Government of India

Ministry of Water Resources

Central Water Commission

Annual Report 2008 - 09

ANNUAL REPORT
2008 ~ 09

CENTRAL WATER COMMISSION

INDIA – LAND AND WATER RESOURCES: FACTS

•	Geographical Area & Location	328.7 M ha Latitude 8^0 4' & 37^0 6' North Longitude 68^0 7' & 97^0 25' East
•	Population 2008 (Projected)	1194.73 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 (2006)	3882.07 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 (2005-06)

•	Total Cultivable Land	182.2 M ha
•	Gross Sown Area	193.7 M ha
•	Net Sown Area	140.3 M ha
•	Gross Irrigated Area	85.8 M ha
•	Net Irrigated Area	60.9 M ha

HYDROPOWER

•	Ultimate Hydropower Potential (As per reassessment)	84044 MW at 60% L.F.
•	Potential Developed by 31st March, 2009	36877.76 MW (total capacity) 32099.8 MW (For the Projects above 25 MW)

From Chairman's Desk

It is our pleasure to bring out this Annual Report of the Central Water Commission (CWC) for the year 2008–09. 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 2008-09. 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 141 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 62 Major, 25 Medium and 8 ERM Projects and CAD works of 134 projects.
- Examination of proposals for Major and Medium Irrigation Projects for release of Rs.5647.90 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 6675 flood forecasts (with 97.81% accuracy) during the monsoon period of 2008 to help effective flood management, particularly in Assam, Andhra Pradesh, Bihar, Maharashtra, Karnataka, Gujarat which faced severe floods.
- Techno-economic evaluation of 29 schemes of Flood Management/Master Plans for Flood Control.

(A K BAJAJ)
CHAIRMAN

HIGHLIGHTS OF THE YEAR 2008-09

- **DESIGNS:**
  - Design units of CWC undertook detailed designs and drawings of various types of hydraulic structures for 141 water resources development projects. DPR's of 168 projects submitted by various State Govts. and other agencies were technically examined in D&R wing during 2008-09.

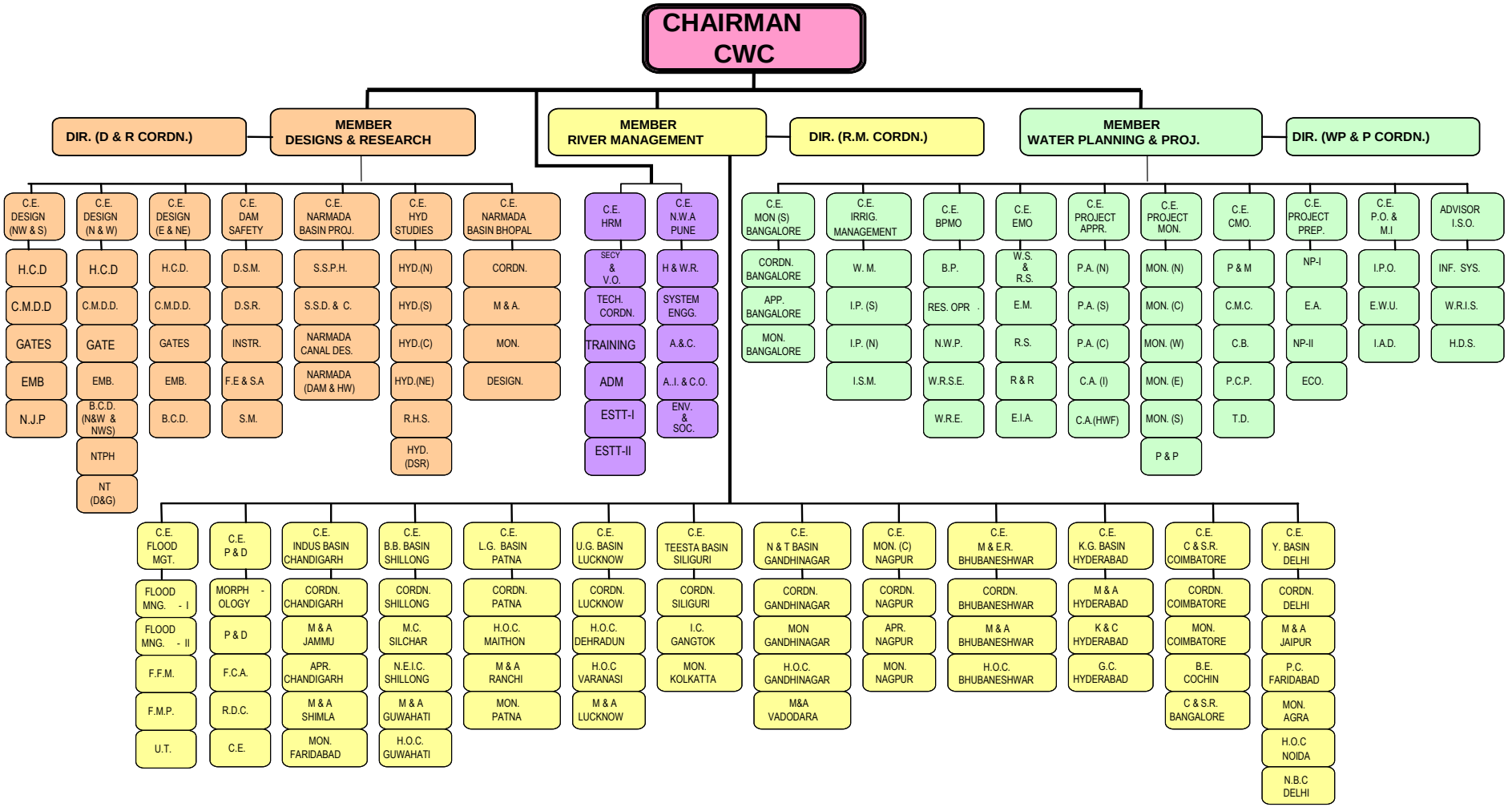
- **RIVER MANAGEMENT:**
  - Carried out Hydrological Observations at 878 sites spread over the country.
  - Operated 175 flood forecasting stations (including 28 inflow forecasting sites) spread over 9 major river basins. During the flood season 2008, 6675 flood forecasts were issued out of which 6529 (97.81%) were within prescribed limits of accuracy. Daily flood bulletins and weekly flood news letters were issued during the flood season. 52 Red Bulletins (for Unprecedented Flood Situation) and 41 Orange Bulletins (for High Flood Situation) were issued.
  - Completed installation of satellite based telemetry system at 162 stations upto March, 2009 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.
  - 29 Flood Management Schemes/Master Plans for Flood Control were examined/ appraised during the year 2008-09 upto March, 2009.
  - Processed 96 flood management schemes for release of funds to Government of J&K, Goa, Punjab and Orissa during 2008-09 under "Flood Management Programme".

- **WATER PLANNING:**
  - 68 new major irrigation projects, 43 revised major irrigation projects, 58 new medium irrigation projects and 24 Hydroelectric power schemes were under appraisal in CWC. 27 projects comprising 9 major, 7 medium irrigation projects and 11 flood control projects were accepted for investment clearance by the Advisory Committee.
  - Monitored 95 Major, Medium and Extension/Renovation/Modernization (ERM), irrigation projects receiving CLA under AIBP and 134 CAD projects.
  - 81 important reservoirs with total live storage of 151.77 BCM were monitored on weekly basis.
  - Examination of proposals for Major and Medium Irrigation Projects for release of Rs.5647.90 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:**
  - 104 in service officers were sponsored for training, attending seminars/ workshops, etc. within the country and 19 officers participated in various programmes abroad. NWA, Pune conducted 26 training programmes including Workshop/Seminar for 586 officers of Central / State Governments and Public sector undertakings.

C O N T E N T S

Organogram of Central Water Commission 2008 - 09



1

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 2008-09 were:

1.	Chairman, CWC	:	Shri A.K. Bajaj* (16.4.2008 to 01.03.2009) Shri A.K.Bajaj (02.03.2009 to till date)
2.	Member (D&R)	:	Shri D. V. Thareja (12.02.2008 to 22.04.2008) Shri A.K. Bajaj (22.4.2008 to 02.03.2009) Shri A.K. Ganju* (17.03.2009 to 19.06.2009) Shri A.K. Ganju (19.06.2009 to till date)
3.	Member (WP&P)	:	Shri A.K. Ganju* (27.06.2008 to 19.06.2009) Shri Indra Raj (19.06.2009 (A.N.) till date)
4.	Member (RM)	:	Shri R C Jha (12.02.2008 to till date)

* Additional Charge (Current Duties)

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 carryout Techno-economic appraisal of Irrigation, flood control & multipurpose projects proposed by the State Governments.
- To collect, compile, publish and analyse the hydrological data relating to major rivers in the country, consisting of 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 provide flood forecasting services to all major flood prone inter-state river basins of India through a network of 175 flood forecasting stations.
- To advise the Government of India and the concerned State Governments on the basin-wise development of water resources;
- 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 on all matters relating to the Inter-State water disputes;
- 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;

- Monitoring of selected major and medium irrigation projects, to ensure the achievement of physical and financial targets. Monitoring of projects under Accelerated Irrigation Benefit Programme (AIBP), and Command Area Development (CAD) programme has also been included in its field of activities.

