resources at NWA.

Out of 29 training programmes conducted by NWA, following programmes/ Workshops were introduced for the first time.

- Workshop on Financial Reporting under Hydrology Project – II (24-25 May 2007) (By the Ministry of Water Resources).
- Workshop on "Change in Rainfall Pattern" (9th June 2007).
- National Workshop on "Geotechnical / Hydrological Instrumentation" (6-7 September, 2007).
- National Seminar on "Adapting to Climate Change" (5-6 December 2007).
- Training Programme on "Hydrological Design Aids" (10-14 December 2007).
- Panchayat Raj Institutions (26-28 February 2008)
- Management Development Programme for Non Engineering officers of organizations under the Ministry of Water Resources.

Various training courses, workshops and seminars organized by NWA at Pune during 2007-08 are given at **Annex-XV-2.**

In addition to the regular training activities, following important events were held during the year 2007-08:

- Under Tank Rehabilitation Project, Punducherry, a group of 35 persons (farmers) visited NWA on 19.09.2007. The participants belonging to various Tank Association in Punducherry including Presidents and Secretaries of the associations were exposed to the importance of Participatory Irrigation Management in Irrigation Sector.
- Hon'ble Members of Parliamentary Standing Committee on Water Resources visited Pune and Mumbai during 15-20 January 2008. The delegates also visited Kukadi Project, Narayan Gaon during the visit. Necessary arrangements for this visit were made by NWA.

15.4 Other Training Programmes/ Conferences/Seminars, etc.

The consolidated details of CWC officers deputed on training, seminars, workshops, conferences etc, within the

country and abroad during the year 2007 – 2008 are given below in Table 15.1.

Table 15.1 Officers deputed for training

Sl. No	Name of activities	No. of Particip-ants
1	Sponsoring officers for training, attending seminars/ workshops, etc. in India organised by other organisations	214
2	Sponsoring officers for training, attending seminars/ workshops, etc. abroad	13

15.5 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 2007-2008, 24 graduate engineers / Diploma holders/Vocational Certificate holders were imparted training.

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

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

Annexure XV-1(a)

Courses organized by Central Water Commission during the year 2007-08

Sl. No.	Training Programme	Duration of the Course	Venue of the Course	No. of Participants
1.	Hindi Workshop	20-22 Jun., 2007	New Delhi	30
2.	Water Quality Monitoring Level-II Parameter	23-27 July, 2007	NOIDA	35
3.	Hindi Workshop	18-19 Sept., 2007	New Delhi	30
4.	Training on Discharge Measurement using ADCP	24-26 Sept., 2007	Hyderabad	10
5.	Mike 11 for flood forecasting	8-12 Oct., 2007	Gandhinagar	11
6.	SWDES	23-27 Oct., 2007	NOIDA	30
7.	Data entry and Validation in SWDES	27-18 Nov., 2007	Lucknow	30
8.	SWDES	7-11 Jan., 2008	Chennai	20
9.	Capsule training programme on vigilance Matters	15-18 Jan., 2008	Gangtok	25
10.	Mike 11 mathematical model for flood forecasting	10-14 March, 2008	Guwahati	9
11.	Analytical Quality Control (AQC) & Data validation	13-14 March, 2008	NOIDA	35

Annexure XV-1(b)

List of officers deputed abroad for various training/ seminar/ symposia/ conferences, etc. during 2007-2008

Sl. No.	Topic of the programme /Venue / Period	Participant S/Shri
1.	Joint Hydrological Observation at Hardinge Bridge, Bangladesh, 9th April to 5th June, 2007	Sh. SBV Somayajulu, EE Sh. Dhananjay Kumar, AD
2.	15th Session of World Meteorological Congress, Geneva, Switzerland, 10th -16th May, 2007	Sh. R K Gupta, Director
3.	World Water Week 2007, Stockholm, 12th – 18th April, 2007	Sh. S K Sinha, CE
4.	G-15 High Level Meeting on Rural and Agricultural Development and Management of Water Resources, Tehran, 2nd – 4th September, 2007	Sh. R K Khanna, CE
5.	Salma Dam Project, Afghanistan, 29th September to 7th October, 2007	Sh. P K Saxena, Director Sh. S S Bakshi, D.D. Sh. Ramesh Kumar, D.D.
6.	Group Meetings of 25th ISO/TC/113, China, 22–26 October, 2007	Sh. A K Ganju, CE
7.	Joint Hydrological Observation at Hardinge Bridge, Bangladesh, 29 December, 2007 to 23 Feb., 2008	Sh. R Azhagesan, EE Sh. Kaila Sreenadhudu, AE
8.	Training on Disaster Management – Climate Forecasting USA, 21-25 January, 2008	Sh. Bhopal Singh, Director Sh. P Dorje, EE