- To impart training to in-service engineers from Central and State Organisations in various aspects of water resource 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 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 1.3.2009 was 3506 as against the sanctioned posts of 4979. 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	1887	} 3506
Regional Offices	3092	
Total	**4979**	**3506**

Table 1.2
Group-Wise Details of Posts Sanctioned and Filled

Sl. No.	Category	Sanctioned	Filled
1.	Group "A"	707	515
2.	Group "B"	1030	764
3.	Group "C"	2298	1495
4.	Group "D"	944	732
	Total	**4979**	**3506**

1.7 Plan Schemes & Annual Budget

1.7.1 Plan Schemes

1.7.2

Details of the Plan Schemes during the year 2008-09 are given below:

(Rs. in Crore)

S. No.	Name of Schemes	Objective / Scope of Works	XI Plan outlay	FY 2008-09 (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	2.30	2.40	2.44
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	6.77	0.42	0.41

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	38.74	37.20	35.42
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.	Total cost Rs 290.00 crore CWC component Rs. 40.00 crore	7.00	5.69	5.14
5	Dam Safety Studies & Planning	Setting up of Instrumentation Demonstration Centre (spill over 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 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),	10.00	1.60	0.88	0.91
6	Flood Forecasting	● Balance works of X Plan. ●Continuing activities of data collection, transmission, and flood forecast formulation / dissemination. ● Installation of telemetry system at additional 222 stations.	130.00	23.00	13.22	13.99

7	River Management Activities & Works related to Border Areas	River management activities on border 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)	20.35	8.62	7.06
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.	28.35	7.58	6.17

1.7.2 Annual Budget

The non-plan budget outlays and expenditure for the year 2008-09 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-2008-09**	**EXP. UPTO MARCH,09**
1	Direction & Administration	14.25	20.04
2	Data Collection	44.65	65.41
3	Research	1.11	1.33
4	Training	0.57	0.52
5	Survey & Investigation	6.35	7.74
6	Consultancy	15.45	20.74
7	Exhibition & Trade Fair	0.30	0.18
8	Cell for Mon. externally aided Project	0.45	0.50
9	Mod. Of Equip. CWC Offset Press	0.25	0.23
10	Water Planning Wing	0.93	1.13
11	Hydrological Obs. In Chenab Basin	1.35	1.61
12	Seminars and Conferences	0.004	0
13	Contribution to International Bodies	0.015	0.01
	Total:	**85.68**	**119.44**

2711- FLOOD CONTROL & DRAINAGE			
SL.NO.	**NAME OF THE SCHEMES**	**BE-2008-09**	**EXP. UPTO MARCH,09**
1	Flood Control	35.00	52.12
2	Payment to Government of Bhutan for Maintenance of Flood Forecasting & Warning Centres	0.80	1.03
3	Strengthening & Modernisation of FF and Hyd. Obs. Network in Brahmaputra and Barak Basin	1.65	1.96
	Total:	**37.45**	**55.11**

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 under the administrative control of the Central Water Commission. Continued measures were taken for improving progressive use of Hindi for official purpose. The Official Language Implementation Committee of the Commission meets regularly under the Chairmanship of the Chairman, Central Water Commission & Member (D&R). Various measures required for progressive use of Hindi are discussed and timely action is being taken on the decisions in the meetings. Sufficient progress has been made in the implementation of the Rajbhasha Act in the Commission. 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 of the Central Water Commission being inspected and effective measures taken for rectifying short comings noticed during the inspection.

2. To generate awareness about Hindi, and to give practical knowledge of the Official Language provisions and incentive schemes etc. four Hindi workshops including computer training programme were organised at Central Water Commission headquarter, in which 60 officials participated.

3. Letter received in Hindi are invariably replied in Hindi. The Progress made in the implementation of important instructions issued by the Deptt. of Official Language regarding progressive use of Hindi for Official purpose, the Official Language Act, 1963

and the Official Language Rules, 1976 is watched through the quarterly progress report regularly.

4. 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.

5. For the effective implementation of the official language policy and to create awareness about Raj Bhasha, Hindi Fortnight was organised from 14 to 30 September, 2008. Various competitions like Hindi noting/drafting, essay writing, extempore speech, *Kavya Spardha*, Shabad nirman, technical article writing were organised and winners were awarded cash prizes and certificates. Raj Bhasha Shields for the year 2007-08 were awarded for doing their maximum work in Hindi during the year to the Central Water Commission offices situated at region A, B, C viz. Middle Ganga Division-II, Lucknow, Indus Basin Organisation, Chandigarh, Sikkim Investigation Division, Sikkim, Establishment-IX Section and Dam Safety & Rehabilitation Directorate within the Commission.

6. Second Sub- Committee of Parliament in Official Language inspected the Field offices of CWC at Sikkim & Madurai on dated 3-5 June, 2008 and 2-12-2008 respectively. The Committee suggested various measures for progressive use of Hindi. These suggestions are being implemented effectively.

7. Hindi Books for the Central Water Commission Library are being purchased as per the targets fixed in the Annual Programme of the Department of Official Language.

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 31-03-2009)

Category	No. of Filled posts	No. of SCs	No. of STs	No. of OBCs
Group A	515	62	31	37
Group B	764	98	11	3
Group C	1495	202	46	70
Group D	732	205	75	11
Total	**3506**	**567**	**163**	**121**

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 31.03.2009 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 31.03.2009)

GROUP	*OH*	*VH*	*HH*	*TOTAL*
'A'	*2*	*0*	*0*	*2*
'B'	*2*	*0*	*1*	*3*
'C'	*7*	*0*	*0*	*7*
'D'	*2*	*4*	*1*	*7*
Total	***13***	***4***	***2***	***19***

OH *– Orthopaedic Handicapped* ***VH*** *– Visually Handicapped* ***HH*** *– Hearing Handicapped*
Note:- The above figures do not include figures pertaining to CSS, CSSS and CSCS Cadres which are controlled by the Ministry of Water Resources and for the cadre controlled by Deptt. of Economic Affairs & Deptt. of Statistics.

1.12 Welfare Measures and Incentives

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

1.12.1 Benevolent Fund

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

- Immediate Relief upto Rs. 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 2008-09 there were seven cases of immediate 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 represented the Central Secretariat Delhi Badminton Team in the All India Civil Services National Badminton Tournament 2008-09, which was held at Aizwal and took Third place in the Men's Team Championship. CWC Hockey Team won the Inter-Ministry Hockey Tournament 2008-09 consecutively for the Third time in a row. Ms R. Laxmi Ganguli won second place in the Free Style and Breast Stroke events in the Inter –Ministry Swimming Tournament 2008-09.Ms Kamlesh Gawba won gold and silver medals respectively in the Discuss Throw and Shot Put in the Delhi State Masters Athletics Championship 2009. CWC officials also participated in Football and Table Tennis in Inter-Ministry tournaments 2008-09. The "Jal-Tarang" staff members of Central Water Commission participated in the Inter-Ministry Music & Dance and Short Play Competition, 2008-09 in the events of Instrumental Music, Folk Dance, Folk Music, Carnatic Light Music and Hindustani Light Music.

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

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

1.13 Restructuring of Central Water Commission

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

Accordingly, the Ministry of Water Resources had awarded the Consultancy for the above studies to the Administrative Staff College of India, Hyderabad on 12th September, 2001. The terms of reference of the study include (i) the evaluation of present status of Central Water Commission and its functions; (ii) future projections in the Water Sector for 2025; (iii) Mission for Central Water Commission in respect of the future projections for 2025; and the organizational structure and related issues in respect of CWC to enable it in achieving the Mission. The final report of the ASCI was submitted on July 2007.

A committee has been constituted under the Chairmanship of Additional Secretary (WR) in the meeting held on 21.01.2009 to examine a proposal on 'Restructuring of Central Water Commission' in the Committee Room of Ministry of Water Resources.

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 uploaded 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 2008-09, 131 requests were received for information under RTI Act. While information in respect of 124 cases has already been provide on time, for the rest, it is under process. All out efforts are being made to provide information to the applications within the prescribed time limit set under the Act.

2

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

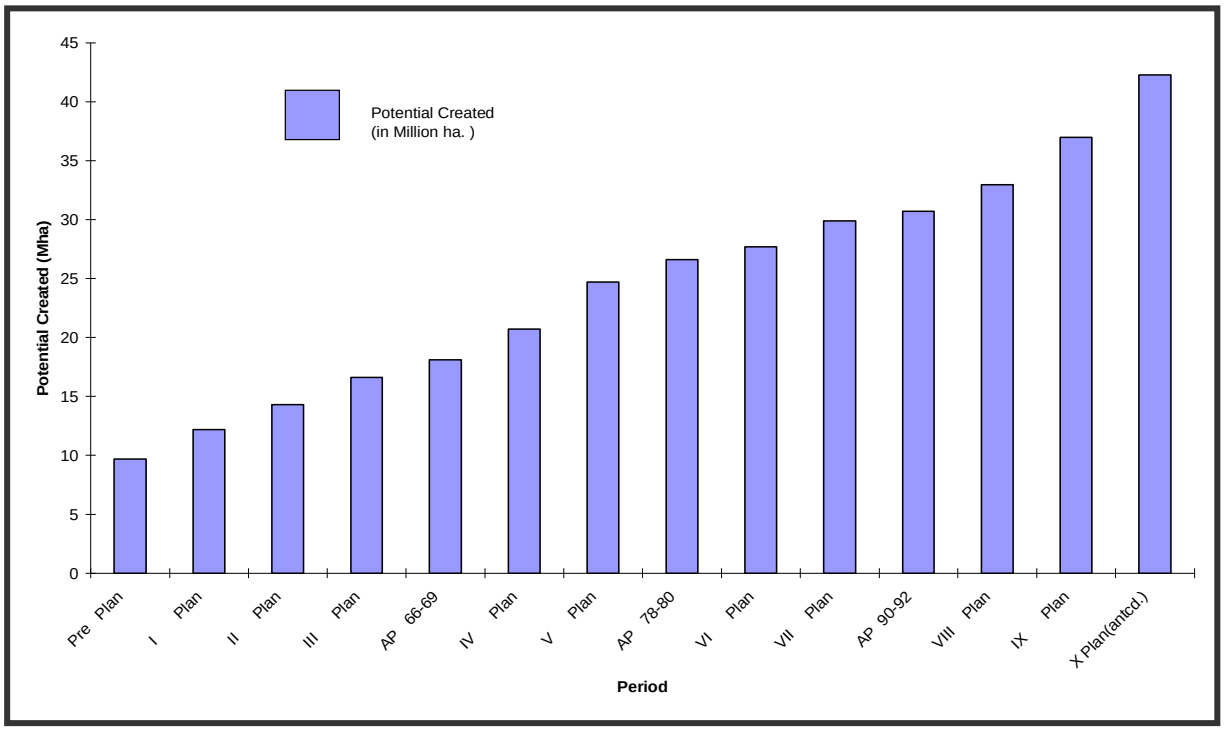


Fig 2.1 - Growth of Irrigation Potential Created During Pre-Plan and Plan Period (Cumulative) (Major and Medium Irrigation Sector)