Annexure XV-2

Courses organized by NWA, Pune during the year 2007-08

Sl. No.	Training Programme	Dates	No. of officers
1.	Water Quality Management for Lakes and Reservoirs.	16-20 April, 2007	32
2.	Application of Artificial Neural Network in Water Resources Development	23-27 April, 2007	16
3.	Preparation of Detailed Project Report of Multipurpose Water Resources Project	24 April - 4 May, 2007	24
4.	Application of Geo- Informatics in Water Sector	1-11 May, 07	29
5.	Training of Trainers in Hydrometry including use of SWDES Software.	8-18 May, 2007	13
6.	Rainwater Harvesting and Groundwater Recharging	21-25 May, 2007	35
7.	DSS planning for IWRDM of River Basins.	5-15 June, 2007	22
8.	Design of Dams	12-22 June, 2007	22
9.	Training of Trainers in Participatory Irrigation Management.	26-29 June, 2007	28
10.	21ST Induction Training Programme for Newly Appoints CWES Officers of CWC.	3 July- 5 October, 2007	12
11.	Training Programme on Environmental Management	9-13 July, 2007	18
12.	Surface Water Data Processing using HYMOS Software	20-31 August, 2007	8
13.	Application of Geo- Informatics in Water Sector	18-28 September, 2007	31
14.	Performance Evaluation and Benchmarking.	10-12 October, 2007	29
15.	Recycle and Reuse of wastewater	22-26 October, 2007	21
16.	Dam Safety Instrumentation	12-16 November, 2007	32
17.	Management Development Programme	15-18 November, 2007	23
18.	Hydrological Design Aids	10-14 December, 2007	26
19.	Flood Forecasting	10-19 December, 2007	26
20.	Socio Economic Analysis of Irrigation Projects	17-21 December, 2007	9
21.	6th Management Development Programme for Senior Officers of CWES/Central and State Govt. Departments/ PSUs	7-11 January 2007	17
22.	Training of Trainers in SWDES using HYMOS Software.	8-18 January, 2008	16

23.	Orientation Programme for Newly Promoted Extra Assistant Directors of CWC	21 January- 15 February, 2008	20
24.	Training Programme for Panchayat Raj Institutions.	26-28 February, 2008	17
25.	Application of Geo- Informatics in Water Sector	4-14 March, 2008	20
26.	Training Programme on Watershed Development	10-14 March, 2008	17
	Workshops/Seminar		
27.	Workshop on "Change in Rainfall"	9 June, 2007	50
28.	National Workshop on "Geotechnical/ Hydrological Instrumentation"	6-7 September, 2007	40
29.	National Seminar on Adapting to Climate Change	5-6 December, 2007	38
		Total No. of Officials Trained	**691**

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CHAPTER–XVI

VIGILANCE

16.1 Disciplinary Cases

The Vigilance/ Disciplinary cases and complaints received against officers & staffs of CWC were given proper and prompt attention. During the year 2007-08, 8 complaints were received and taken up for investigation. Final decision was taken in respect of 12 cases out of which in 5 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:-

S. No.	Particulars	Category of officers/staff			
		Gr. A	Gr. B	Gr. C	Gr. D
a)	No. of cases pending at the beginning of the year	22	16	18	5
b)	No. of cases added during the year	4	-	1	3
c)	No. of cases disposed of during the year	4	1	5	2
d)	No. of cases pending at the end of the year (a+b+c)	22	15	14	6

Vigilance Awareness Week was observed at CWC headquarters from 12th to 16th November, 2007.

16.2 Redressal of Grievances

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

As on 31.03.2008, out of 86 grievance cases, 56 cases were disposed off and 30 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.

17

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. 0	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	Chairman, CWC	Chairman

	(INCOH)		
10.	Indian National Committee on Irrigation and Drainage (INCID)	Chairman, CWC Member (WP&P)	Chairman Member
11.	Selection Committee for i) JAIN-INCID Sookshma Sinchai Puraskar ii) JAIN-INCID Krishi Sinchai Vikas Puraskar	Chairman, CWC	Chairman
12.	Executive Committee of Betwa River Board	Chairman, CWC Member (WP&P)	Chairman Member
13.	Executive Committee of Bansagar Control Board	Chairman, CWC Member (WP&P)	Chairman Member
14.	Regulation Committee of Bansagar Reservoir	Chairman, CWC Member (WP&P)	Chairman Vice Chairman
15.	Standing Committee on Education & Training	Chairman, CWC	Chairman
16.	Committee for expediting Environment /Forest clearance of TAC cleared projects	Chairman, CWC	Chairman
17.	Advisory Board of NWA, Pune	Chairman, CWC	Chairman
18.	Office Council of CWC	Chairman, CWC Member (WP&P) Member (D&R) Member (RM)	Chairman Member Member Member
19.	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
20.	Joint Group of Experts on Pancheshwar Multipurpose Project	Chairman, CWC Member (RM)	Team Leader Spl. Invitee
21.	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
22.	Governing Council for Central Soil & Materials Research Station.	Chairman, CWC Member (D&R)	Vice-Chairman Member
23.	International Commission on Irrigation & Drainage (ICID)	Chairman, CWC	Vice-President
24.	ICID Working Group on comprehensive approaches to Flood Management (WG-	Chairman, CWC	Member

	CAFM)		
25.	Departmental Council of MoWR	Chairman, CWC	Member
26.	Governing Council for the Central Water and Power Research Station, Pune	Chairman, CWC	Member
27.	National Institute of Hydrology Society	Chairman, CWC Member (D&R)	Member Member
28.	Governing Body of National Institute of Hydrology	Chairman, CWC	Member
29.	Monitoring Committee for the National River Conservation Plan (NRCP)	Chairman, CWC	Member
30.	Steering Committee of National River Conservation Plan (NRCP)	Chairman, CWC	Member
31.	Water Quality Assessment Authority (WQAA)	Chairman, CWC	Member
32.	High Powered Review Board of Brahmaputra Board	Chairman, CWC Member (RM)	Member Permanent Invitee
33.	Board of Governors (BOG) of National Institute of Construction Management and Research (NICMAR)	Chairman, CWC	Member
34.	Indo-Nepal Joint Committee on Water Resources	Chairman, CWC	Member
35.	Farakka Barrage Control Board	Chairman, CWC	Member
36.	Sardar Sarovar Construction Advisory Committee	Chairman, CWC Member (WP&P)	Member Invitee
37.	Society of National Water Development Agency	Chairman, CWC Member (D&R) Member (WP&P)	Member Member Member
38.	Governing body of National Water Development Agency	Chairman, CWC Member (D&R) Member (WP&P)	Member Member Member
39.	National Water Board (NWB) of the National Water Resources Council	Chairman, CWC Member (WP&P)	Member Member-Secretary
40.	High Powered Committee (HPC) on Maintenance of Minimum Flow of River Yamuna	Chairman, CWC	Member
41.	Cauvery Monitoring Committee (CMC)	Chairman, CWC	Member