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 186 major, 814 medium and 117 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 m ha and target kept for XI Plan is 9 m ha 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	186	260	182
Medium	143	1087	1230	143	814	957	273
ERM	-	215	215	-	117	117	98
Total	217	1670	1887	217	1117	1334	553
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)	Potential creation during X Plan	Potential created upto X Plan
1	Andhra Pradesh	5000.00	3303.22	439.44	3742.66
2	Arunachal Pradesh	0.00	0.00	1.2	1.20
3	Assam	970.00	243.92	68.98	312.90
4	Bihar	5223.50	2680.00	279	2959.00
5	Jharkhand	1276.50	354.47	249.5	603.97
6	Goa	62.00	21.17	16.48	37.65
7	Gujarat	3000.00	1430.37	788.13	2218.50
8	Haryana	3000.00	2099.49	91.87	2191.36
9	Himachal Pradesh	50.00	13.35	2.1	15.45
10	Jammu & Kashmir	250.00	179.69	23.61	203.30
11	Karnataka	2500.00	2121.12	6.63	2127.75
12	Kerala	1000.00	609.49	480.98	1090.47
13	Madhya Pradesh	4853.07	1386.90	65	1451.90
14	Chattisgarh	1146.93	922.50	888.18	1810.68
15	Maharashtra	4100.00	3239.00	255.15	3494.15

16	Manipur	135.00	91.15	11.9	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	1	1.00
20	Orissa	3600.00	1826.56	163.41	1989.97
21	Punjab	3000.00	2542.48	62.19	2604.67
22	Rajasthan	2750.00	2482.15	408.2	2890.35
23	Sikkim	20.00	0.00	0.00	0.00
24	Tamil Nadu	1500.00	1549.31	11.75	1561.06
25	Tripura	100.00	4.90	13.8	18.70
26	Uttar Pradesh	12154.00	7910.09	871.26	8781.35
27	Uttrakhand	346.00	280.30	9.35	289.65
28	West Bengal	2300.00	1683.29	86.52	1769.81
29	UTs	98.00	6.51	0	6.51
	Total States+U.Ts.	**58465.00***	**36981.43**	**5295.63**	**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.

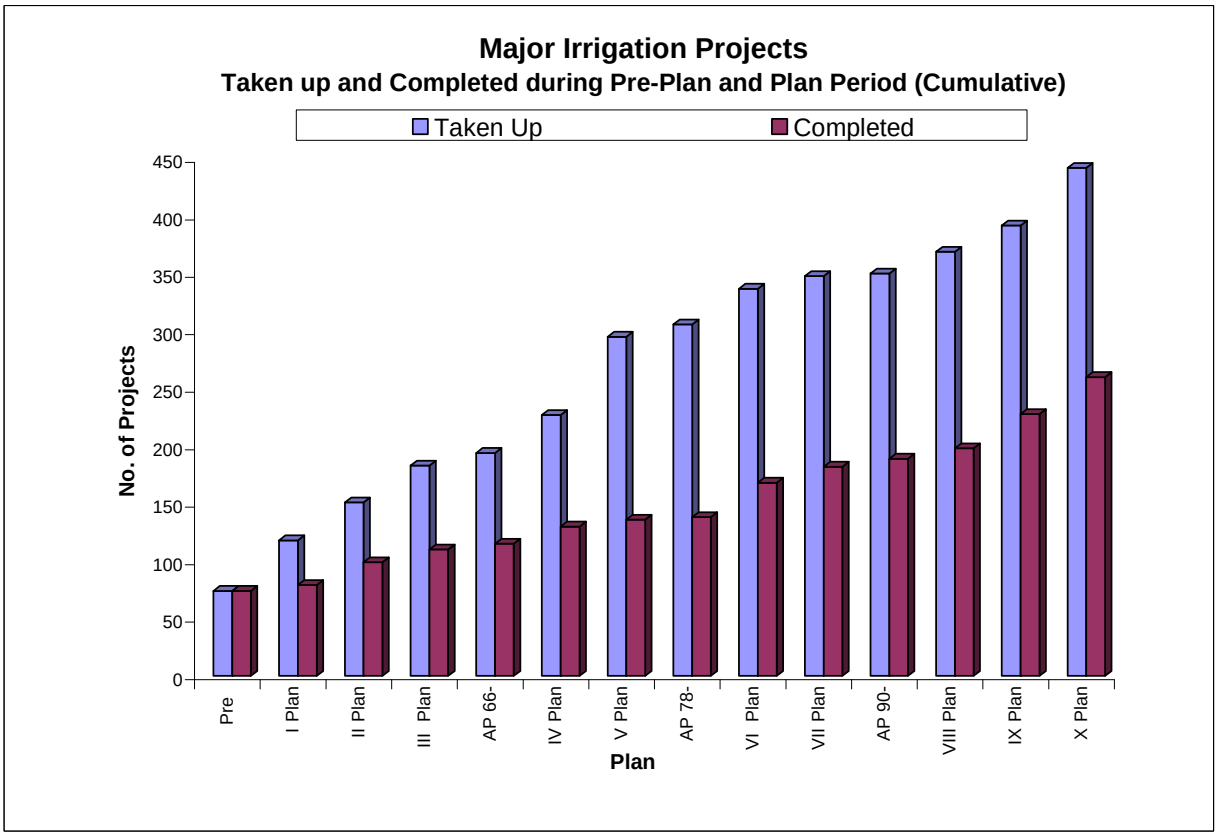


Fig 2.2 - Major Irrigation projects
Taken up and completed during pre-plan and plan period (Cumulative)

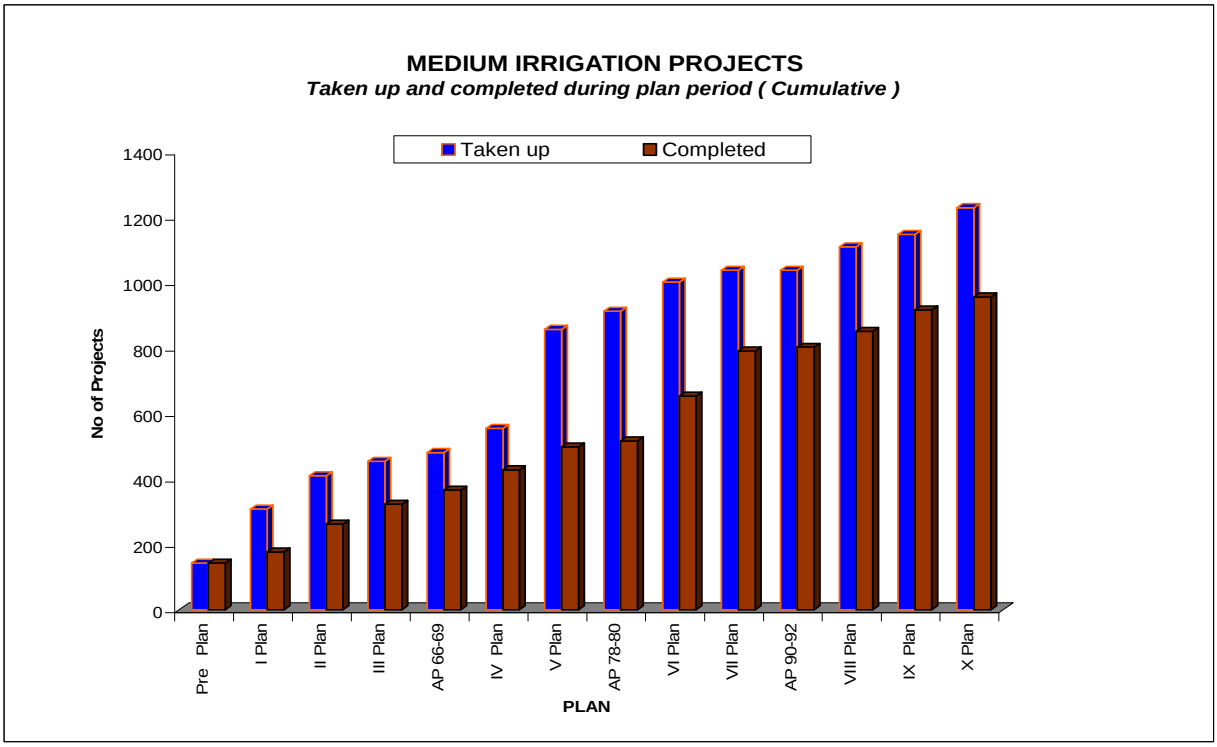


Fig 2.3 - Medium Irrigation projects
Taken up and completed during pre-plan and plan period (Cumulative)

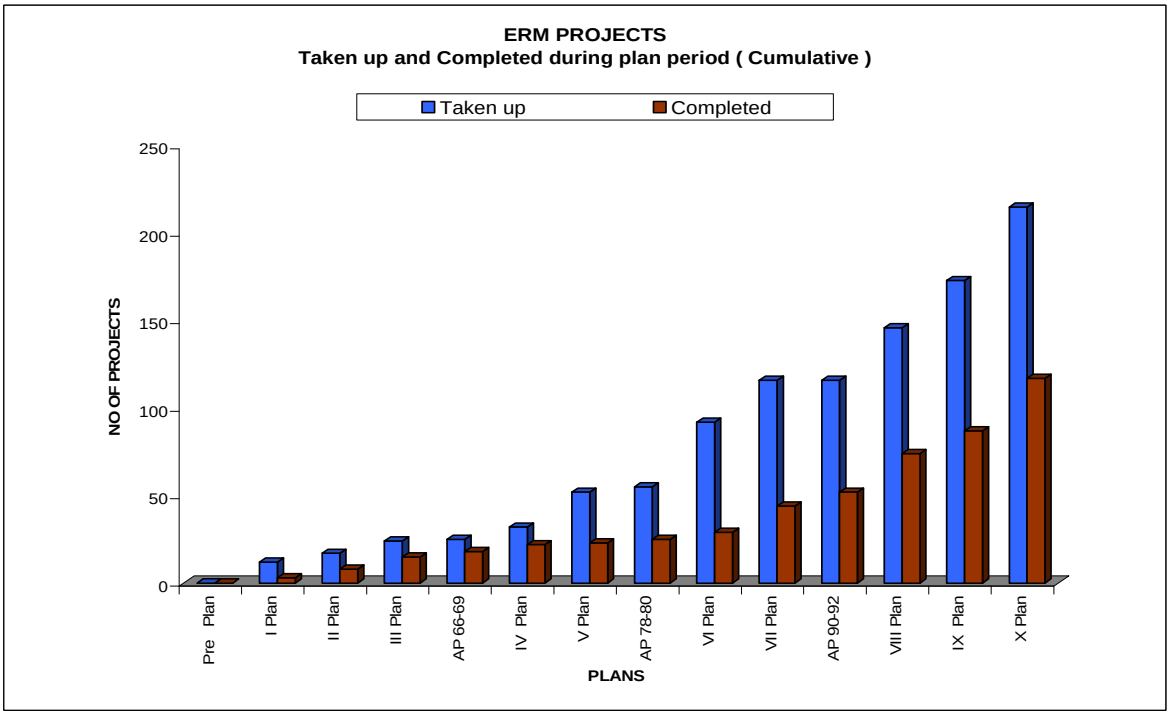


Fig 2.4 - Modernisation of ERM Projects
Taken up and Completed during pre-plan and plan period (Cumulative)

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.

Under Hydrology Project, five Regional Data Centres are set up at Nagpur, Bhubneshwar, Hydrabad, Gandhinagar and Coimbatore for storage of data. At National Surface Storage Centre, data of above regions of CWC is stored and combined catalogue of metadata is hosted on website.

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 which started in 1966. Under the project, Hydrological Information System (HIS) has been established for 284 sites to provide reliable hydrological data 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. State and Central agencies participated in phase-I of HP.

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 newspapers 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.

- Based on the Expression of interest (EOI) received, the firms have been short listed for procurement of consultancy services for Development of Hydrological Design Aids and RFP documents were issued to the firms on 15-07-2008. The Technical proposals received from the firms were evaluated by the "Committee for Evaluation of Technical proposal; who submitted its Report on 17-12-2008 to MOWR for review. " No Objection" from World Bank has been received and financial proposal have been opened on 19th March, 2009. Combined evaluation is completed. No objection from the World Bank received on Draft Contract Agreement. Approval of Competent authority in MoWR is under process. Signing of contract is likely during October, 2009.

- The administrative approval for the works at NWA was conveyed by MOWR on 22-08-2008. Construction of work is proposed to be executed by CPWD. CPWD has submitted draft bid document for clearance of World Bank. Tender will be floated by CPWD after receipt of the clearance from World Bank.

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 2008

During the flood season of 2008 (May to October), 6675 flood forecasts (5656 level forecast and 1019 inflow forecasts) were issued, out of which 6529 nos. (97.81%) forecast 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 analyses and used to generate flood reports of the regions.

During the flood season of 2008 (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 5 flood forecasting stations viz. Subernarekha at Rajghat, Orissa (once again after HFL of 2007), NH Road Xing on Puthimari, Alipingal on Mahanadi's branch Devi (delta), Elgin Bridge and Ghaghra at Ayodhya (U.P.) (once again after HFL of 2007).

Due to breach in Kosi, near India-Nepal Boarder, the flood waters got directed to Kursela, instead of coming through Basua-Baltara. Comparatively, huge floods were witnessed in Mahanadi Basin, as the tributaries like Tel, downstream of Hirakund Dam. Ganga also witnessed "high floods" upstream of its confluence with the Yamuna, after a gap of four years.

During the flood season of 2008, all the 175 flood forecasting stations including 28 inflows forecasting station were operational from the flood forecasting point of view. Out of these, at 36 stations (20.5%) sites including 5 inflows forecast stations, issue of forecasts were not required, as they did not exceed the lowest criteria. On the whole, 5656 level forecasts were issued at 116 stations out of which 5528 (97.74%). Similarly, out of 1019 inflow forecasts issued, 1001 (97.81%) at 23 stations were within permissible limits of accuracy. Out of 139 stations, where forecasts were issued, 81 stations (58.27%) achieved 100% accuracy within permissible limits. Of these, again 66 were level forecast stations and 15 were inflow forecast stations.

Also, in addition to monitoring 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 2008, a total of 93 Special Flood Bulletins (Unprecedented-52 and High flood situations-41), were issued, mostly on 3 hourly basis. In addition, 154 ordinary daily bulletins were issued; which included both level and inflow forecasts information.

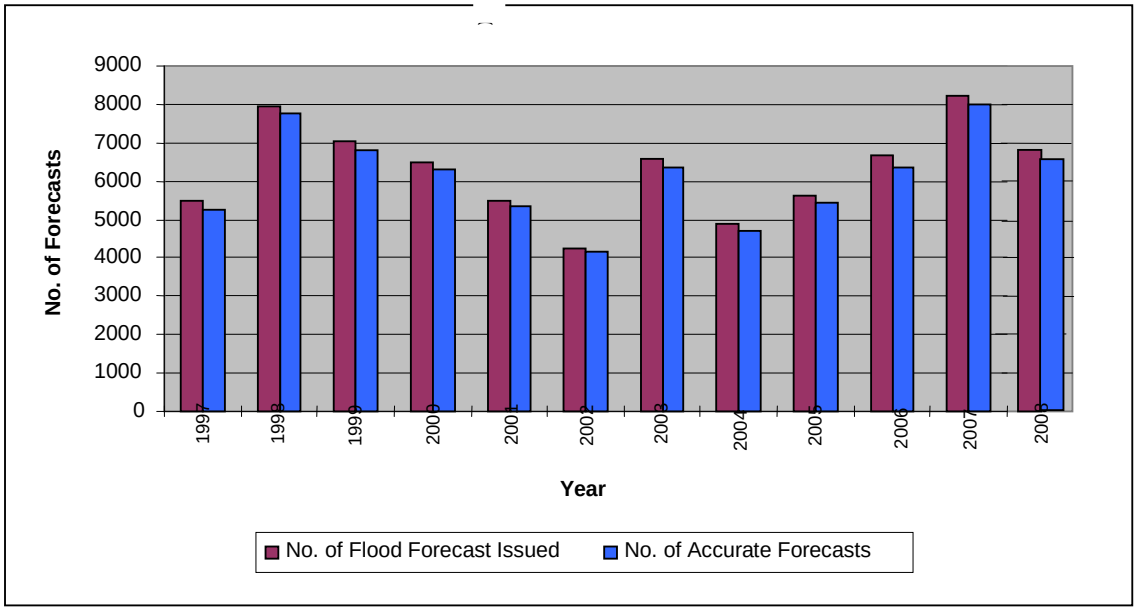


Fig 3.1 - Flood Forecasting Performance (1997-2008)

3.2.3 Modernisation of Flood Forecasting Services

The Central Water Commission is 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, Modernization of inflow forecasting services in Mahanadi and Chambal basins was taken up with a view to improve the quality and accuracy of the forecasts through (i) Automated data collection and transmission (ii) use of Satellite based communication system through VSAT (III) Improvement of forecast formulation techniques using computer based catchments models. This scheme proved to be of immense help to

provide forecast to various dam sites and flood prone cities for taking advance action for suitable reservoir regulation fro ensuring safety of the dam as well as property and livestock. During 10th plan it was further extended to Brahmaputra, Damodar, Krishna, Godavari, Yamuna, and Mahanadi river basins. The additional 168 Telemetry stations in different rivers are as follows:

Godavari Basin	63 stations
Krishna Basin	41 stations
Brahmaputra Basins	14 stations
Damodar Basin	20 stations
Yamuna Basin	15 stations
Mahanadi Basin	8 stations

By the end of the year 2008-09, 162 stations (out of 168 mentioned above) and 11 modelling centres have been installed. During XI plan, 235 telemetry additional stations are proposed to be installed in the following river Basins:

Indus Basin	13 stations
Narmda & Tapi Basin	70 stations
Brahmaputra Basins	14 stations
Lower Ganga Basin	18 stations
Upper Ganga Basin	45 stations
Yamuna Basin	25 stations
Monitoring central	4 stations

The work of setting up of 11 modeling centres 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
2008	NA	19.221	2214.405

3.4 Flood Management Works

Out of India's total geographical area of 329 m ha, the flood prone area was assessed as 40 m ha by National Flood Commission (Rashtriya Barh Ayog) as per its Report-1980, out of which an area of 32 m ha was assessed as protectable. An area of about 18.22 m ha has been provided with a reasonable degree of protection up to March 2006. The protection has been offered by means of construction of embankments (33928.642 km), drainage channels (38809.857 km.), town protection works (2458 Nos.) and by raising of villages (4716 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 for 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.

Central assistance to 'other than the Ganga basin states' has been released as detailed below:

(Rs. In Crore)

S.N.	States/UT	No. of Schemes	Estimated Cost	CS Released		
				2007-08	2008-09	Total
1.	Goa	2	31.59	0.00	1.82	1.82
2.	J&K					
	Spill over works	4	30.08	6.36	2.71	9.07
	New works	16	171.91	0.00	12.80	12.80
	Total	20	201.99	6.36	15.51	21.87
3.	Orissa	72	170.41	0.00	45.90	45.90
4.	Punjab	2	129.72	0.00	21.50	21.50
Total		96	533.71	6.36	84.73	91.09

The following Flood Management schemes were under technical examination in CWC.

S.N.	State/UT	Estd Cost (in Cr. Rs.)	No. of Schemes
1	J&K	1132.40	19
2	Himachal Pradesh	12.77	1
3	Punjab	498.063	29

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 29-1-2008. Based on the decision taken during third meeting, various States have been requested to supply requisite information for incorporating in the report. The TEG has met three times in New Delhi.

3.7 Flood Plain Zoning

The need for enactment of Flood Plain Zoning legislation has been emphasized in various National for a 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.

In 1978, the work of preparation of flood prone area maps of 0.5 m contour interval in the scale of 1:15,000 for the state of U.P. Bihar, Delhi, West Bengal, Haryana, Punjab, Assam and Jammu and Kashmir by SOI. The work mainly envisages updating and digitization of existing flood plain zoning maps with contour interval of 0.5 m, maps to be in five layers viz. contour, water bodies (river/ponds) communication, vegetation existing flood control works i.e. embankment, anti erosion works etc. the priority areas for the work are in the order of Assam, Bihar, U.P., Delhi, West Bangal, Haryana, Punjab and J&K. The digitized maps are proposed to be GIS ready and the time frame for completion of work is 2 years. After consent of SOI, the work has been entrusted to SOI in March, 2006. The total cost of the work as initiated by SOI is Rs. 179.00 lakh as per details given below.