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

61.	Joint Regulation Committee of Kharkai Dam	Member (WP&P)	Chairman
62.	Sub-Committee on Irrigation, Performance Assessment History, Education, Training, Research & Development	Member (WP&P)	Chairman
63.	Standing Project Appraisal committee of Central Water Commission	Member (WP&P)	Chairman
64.	Water Resources Planning Management and evaluation Sectional Committee-WRD-06 (BIS)	Member (WP&P)	Chairman
65.	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
66.	Task Force for Flood Management in the country (North Western Region)	Member (WP&P)	Chairman
67.	Committee for Cost Sharing of Hathnikund Barrage	Member (WP&P)	Chairman
68.	Sub-Group-1 for Research topics under invited reserved Category	Member (WP&P)	Chairman
69.	Sub-Group-II Rain Water Harvesting	Member (WP&P)	Chairman
70.	Committee for the Re-organised UP/ Uttaranchal States	Member (WP&P)	Chairman
71.	Committee for Re-organised Bihar/ Jharkhand States	Member (WP&P)	Chairman
72.	Upper Yamuna Review committee	Member (WP&P)	Member-Secretary
73.	Working Group of INCID on capacity building	Member (WP&P)	Member
74.	Working Team on Socio-Economic Impacts & Policy Issues (ICID)	Member (WP&P)	Member
75.	Standing Committee for overall National Perspective Water Planning and Coordination in relation to diverse use of water	Member (WP&P)	Member
76.	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
77.	Committee Constituted by Hon`ble Supreme Court of India in matters of WP (Civil)	Member (WP&P)	Member

	No.725/94. Regarding news item in Hindustan Times on "And quiet flow the Maily Yamuna versus Central Pollution Control Board and others".		
78.	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
79.	Committee for Eastern River Waters of Indus System of River	Member (WP&P)	Member
80.	National Watershed Committee	Member (WP&P)	Member
81.	Central Loan Assistance under Accelerated Irrigation Benefits Programme	Member (WP&P)	Member
82.	Steering Committee of Indian National Committee on Hydrology (INCOH)	Member (WP&P)	Permanent Invitee
83.	High Powered Committee-Yamuna Action Plan of Ministry of Environment and Forests	Member (WP&P)	Invitee
84.	Technical Advisory Committee for Flood Control, Drainage and Anti-Sea Erosion Schemes (Goa)	Member (RM)	Chairman
85.	Subernarekha Embankment Committee (Orissa, West Bengal & Bihar)	Member (RM)	Chairman
86.	Working Group to advise WQAA on the minimum flow in the rivers	Member (RM)	Chairman
87.	Setting up of HISMG (Data and Data dissemination) for Implementation of the World Bank assisted Hydrology Project Phase –II.	Member (RM)	Member
88.	Setting up of HISMG (Technical) for Implementation of the World Bank assisted Hydrology Project Phase –II.	Member (RM)	Chairman
89.	Steering Committee for the Preparation of Status Report on Water Resources requirements and its availability for Urban Areas	Member (RM)	Chairman
90.	Coastal Protection and Development Advisory Committee (CPDAC)	Member (RM)	Chairman
91.	National Coastal Zone Management Authority (NCZMA)	Member (RM)	Chairman
92.	Ghaggar Standing Committee	Member (RM)	Chairman
93.	Yamuna Standing Committee	Member (RM)	Chairman

94.	Sahibi Standing Committee	Member (RM)	Chairman
95.	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
96.	Flood Control Board set up by the Irrigation and Flood Control Department of Govt. of NCT of Delhi	Member (RM)	Chairman
97.	Committee for Flood Control Works in Brahmaputra Valley	Member (RM)	Chairman
98.	Standing Committee to Brahmaputra Board	Member (RM)	Chairman
99.	West Bengal State Committee of Engineers	Member (RM)	Chairman
100.	Ganga Flood Control Commission	Member (RM)	Chairman
101.	Kosi High Level Committee	Member (RM)	Chairman
102.	Damodar Valley Reservoir Regulation Committee	Member (RM)	Chairman
103.	WRD 01 Sectional Committee of BIS for Fluid Flow Measurements	Member (RM)	Chairman
104.	WRD-22 River and Diversion Works Sectional Committee	Member (RM)	Chairman
105.	Sub-Committee-III (Flood Management, Drainage and Environment Impacts) of INCID	Member (RM)	Chairman
106.	Joint Group of Experts on Pancheshwar Multi-purpose project	Member (RM)	Special Invitee
107.	Joint Team of Experts (JTE) on Sapta Kosi Project	Member (RM)	Team Leader
108.	Committee for examination of technical issues regarding Baglihar Hydro-Electric projects on the Chenab Main in J&K	Member (RM)	Chairman
109.	TAC to Assam State Brahmaputra Valley Flood Control Board	Member (RM)	Chairman
110.	TAC to Cachar Flood Control Board (Assam)	Member (RM)	Chairman
111.	High Level Committee to Study the Regulation of Releases from various Hydro-Electric Projects Constructed Along Teesta	Member (RM)	Chairman
112.	Committee to study Erosion Problem of Bhutani Diara (West Bengal) and Majauli Island (Assam)	Member (RM)	Chairman