S.N.	Item of work	Amount (Rs. Lakh)
1.	Updating of existing 800 no. flood plain zoning maps covering the area of 54.740 sq. km. of the State of U.P., Bihar, West Bangal, Punjab, Haryana, Delhi, Assam and J&K	91.00
2.	Digitization of 800 nos. above maps @ Rs. 11,000/- per map	88.00
	Total	179.00

Survey of India has so far prepared 33 maps of Assam State and 20 maps of Uttar Pradesh and 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.

Morphological study of six river was proposed in 10th plan, out of which morphological studied of four rivers namely, kosi, Ghagra Sutluj and Gandak rivers were taken up during 10th plan period. The draft reports for Kosi, Ghagra and Satluj have been submitted by NIH, Roorkee and for river Gandak the Interim report has been submitted by CWPRS, Pune. The preparation of final report for these four rivers has spilled over to 11th 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. During the meeting, it was decided to include more rivers for Morphological Studied in 11th Five Year Plan. The Standing Committee was also to review and update the General Guidelines for preparing river morphological reports (April, 1911). The same has been reviewed and updated and the revised 'General Guide lines for preparing River Morphological Reports' March, 2009 has been prepared by CWC.

During XI Plan, morphological studies of 17 rivers have been taken up under the plan scheme "R&D Programme in Water Sector". There are two main components of the proposed works during 11th plan-

i) Morphological study using remote sensing and other historical information like topo-sheet etc. and preparation of comprehensive report;

ii) Collection of field data like cross-sections of river, discharge and silt data etc. for studied in future.

The EFC Memo for the 'R&D Programme in Water Sector' has been approved during 2008 for Rs. 295 Crore out of which, the component for study is morphological Rs. 21.18 Crore.

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. out of which about 2150 kms is affected by sea erosion.

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 outcome 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.

3.11 Climate Change Issues and National Water Issues

As decided in the Long term Action Plan of MOWR for Climate Change studies, a Preliminary Consolidated Report on “Effect of Climate Change on Water Resources” has been prepared in CWC on the basis of the analysis of time series of rainfall data and flow data analysis and related secondary information particularly about snowmelt and glacier melt and the results of the studies carried out by National Institute of Hydrology, Roorkee. The report is an effort to consolidate the various related studies carried out, so far by different organisations including CWC and NIH. Various possible mitigation and adaptation strategies have been spelled out in the report; however the same are further required to be investigated.

Hon'ble Prime Minister unveiled National Action Plan on Climate Change on 30.06.08 wherein eight missions have been launched including National Water Mission. Ministry of Water Resources has been mandated to institutionalised the water mission, wherein Central Water Commission has to shoulder major responsibilities in taking up various identified strategies of the Mission.

Reconstitution of the climate change cell of the CWC is under process to take up and coordinate the mandated activities.

Reassessment of basin water using latest technologies including remote sensing, satellite data, mathematical modelling with observe data and review of data collection networks of various hydrological parameters are a few important activities which have been taken up by CWC under National Water Mission.

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.

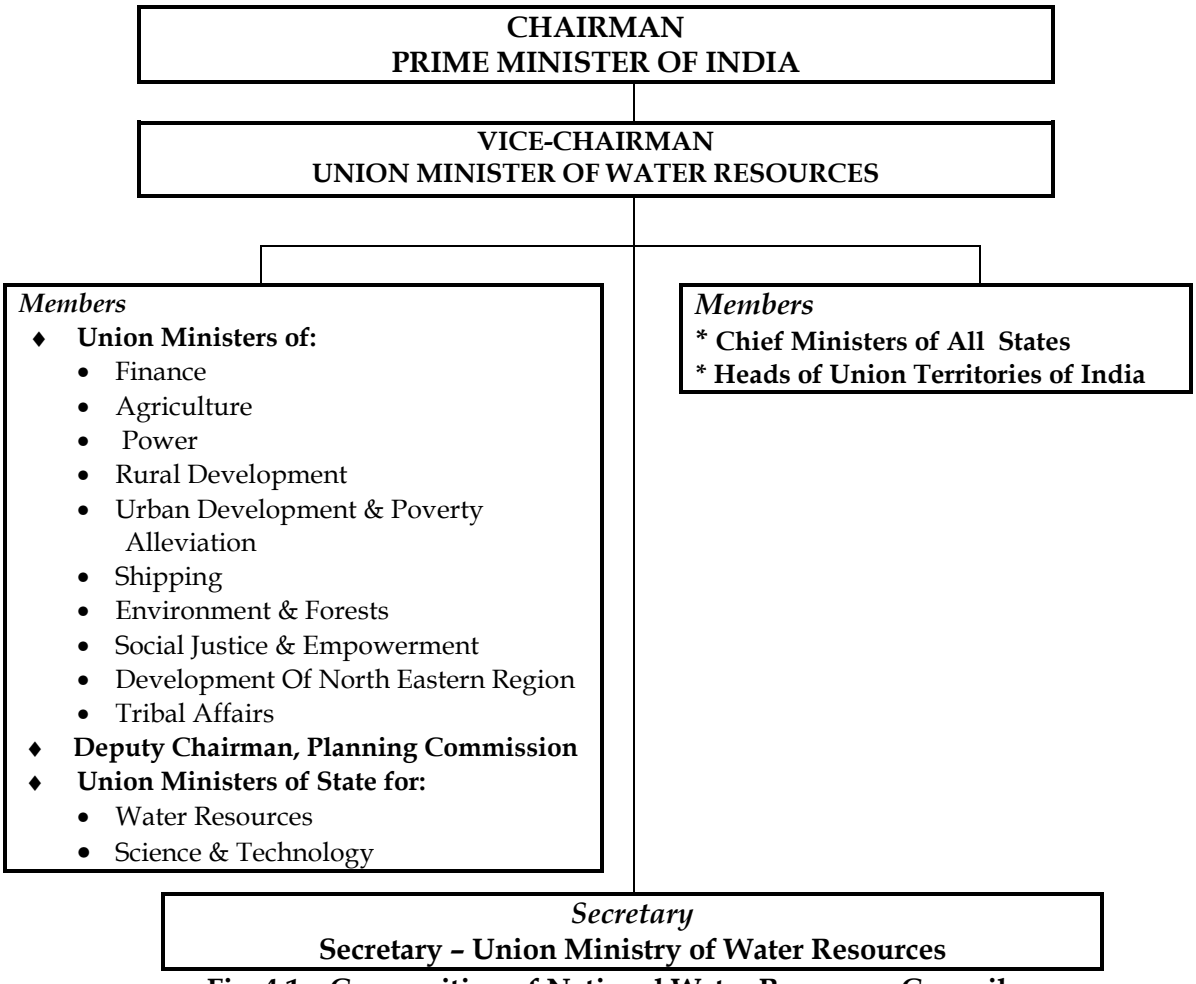


Fig. 4.1 – Composition of National Water Resources Council

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 above agenda items were made by the board.

i) 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

ii) Implementation of Irrigation Projects in the Time Bound Manner

iii) Ground Water Management

iv) Participatory Irrigation Management

v) Need for Regulatory Mechanism to Ensure Sustainability of the Resources and Facilities created

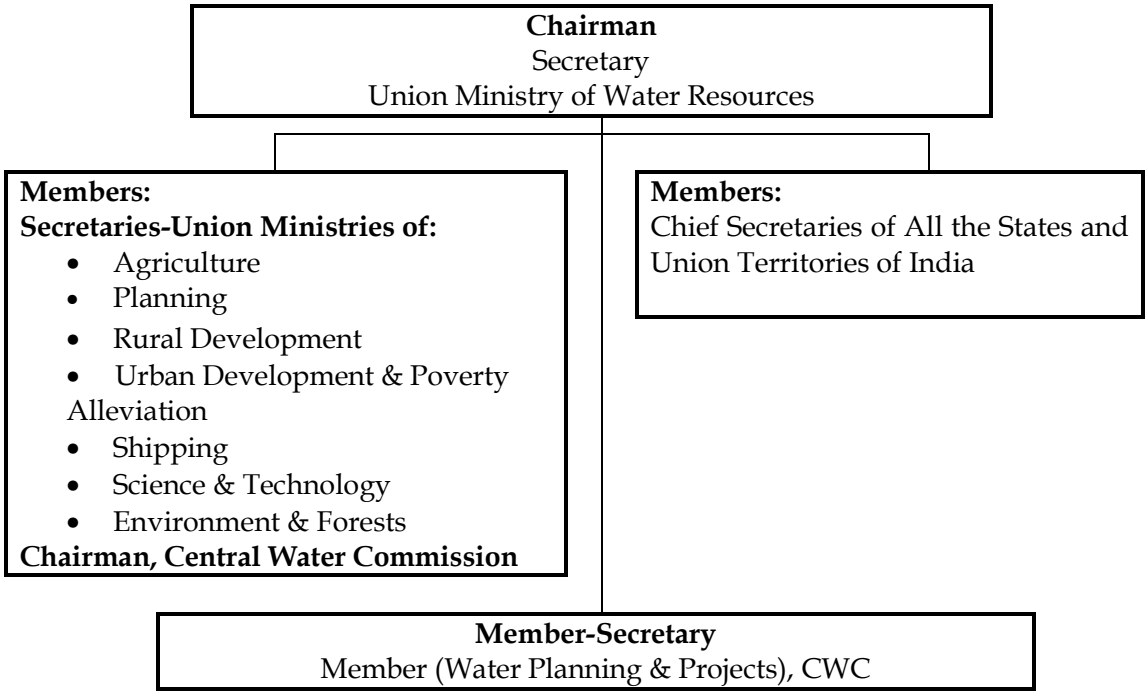


Fig. 4.2 - National Water Board

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, under the Chairmanship of Additional Secretary, MoWR with Commissioner (PP), MoWR as 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 finalised in its fourth meeting held in June 2004 has been submitted and subsequently discussed in 12th NWB Meeting.

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 basins/sub-basins are situated. Secretary (WR) has further proposed only two river basins namely Mahanadi and Godavari for constitution of RBO under River Board Act, 1956 during XI Plan.

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) has 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 is engaged in carrying out water balance studies, link canals 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. Now NWDA's function has been extended/amended to prepare pre-feasibility/feasibility/DPR of links under National Perspective Plan as well as Intra-State links proposed by the States. Chairman, Member (WP&P) and Member (D&R), CWC are members of NWDA Society and 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.

37th TAC meeting was held on 12th September, 2008 and the technical aspects of the following reports have been discussed:

(i) Finalisation of Water Balance Studies of NWDA in Consultation with Central Water Commission

(ii) Status of Studies pertaining to the Peninsular Rivers Development Component of NPP

(iii) Feasibility Report of 9 link System of Mahanadi-Godavari-Krishna-Pennar-Cauvery- Vaigai-Gundar Linkage

(iv) Status of Studies pertaining to Himalayan Rivers Development Component of NPP

(v) Pre-feasibility Report of Jogighopa-Tista-Farakka Link Project

(vi) Intra-State link proposals

4.4.2 Consensus Group

In pursuance of the decision taken in the 42nd meeting of the Governing Body of the 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.

So far nine meetings of the consensus group have been held. The 9th Consensus Group meeting was held on 22nd 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 5th meeting of the Committee was held on 24.07.2008 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 sixth and seventh meeting of the Committee was held on 19th, June 2008 & 20th, Oct 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 was formed on 7th June 2006 under Chairmanship of Secretary (WR) and Chairman, CWC as a Member of the Committee. In the 2nd meeting of steering Committee held on 8th September, 2008 progress of preparation of DPR of Ken-Betwa link and enhancement of financial powers to DG, NWDA were discussed.

DPR of Ken-Betwa link has been completed.

4.5 Reservoir Operation

4.5.1 Joint Operation Committee of Rihand Reservoir

The 21th meeting of Joint Operation Committee of Rihand Reservoir was held in New Delhi on 7th October 2008 under the chairmanship of Member (WP&P) in which the operation plan for 2008-09 was finalized and the issue of restoration of MDDL to the designed level was discussed.

4.5.2 Comprehensive System Studies of Damodar Barakar basin

The Comprehensive System Studies for Damodar Barakar basin were completed and a presentation was made in the 118th meeting of DVRRC meeting held on 16.04.2008 at New Delhi.

4.5.3 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 Basin Planning

4.6.1 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 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, various reference related to the information contained in the report were attended.

4.6.2 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), Ministry of Urban and Development, 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 have been prepared and sent to MOWR. Various references related to the above one being attended to.

4.6.3 Reassessment of basin-wise water situation in the country –National Water Mission

The National Action Plan on Climate Change (NAPCC) was prepared by the Government of India, which was released by the Hon'ble Prime Minister on 30th June 2008. The NAPCC has laid down the principles and has identified the approach to be adopted to meet the challenges of impact of climate change through eight National Missions. National Water Mission is one of them.

Under National Water Mission, six Sub-Committees were constituted of which Basin Level Management under the Chairmanship of Member (WP&P) and Member – Secretary, Director (BP) was one of them. The Sub-Committee finalised its report and sent it to MoWR.

Based on the objectives of the National Water Mission, the Comprehensive Mission Document of "National Water Mission" identified the strategies for achieving the goals

of (a) Comprehensive water data base in public domain and assessment of impact of climate change on water resources ; (b) Promotion of citizen and State actions for water conservation , augmentation and preservation , (c) Focussed attention to over-exploited areas, (d) Increasing water use efficiency by 20%, and (e) Promotion of basin level integrated water resources management.

One of the recommended strategies identified for implementation in the Mission Document is "Reassessment of basin –wise water situation in the present scenario including water quality by using latest techniques, which inter –alia may include:

(i) Development or adoption of comprehensive water balance based model,
(ii) Fitting models to basin using current data, and
(iii) Assessment of likely future situation with changes in demands, land use, preparation and evaporation.

Presently discussions are underway with in CWC as well as with National Remote Sensing Centre, Hyderabad, Central Ground Water Board, National Institute of Hydrology etc. to firm up the modalities and methodologies of the study.

4.6.4 Publication

The landmark publication named "Guidelines for Preparation of River Basin Master Plan" is under printing.

4.6.5 River Basin Plan for Jhelum, Chenab and Indus river

A Committee under the chairmanship of Additional Secretary (WR) was constituted to work out Action Plan for utilizing the potential of the western rivers as permissible under the Indus Water Treaty. In this connection a sub-Group was constituted under the leadership of CE (BPMO) to prepare the basin plans for Jhelum, Chenab and Indus rivers. The draft basin plans have been prepared and are updated with the information received from different State Governments.

4.6.6 Technical Papers/Reports

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

(a) A technical paper titled "Development of Water Resources Infrastructure to meet Agricultural, Energy and Urban needs – Indian Scenario" was prepared and sent to MoWR in connection with the 5th World Water Forum (WWF) to be held in Istanbul. In context to the 5th WWF a status key note on water and food for

ending poverty and hunger titled "Situation in India and Approach of the Indian Govt." was prepared and sent to MoWR.

(b) Material for discussions, during the meeting of the First Ministerial Forum on Water in connection to G77 to be held at Muscat in Feb, 2009 was prepared.

5

CHAPTER–V

DESIGN & CONSULTANCY

5.1 General

Designs and Research wing of Central Water Commission plays a pivotal role in 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 141 projects (including 9 projects with special problems) is being carried out in the design units of D&R wing during the year 2008-2009 as under:

Sl. No.	Category	No. of Projects
1.	Projects at construction stage.	85
2.	Projects at investigation and planning stage (for which detailed project reports are being prepared)	47
3.	Projects with special problems	9
	Total	**141**

State-wise break up of all the 141 projects is shown in Fig. 5.1 and list of projects in Annex 5.1.

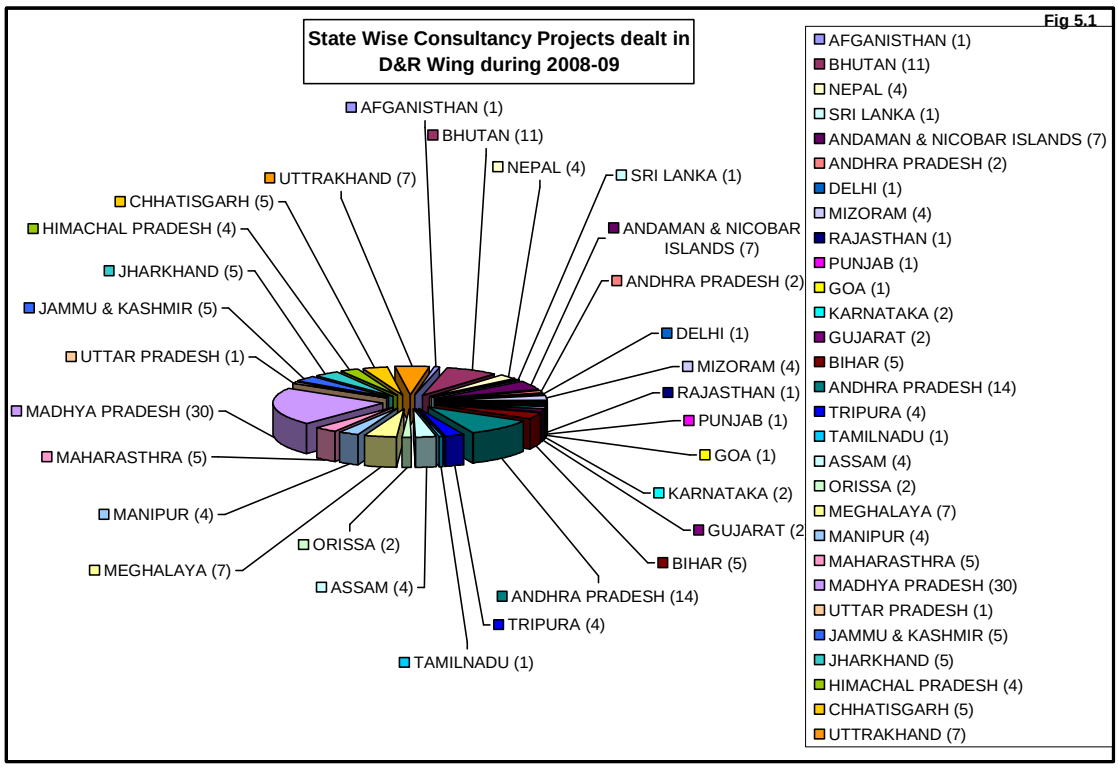


Fig. 5.1

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

1. **Pancheshwar Multipurpose Project & Poornagiri Re-regulating Dam, Indo–Nepal**

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

The proposed project envisages a 293 m high rock-fill dam with central clay core just downstream of the confluence of the Mahakali and Sarju rivers. The project is proposed to have 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 Uttar Pradesh State 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 Nepalese DPR, the re-regulating dam had been proposed at Rupaligad, which was not favoured by the Indian side initially. Instead, the India side had proposed Poornagiri as the re-regulating dam. This has been reviewed in the Ministry of Water Resources and it has been decided to consider both the alternatives. Geo-physical investigation for Rupaligad dam is 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.

2. Sapta Kosi High Multipurpose Project, Indo-Nepal

The Sapta Kosi High Dam Multipurpose Project, as per the preliminary studies carried out, envisages construction of a 269 m high dam to divert river waters through a dam toe power house with an installed capacity of 3000 MW (at 50 % load factor) and irrigation of 15.22 lakh ha. gross command area through construction of a barrage 1 km downstream of the dam. An additional capacity of 300 MW is further contemplated by construction of three canal type power houses along the canal system. Field investigation studies and preparation of DPR for Sapta Kosi High dam Multipurpose Project and Sun Kosi Storage-cum-Diversion Scheme are to 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. CWC has furnished investigation stage layout for power house related components.

3. Tehri Dam Project, Uttarakhand

Tehri Dam Project is the first multi-purpose river valley project taken up for construction on river Bhagirathi to tap its vast potential and is being executed by Tehri Hydro Development Corporation (THDC) Ltd. 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, and Intermediate Level Outlets etc. were handled in D&R wing. An inspection gallery has been provided in the core of fill dam joining left and right abutments, which is a unique feature for rock fill dam undertaken for the first time in India. CWC had carried out structural design of lining and issued all the necessary construction stage drawings in respect of intermediate level outlet tunnel (ILO at EL 700) and additional ILO (at EL 750). Inter-Ministerial committee report for permission to plug the Additional Intermediate Level Outlet (AILO) is under consideration. 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 was on 25.10.2006 and Unit II on 30.01.2007.