113.	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
114.	Standing Technical Advisory Committee (STAC) to the Governing Council for CSMRS, New Delhi.	Member (D&R)	Chairman
115.	Technical Committee for procurement of Instruments and working models for Instrumentation Centre (IDC)	Member (D&R)	Chairman
116.	Governing Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
117.	General Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
118.	Board of Management of Geological Survey of India	Member (D&R)	Member
119.	Research Advisory Committee (RAC) of National Council for Cement and Building Materials.	Member (D&R)	Member
120.	Board of Consultants for Koyna Dam and its appurtenent works and Generating Equipment/Machinery including Koyna Power	Member (D&R)	Member
121.	Indian National Committee on Hydraulic Research (INCH)	Member (D&R)	Chairman
122.	R&D Implementation and Monitoring Committee(RIMC)	Member (D&R)	Chairman
123.	National Committee on Seismic Design Parameters of River Valley Projects (NCSDP)	Member (D&R)	Chairman
124.	WRD 09, Dams & Spillway Sectional Committee of BIS	Member (D&R)	Chairman
125.	National Level Steering Committee (NLSC) for Dam Rehabilitation and Improvement Project (DRIP)	Member (D&R)	Member
126.	Technical Committee (TC) for Dam Rehabilitation and Improvement Project (DRIP)	Member(D&R)	Chairman
127.	Technical Advisory and Review Committee (TARC) for preparation of PMP Atlas	Member (D&R)	Chairman
128.	National Institute of Hydrology (NIH Society)	Member (D&R)	Chairman
129.	Indian National Committee on Hydrology	Chairman, CWC	Chairman

	(INCOH)		
130.	Steering Committee of INCOH	Member (D&R)	Chairman
131.	World Meteorological Organization	Member (D&R)	Principal Representative
132.	Committee of International Commission on large dams, India	Member (D&R)	Member
133.	Board of Directors of Tehri Hydro Development Corporation	Member (D&R)	Part Time Director
134.	Indo-French Working Group on Energy	Member (D&R)	Member
135.	Group of Implementation of Hydro-Electric Projects in J&K State	Member (D&R)	Member
136.	Bureau of Indian standards, WRD-15	Member (D&R)	Chairman
137.	Technical Advisory Committee of the Farakka Barrage Project.	Member (D&R)	Chairman
138.	Technical Co-ordination Committee (TCC) for Tala HE Project, Bhutan.	Member (D&R)	Co-Chairman
139.	Board meeting of Tala HE Project Authority (THPA), Bhutan	Member (D&R)	Invitee
140.	Committee of CEA to accord of techno-economic appraisal of Power Schemes.	Member (D&R)	Permanent Special Invitee
141.	NHPC Performance Review Committee	Member (D&R)	Member
142.	Tender Committee of Farakka Barrage Project	Member (D&R)	Chairman
143.	Fly Ash Utilisation Programme – Technical Advisory Group (FAUP – TAG) constituted by Department of Science and Technology	Member (D&R)	Member
144.	Committee for monitoring progress of Farakka Barrage Project	Member (D&R)	Chairman
145.	Committee for examination of technical/legal issues regarding Baglihar H. E. Project (J&K)	Chairman, CWC	Chairman
146.	Review Committee on Narmada Control Authority	Chairman, CWC	Invitee

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.