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 and National Committee on Seismic Design Parameters with its secretariat in CWC has been considering related issues.

4. Koteshwar HE 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 the entire power house including intake and tailrace etc. Construction drawings of power house substructure, service bay (1st stage concrete) upto EL544.00, Draft tube liner, Intake and Tail-race have been issued to project authorities (Tehri Hydro Development Corporation).

5. Loharinag Pala and Tapovan Vishnugad H.E. Project, Uttarakhand

A Memorandum of Understanding (MoU) for complete design engineering including pre-award engineering & assistance during construction for technical and site related issues for the 600 MW Loharinag Pala and 520 MW Tapovan Vishnugad H.E. Projects had been signed between NTPC and CWC during the year 2004**.** Complete engineering support covering planning, detailed specifications, drawings, evaluation of quantities etc. in respect of these projects were offered by CWC. Design Consultancy for these projects is being provided by CWC.

6. 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 Brahamputra 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 **10** projects for which DPRs are under preparation.

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

	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.	Tawang Chu H.E. Project River	DPR stage
5.	Nyukcharong Chu H.E. Project	DPR stage
6.	Kameng 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.	Myntdu HE Project Stage - II	DPR stage
17.	Kulsi Multipurpose Project	DPR stage
18.	Jadukata Dam Project(Stage – I &II)	DPR stage
19.	Ganol HE Project	Construction Stage
20.	New Umtru HE Project	Construction Stage
	Mizoram	
21.	Kolodyne H.E. Project Stage – I	Construction Stage
22.	Tuirini H.E. Project	Construction Stage
23.	Tuivawl H.E. Project	Construction Stage
24.	Tuichang H.E. Project	DPR stage
	Tripura	
25.	Kalasi Barrage	Construction Stage
26.	Manu Medium Irrigation Project	Construction Stage
27.	Champaichera Dam Project	Construction Stage
28.	Howarah Dam Project	Construction Stage

5.3.2 Hydrological Studies

The Hydrological Studies Organisation (HSO), a specialized unit under D&R Wing of Central Water Commission, carries out hydrological studies in respect of most of the projects in the country. During the year 2008-09 HSO has dealt with 110 projects from hydrological point of view which includes 8 projects for consultancy and 102 projects 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:

(a) Development of flood estimation model for un-gauged catchments

The country has been divided into 7 zones and further 26 hydro-meteorologically homogeneous sub-zones. So far flood estimation reports covering 24 sub-zones have been published.

(b) Preparation of Generalised Probable Maximum Precipitation (PMP) Atlas

Design storm (PMP/SPS) estimates, which are basic inputs for computing design flood values, are presently calculated on a case –by-case basis for new dams under planning and design. However, reassessment / estimation of design storm depths for a large number of existing projects 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 get a first estimate of design storm depths. Generalised PMP Atlases have been prepared and published for 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.

The work of digitization of PMP Atlas of Krishna basin was awarded to CDAC, Pune during 2007-08 and has been completed during the year 2008-09.

5.3.3 Review of Safety Aspects of Dams

Dam Safety Organization is looking after issues related to Dam Safety which can be broadly categorized as under:

- Instrumentation in Dams and Power House Caverns, besides other hydraulic structures.
- Special Analysis like Dam Break Modelling and foundation problems.
- Computer Aided Designs.
- Monitoring and Rehabilitation of Large dams.

Plan Schemes under Dam Safety Organization:

(i) Dam Rehabilitation & Improvement Project (DRIP)

The Dam Safety Assurance & Rehabilitation Project (DSARP) assisted by the World Bank was implemented in 4 States of the Indian Union, namely Madhya Pradesh, Orissa, Rajasthan and Tamil Nadu, during the period 1991 to 1999. The Project was successfully completed in September 1999 at a cost of Rs.422.95 crore.

After seeing the performance and benefits accrued from the Dam Safety Assurance and Rehabilitation project, an imperative need was been felt that another project covering some more States having significant number of large dams be implemented through the World Bank assistance on similar terms and conditions. A proposal titled 'Dam Safety Assurance, Rehabilitation and Disaster Management Project (DSARDMP)" was prepared for an estimated cost of Rs.718.99 crore during February 2003 and submitted to MoWR for taking up with the World Bank. Eleven States, namely Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Jharkhand, Kerala, Maharashtra, Tamil Nadu, Uttar Pradesh, Uttarakhand and West Bengal were included in this proposal. The States of Madhya Pradesh and Orissa have subsequently been included in the project on specific request from them. This project aimed at improving 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 coordination between the participating State Governments and the Central Government in respect of various activities of DSARDMP, Ministry of Water Resources, Government of India constituted the following two committees on 2nd May 2005:

National Level Steering Committee (NLSC) under the Chairmanship of Secretary to Government of India, Ministry of Water Resources with Principal Secretaries / Secretaries of participating State Governments and senior officers of MoWR, CWC, Planning Commission, etc., as members. This Committee will give policy directions in the formulation and implementation of the Project, as well as review the physical and financial progress of the Project.

Technical Committee (TC) under the Chairmanship of Member (D&R), CWC with Engineers-in-Chief / Chief Engineers of the participating State Governments and senior officers of MoWR, CWC, India Meteorological Department, etc., as members. The Technical Committee is to finalize technical details and coordinate with the implementing committees of the respective State Governments in addition to reviewing the project progress and providing technical input to NLSC.

Discussions were held with World Bank on several occasions to finalize the dam safety efforts. A preparation brainstorming workshop was organized by the World Bank on 27.7.2005. It was decided to rename the project as Dam Rehabilitation and Improvement Project (DRIP) in place of Dam Safety Assurance, Rehabilitation and Disaster Management Project (DSARDMP).

The World Bank DRIP Preparation Mission visited India from 12 to 22 November, 2008 and held discussions with officials of CWC & participating States. Out of 13 participating States only 11 States participated in the discussions Uttar Pradesh and Bihar did not attend the discussion. The Aide Memoire circulated by the World Bank indicated to include 5 States viz. Chhattisgarh, Kerala, Madhya Pradesh, Orissa and Tamil Nandu as confirmed States.

The proposed Dam Rehabilitation and Improvement Project (DRIP) would be a six-year project starting around April 2010. Apart from structural and non-structural measures for rehabilitation and improvement of identified dams, the scope of project includes the development of appropriate institutional mechanisms for the safe operation and maintenance of all large dams in participating states. In addition, strengthening of the institutional setup for national level dam safety surveillance and guidance would be taken up in Central Water Commission (CWC) under Ministry of Water Resources (MoWR).

The project has three components:

(i) Rehabilitation and Improvement of Dams and Associated Appurtenances, focusing on structural and non-structural measures at the project dams, estimated at 243 dams, many of which are more than 25 years old.

(ii) Dam Safety Institutional Strengthening, focusing on regulatory and technical frameworks for dam safety assurance.

(iii) Project Management. The overall responsibility for project oversight and coordination will rest with the Dam Safety Rehabilitation Directorate in the CDSO of CWC. This Directorate will act as the Central Project Management Unit (CPMU). The Directorate will be assisted by a management and engineering consulting firm. Each state will establish a Project Management Unit (SPMU) in the SDSO. This Unit will have direct responsibility for the coordination and management of the project at state level.

The total project cost is estimated at US $ 437.5 million to be financed by World Bank. Out of the total estimated cost 80% cost will be financed by World Bank while balance 20% will be financed by respective state government and Ministry of Water Resources.

(ii) Dam Safety Studies & Planning under XI Plan

A Plan scheme titled "Dam Safety Studies & Planning" at an estimated cost of Rs10.00 Crore is under implementation for XI Five Year Plan (2007-2012). The scheme envisages to continue the present Dam Safety activities and to improve the technical expertise of Dam Safety in CWC. Expenditure incurred during the Financial Year 2007-08 was Rs.0.523 Crore. The budget estimate for the Financial Year 2008-09 is Rs. 1.60 Crore. Expenditure incurred during the Financial Year 2008-09 is Rs. 0.9123 Crore till March, 2009.

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

An effort had been initiated 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 earlier plan scheme. Expenditure incurred during the financial year 2007-08 was Rs.0.4677 crore. The budget estimate for the Financial Year 2008-09 is Rs. 2.352 crore. Expenditure incurred during financial year 2008-09 is Rs.0.5644 crore till March, 2009.

Dam Safety Act

The draft Dam Safety Act-2002, approved by Ministry of Water Resources (Government of India), has been circulated to the States. The States have responded well to the Draft Act and so far the Government of Bihar has passed the Dam Safety Act 2006 and the same was published in the Bihar Gazette on 4.5.2006. The Government of Andhra Pradesh adopted a Resolution on 24.3.2007 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 24.7.2007 empowering the Parliament of India to pass the necessary Dam Safety Act. The Government of Kerala has passed the Kerala Irrigation and Water Conservation Act 2003 which was subsequently amended through the Kerala Irrigation and 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.

Government of India has already initiated action to pass a Central Act on Dam Safety.

National Committee on Dam Safety (NCDS)

The NCDS was constituted by the Govt. of India in Oct., 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. 29th meeting of NCDS was held on 12.12.2008.

Technical examination of seismic and foundation aspects of river valley projects

Detailed Project Report of 11 river valley projects in various States namely Uttarakhand, Sikkim, Andhra Pradesh, Orissa, Manipur, Arunachal Pradesh and Bhutan were studied for techno – economical appraisal with respect to foundation engineering and seismic aspects.