36th TAC meeting was held on 19th July 2007 and the technical aspects of the following reports have been discussed:

- Preliminary water balance study of Tapi basin upto Ukai dam
- Feasibility report of Par-Tapi-Narmada 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
- Status of studies pertaining to Himalayan Rivers Development Component of NPP
- Feasibility report of Jogighopa-Teesta-Farakka link project
- Status of studies pertaining to peninsular rivers Development Component of NPP
- Finalization of water balance studies of NWDA in consultation with central water commission

17.2.2 Technical Advisory Committee of NIH

The research programmes and other technical activities of NIH are monitored and guided by Technical Advisory Committee of NIH headed by Chairman, CWC. Member (D&R) and Chief Engineer, Hydrological Studies Organization are its Members. TAC gets feedback from 3 Working Groups on Surface Water, Ground Water and Hydrological Observation and Instrumentation. Chief Engineer, HSO and Chief Engineer, BPMO are the Members of the Surface Water Group and Chief Engineer (P&D) is the Member of the Hydrological Observations and Instrumentation Group. The 56th meeting of TAC was held on 5.04.2007 at NIH, Roorkee. 57th meeting of TAC was held on 12.09.2007 at NIH, Roorkee and 58th meeting of TAC was held on 18.03.2008 at New Delhi. The 26th, 27th and 28th meetings of Surface Water Working Group of NIH (Surface Water) were held from 26-27.09.2007, 9-10.10.2007 and 14-15.02.2008 respectively at NIH, Roorkee.

17.2.3 Technical Advisory Committee of CWPRS

The TAC was constituted mainly for the purpose of providing an overall perspective and technical guidance in the area of hydraulic research. The TAC is composed of 17 members drawn from various public Institutions and is headed by Chairman, CWC. Member (D&R), CWC is one the Members of TAC. The 29th Meeting of TAC was held on 27th June, 2007 at Pune under the Chairmanship of Chairman, CWC. The Member-Secretary of this committee had briefly explained the objectives and activities undertaken under five schemes during 10th Plan period.

17.2.4 Technical Advisory Committee of Farakka Barrage Project

The TAC of Farakka Barrage Project is headed by Member (D&R), CWC, which generally meets once every year and takes decisions about various works to be executed for efficient and safe functioning of the project. Various problems, special studies and related design work were referred to D&R wing from time to time. Member (D&R) held discussions with the Farakka Barrage Project authorities from time to time and chaired the Technical Advisory Committee meeting of Farakka

Barrage Project. The jurisdiction of Farakka Barrage Project has also been extended 40 km on up stream and 80 km on down stream of Farakka Barrage for carrying out the erosion protection works of River Ganga. During the year 2007-08 two emergent meetings were held.

The 1st emergent meeting of Technical Advisory Committee of Farakka Barrage Project (FBP) was held from 24.05.2007 to 26.05.2007 at Farakka under the Chairmanship of Member(D&R) to take decisions on the execution of seven number of priority river schemes along Fulhar, Mahananda, Kulik, Nagar, Tangon, Punarbhava and Atrai in the districts of Malda, North Dinajpur and South Dinajpur of West Bengal.

The 2nd emergent meeting of Technical Advisory Committee of Farakka Barrage Project (FBP) was held on 25.01.2008 at New Delhi under the Chairmanship of Member(D&R), CWC to take decisions on anti erosion measures on the left bank, up-stream of Farakka Barrage near Birnagar and Manikchak Ghat.

17.2.5 Standing Technical Advisory Committee of CSMRS

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

17.2.6 Indian National Committee on Hydraulic Research (INCH)

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

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

During the year, out of the 5 nos. new research proposals received by the Secretariat for funding under R&D programme of MOWR, 3 nos. proposals were sent to experts for their comments and

2 nos. returned with the approval of Chairman, INCH as they do not come under INCH domain. Service request for revalidation of the unspent amount and time extension for ongoing schemes were sent to MoWR. Monitoring of ongoing Research Schemes (12 nos.) for their physical and financial progress was carried out.

16th INCH meeting and 7th R&D Session have been held in Pune during 27-28 March,2008.

17.2.7 Indian National Committee on Hydrology (INCOH)

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

INCOH plays an active role for implementation of UNESCO sponsored International Hydrological Programme (IHP). The Committee normally meets twice a year, the 33rd meeting was held on 19.12.2007 under the Chairmanship of Chairman, CWC at New Delhi.

The sub-committee meetings of INCOH held during 2007-08 are as follows:

- Steering Committee – It is a sub-committee of INCOH. Member (D&R) is the Chairman and Chief Engineer, HSO is the Member of this sub-committee. The 26th meeting of this sub-committee was held on 17.07.2007 at New Delhi.
- Research Committee (Surface Water) – It is a sub-committee of INCOH. Director, Hyd(DSR) is the member of this sub-committee. The 16th meeting of this sub-committee was held on 3.12.2007 at NIH, Roorkee.

17.2.8 Indian National Committee on Irrigation and Drainage (INCID)

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

(i) Irrigation Performance Assessment, History, Education, Training, Research and Development;
(ii) Crops, Water Use and Drought Management, Micro and Mechanized Irrigation
(iii) Flood Management, Drainage and Environmental Impacts, and

(iv) Construction, Rehabilitation and Modernisation, Operation, Maintenance and Management.

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

The activities of INCID during the year are given below:

- During the year, INCID has brought out regular publication of the Quarterly Newsletters- "**INCID NEWS**" and Annual Report- for dissemination of its activities.
- INCID has instituted the "**JAIN-INCID AWARDS**" to encourage institutions, engineers, scientists, agriculturists, economists, etc. who have made outstanding contribution in the fields of irrigation and drainage. The award is given to institutions and individuals in alternate year.
- INCID Sub-committee-III on Flood Management Drainage and Environmental Impacts with Member (RM), CWC, as its Chairman for selection and monitoring of R&D schemes in the field of "Flood Management, Drainage and Environmental Impacts" convened it's 9th meeting on 12.11.2007.
- INCID Sub-committee-I on Irrigation Performance Assessment, History, Education, Training, Research and Development, with Member (WP&P), CWC, as its Chairman for selection and monitoring of R&D schemes in the field of "Irrigation Performance Assessment, History, Education, Training, Research and Development" convened it's 11th meeting on 04/03/2008.
- 8th R&D session of INCID was held at Hyderabad from 18-19th February, 2008 to review the progress of ongoing R&D Schemes, wherein all the Principal Investigators made their presentations.

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

17.2.11 ICAR - CWC Joint Panel

Central Water Commission is represented in the Crop Weather Watch Group meetings of Ministry of Agriculture in which the water storage status of 81 important reservoirs being monitored by CWC is apprised.

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 eight times so far. Director General, ICAR is chairman of the panel for first and third year and Chairman, CWC is the Chairman of the Panel in the second year. Joint Panel of CWC-ICAR was reconstituted. The first meeting of the newly constituted eighth

panel was held on 03rd May, 2007.

17.2.12 Bureau of Indian Standards (BIS)

Central Water Commission being an apex technical body in the water resources sector, has been playing an important role in formulation of standards in field of water resources development and management and allied areas through its participation in activities of Water Resources Division (WRD) and Civil Engineering Division (CED) of BIS. Chairman, Central Water Commission is presently the Chairman of Water Resources Division Council (WRDC). FE&SA is the nodal directorate in CWC dealing with works of WRDC of Bureau of Indian Standards at CWC.

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

Since Chairman, CWC is the Chairman WRDC and Director (FE&SA) is Nodal Director for related works, the approval of draft codes for adoption and printing/approval of amendments to IS Codes are processed in FE&SA Dte. and approval of Chairman is communicated to BIS. In the current year 15 draft standards and 3 amendments to IS Codes have been approved by the Chairman for adoption and printing.

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

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

The Sub Committee had interalia recommended to initiate 5000 Farmers Participatory Action Research Programme (FPARP) through out the country with the help of Agricultural Universities/ ICAR institutes/ Engineering colleges/ WALMIs etc. for demonstrating the technologies available on shelf to the farmers for increasing the productivity and profitability of agriculture through generating synergy among water, crop, agronomic practices, soil nutrients, crop variety and implements etc. To implement the recommendations of the Sub-Committee, MoWR constituted a National Project Steering Committee. CE(IMO), CWC represents CWC in the Steering Committee. The Committee in its first meeting held on 5.2.07, recommended constituting Project Implementation Team

(PIT) to evaluate the proposals for Farmers Participatory Action Research Programme (F-PARP) received from various Institutes and formulate the guidelines to operationalise the programme.

MoWR constituted the Project Implementation Team(PIT) under the Chairmanship of Dr. K. Palanisami, Director, CARDS, Tamil Nadu Agriculture University, Coimbatore, Tamil Nadu with Chief Engineer (IMO). The PIT held four meetings on 04.05.07, 04.06.07, 28.06.07 and 16.07.07 and approved 5000 demonstrations by 63 Institutes amongst the proposals received from 85 Institutes. Proposals for release of funds for 5000 demonstrations by 63 short listed Institutes were submitted to MOWR. The Ministry has issued sanction order to 24 Institutes for undertaking 2060 demonstrations on 10.09.07 and released first instalment of the funds to start the programme.

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CHAPTER – XVIII

PUBLICITY AND PUBLICATION

18.1 Printing and Publication

The offset press in the Publication Division of Technical Documentation Directorate carried out various printing jobs for CWC & MoWR. About 6310 number composed pages and 1,50,840 number of copies of various publications/forms were printed during the year. The press also carried out binding/trimming works for publications and reports etc.

Some of the publications/reports/ Journals/ Pamphlets/ folders printed and brought out during the year 2007-08 are given below:

Sl. No.	Name of Publication/Job
1.	Annual Report of MOWR 2006-07 (English)
2.	CWC Administration News Bulletin May-June, 2007 (English)
3.	Bhagirath (Hindi) July-Sept.,Oct-Dec. 2006 & Jan.-March, 2007
4.	Bhagirath (English) July-Sept.,Oct-Dec. 2006
5.	CR Form of Group 'A', 'B' & 'C'
6.	Annual Report of MOWR 2006-07 (English & Hindi)
7.	CWC Administrative News Bulletin (Hindi) Vol.IX No.2 March-April, May-June, July-Aug. Sept.-Oct. & Nov.-Dec., 2007
8.	CWC Administrative News Bulletin (English) Vol. IX, No. 2 March-April, May-June., July-Aug., Sept.-Oct., & Nov-Dec., 2007
9.	Pamphlet/Folders : Rainwater Harvesting
10.	Annual Report of CWC (English) 2005-06 & 2006-07
11.	Theme Paper on Water Resources Day-2007 & 2008
12.	Bhagirath (Hindi) Rajbhasha Visheshank, 2006 cover
13.	Storage Position of the Reservoir CWC
14.	Brochure on Goals and Achievements at a glance by Shri Jai Prakash Narayan Yadav, Hon'ble Minister of State (WR)
15.	Cover Bhagirath (Hindi) July-Sept., 2006
16.	Cover Storage Position of the Reservoirs

18.2 Microfilming

With a view to preserve important drawings and other documents for future references, the microfilming unit of TD Dte. records documents in microfilms after proper indexing and coding. During the

year 2007-08, 898 number of engineering drawings/documents were microfilmed.

18.3 Journals

T.D. Dte 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 during the year. In addition, 'Administrative News Bulletin' on bi-monthly basis were also published during the year 2007-2008 bilingually.

18.4 AZO Prints

Nearly 6750 numbers of Azo prints were developed from the tracings of drawings/documents pertaining to various Directorates of CWC/MoWR at Ferro-printing Units of T.D. Dte.

18.5 Publicity and Mass Awareness

Publicity and Mass Awareness programmes on Water Resources were arranged. In this regard, daily screening of newspaper / magazine / tabloids and submission of news clippings, preparation of pamphlets/posters (as and when required)/ Radio/TV talks were carried out.

18.6 Media Plan 2007-2008 of MoWR

As per Media Plan 2007-08 of Ministry of Water Resources, CWC participated in the following exhibitions along with other departments of MoWR.

- IITF 2007 at Pragati Maidan, New Delhi from 14.11.2007 to 27.11.2007.
- Asom International Trade Fair at Guwahati from 04.02.2008 to 17.02.2008.

18.6.1 Engineering Museum

Central Water Commission is maintaining an Engineering Museum at B-5, Kalindi Bhavan, 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.

During the year 2007-08 some models & translates also sent for mobile exhibition train from 28.09.2007 to 15.05.2008.