Consultancy Services on Instrumentation in Hydraulic Structures

During the year, Planning and preparation of Instrumentation construction drawings for following projects has been done:

(1)	Mulla Periyar – Baby Dam, Tamil Nadu	- 3 drawings issued
(2)	Head Race Tunnel of Loharinagpala HE Project (4x150 MW), Uttarakhand	- 1 drawing issued
(3)	Barrage Instrumentation in respect of Loharinagpala HE Project (4x150 MW), Uttarakhand	- under progress
(4)	Transformer Hall Cavern Instrumentation in respect of Loharinagpala HE Project (4x150 MW), Uttarakhand	- under progress
(5)	Butterfly Valve Chamber Instrumentation in respect of Loharinagpala HE Project (4x150 MW), Uttarakhand	- under progress
(6)	Power House/Transformer Cavern of Tapovan Vishnugarh HE Project, Uttarakhand	- 1 drawing issued
(7)	Barrage Instrumentation in respect of Tapovan Vishnugarh HE Project, Uttarakhand	- under progress

CWC is a review consultant for WAPCOS, New Delhi for the Salma Dam Project, Afghanistan and in this connection, the "Chute Spillway Instrumentation Drawing of Salma Dam Project, Afghanistan" is examined / vetted and comments issued to Project Authorities.

National Committee on Seismic Design Parameters (NCSDP)

National Committee on Seismic Design Parameters (NCSDP), earlier known as Standing Committee to suggest design "Seismic Coefficient of Hydraulic Structures in River

Valley Projects" was formed by the then Ministry of Irrigation, Govt. of India in June, 1969 comprising of experts from the different technical institutions and Govt. Organisations. The same was renamed and reconstituted as "National Committee on Seismic Design Parameters (NCSDP)" in October, 1991. Member (D&R), CWC is the Chairman of the 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.

During 2008-09 two meetings (XIX and XX) of NCSDP were held on 11-04-2008 and 23.09.08 respectively at CWC, New Delhi. In the XIX meeting seismic design parameters of 19 projects were discussed and the Committee approved the coefficients and response spectra for 8 projects and accorded conditional approval to six projects. In the XX meeting 14 projects were discussed and Committee approved the coefficients and response spectra for 4 projects.

Dam Health and Rehabilitation Monitoring Application (DHARMA)

The 'Management Information System' proposed in the 26th NCDS meeting is essentially focused on historical (engineering) data of large dams; and the process of collecting such data is under progress. Meanwhile, the process of recording the health status of various dams by various Dam Safety Organizations has already commenced, and an immense amount of data is being generated and passed on to CWC on annual basis. This volume of data is expected to increase many fold with the taking-up of rehabilitation works of old dams.

There is a need to collect and present the Dam's Health and Rehabilitation related data in an organized manner, with standard format and nomenclature. With this view, Central Water Commission has presently taken up the task of developing a 'Dam Health and Rehabilitation Monitoring Application (DHARMA)' Software. Besides enabling a meaningful interpretation of voluminous data being collected by the DSOs, this monitoring application will enable CWC and State Governments to effectively monitor and carry out miscellaneous corrective and rehabilitation measures. The software development will be taken up in a phased manner and eventually it is expected to allow a larger sharing of knowledge-pool on innovative techniques of dam safety and rehabilitation measures.

So far, two modules of DHARMA have been completed. Beta version of the software has been given to State DSO's and data related to various dams have also been prepared and included in the software.

5.3.4 Project Appraisal

Detailed Project Reports of 168 projects submitted by various State Governments and other agencies were technically examined in D&R Wing during the year 2008-09.

5.3.5 Special Studies

Dam break analysis is carried out to prepare the inundation map and disaster management plan in the unlikely event of dam failure. It estimates the maximum water level at the downstream locations of the dam in the event of hypothetical failure of the dam. The dam break analysis is being carried out in CWC on consultancy basis using one dimensional mathematical model MIKE11 developed by the Danish Hydraulic Institute (DHI), Denmark. During the year integrated dam break analysis of Omkareshwar Project (MP) and Indira Sagar Project (MP) has been taken up.

5.4 Central Water Commission Library

CWC Library is one of the most prestigious technical reference library on the subject of Water Resources Engineering and other allied subjects. Library & Information Bureau is one of the modules on Intranet Portal "Sangam" having data base of nearly 26000 publications. It has collection of over 1.25 lakh books and 3.5 lakh journals/bulletins/news letters/reports etc. and it is growing every year with more and more addition of books/journals and other publications.

During the year 2008-09 the Library has subscribed/procured nearly 70Nos. journals, Indian as well as foreign, local news papers and magazines, Hindi publications, technical books, standards and also received hundred numbers of technical and non-technical Journals/ bulletins/ news letters/ publications from various govt. / non-govt. and educational institutes/societies on complimentary basis. The Library has also procured books / publications requisitioned by other directorates of CWC for their mini libraries.

The Library is functioning properly from the new library building after shifting in the month of March, 2008. Library stock has been re-arranged in a manner to make retrieval of desired publication fast and easy. Now the Library has adequate space and improved facilities for the users, scattered over ground, 1st and 2nd floors. The Map Record Section, a unit of L&IB, is now functioning from 3rd floor. There is also an auditorium and conference room in the library building for holding seminars, workshops and meetings etc.

Annex – 5.1

List of Active Consultancy Projects in D&R Wing during the Year 2008-09

Sl. No.	State/ name of projects	Sl. No.	State/ name of projects
	Andaman & Nicobar Islands	42	Rampur H.E. Project (DPR)
1	Raising of Chaudhary Nalla Earth Dam (DPR)		**Jammu & Kashmir**
2	Indira Nalla Water Supply Scheme (Const.)	43	Parnai H.E. Project(Const.)
3	R.K. Pur (Const.)	44	Kirthai H.E. Project- Stage – II (DPR)
4	Kamsarat Water Supply Scheme (Const.)	45	Tulbal Navigation Project (Const.)
5	Bamboo Flat Water Supply Scheme(Const.)	46	Baglihar Project (Const.)
6	Chaudhary Nallah Project (Const.)	47	Chek Dam Yakh Nalla BADP Project(Cons)
7	Kamsarat Nalla Water Supply Scheme (DPR)		**Jharkhand**
	Andhra Pradesh	48	Amanat Barrage(Const.)
8	Indira Sagar (Polavaram) Project (Const.)	49	Garhi Reservoir Project(Const.)
	Arunachal Pradesh	50	Tenughat Dam Radial Crest Gates
9	Kameng H.E. Project (Const.)		(Automation) – Const.
10-18	Nuranang Chu Small H.E. Project (DPR) - 9 Projects.	51	Gumani Barrage (Const.)
19	Nyukcharang Chu H.E. Project (DPR)	52	Balpahari Project(Const.)
20	Tawang Chu H.E. Project (DPR)		**Karnataka**
21	Lohit Dam Project (DPR)	53	Lakiya Tailing Dam (Const.)
22	Jiadhal Multipurpose Project (DPR)	54	Kochige Hole Earth Dam (Const.)
	Assam		**Madhya Pradesh**
23	Barbhag Drainage Dev. Scheme-Sluice Regulator(Const.)	55	Ban Sagar Project(Const.)
24	Karbi Langpi H.E. Project(Const.)	56	Mahi Main Dam(Const.)
25	Amjur Drainage Dev. Scheme(Const.)	57	Kutni Feeder Reservoir Project (Const.)
26	Pagaladiya Dam Project (Const.)	58	Kushalpura M.P. Project(Const.)
	Bihar	59	Sindh Project(Phase–II)-Madikheda Dam (Const.)
27	Durgavati Reservoir Scheme(Const.)	60	Upper Beda Project(Const.)
28	Western Kosi Main Canal(Const.)	61	Halon Project (Const.)
29	Tirhut Main Canal, Valmikinagar (Const.)	62	Pench Valley Group Water Supply Scheme (Const.)
30	Sone Western-Eastern Link Canal (Const.)	63	Upper Narmada Project (Const.)
	Chattisgarh	64	Pench Diversion Scheme(DPR)
31	Sukha Nalla Barrage Project(Const.)	65	Ataria Project (DPR)
32	Karra Nalla BarrageProject(Const.)	66	Morand Project (DPR)
33	Ghumeria Nalla Barrage Project(Const.)	67	Bargi Diversion Project(RBC) Canal Syphon (Const.)
34	Sutiapat Medium Project(Const.)	68	Dudhi Project(DPR)
35	Ghumaraiya Barrage Project (Const.)	69	Jobat Project (Const.)
	Delhi	70	Punasa Lift (DPR)
36	Palla Barrage (Const.)	71	Lower Goi Project (Const.)
	Goa	72	Ken-Betwa Link Project (DPR)
37	Opa Barrage (Const.)	73	Omkareshwar Project Unit-II Canal (Const.)
	Gujarat	74	Sanjay Sagar (BAH) Project (DPR)
38	Sardar Sarovar Project(Const.)	75	Indira Sagar ProjectUnit-II Canal(Const.)
39	Daman Ganga Pinjal Project (DPR)	76	Man Project (Const.)
	Himachal Pradesh	77	Budhner Project(DPR)
40	Seli H.E. Project (DPR)	78	Ganjal Project (DPR)
41	Raoli H.E. Project (DPR)	79	Machchrewa Project (DPR)

80	Sher Project (DPR)		**Foreign Projects**
81	Shakkar Project (DPR)		**Afghanistan**
82	Balkund Canal Syphon (Const.)	117	Salma Dam Project(Const.)
83	Yashwant Sagar Dam (Const.)		**Bhutan**
	Maharashtra	118	Punatsangchu Stage-I HE Project (Const.)
84	North Koel Dam(Const.)	119	Sankosh Multipurpose Project (DPR)
85	K.T. Weir Malkapur (DPR)	120	Punatsangchu Stage-II H.E. Project(DPR)
86	Wansi Medium Project (DPR)	121	Chenary Mini Hydel Scheme (Const.)
87	Upper Kundalika Medium Project(DPR)	122	Gyetsa Mini Hydel Scheme (Const.)
	Manipur	123	Khalanzi Mini Hydel Scheme (Const.)
88	Khuga M. P. Project(Const.)	124	Khaling Mini Hydel Scheme(Const.)
89	Thoubal M.P. Project(Const.)	125	Lhuntshi Mini Hydel Scheme (Const.)
90	Irang H.E. Project (DPR)	126	Chukha Damchu Highway Project (Const.)
91	Dholaithabi Barrage Project (Const.)	127	Thimpu Mini Hydel Scheme (Const.)
	Meghalaya	128	Wangdi Mini Hydel Scheme (Const.)
92	Myntdu H.E. Project (Const.)		**Nepal**
93	Myntdu H.E. Project Stage - II (DPR)	129	Sapta Kosi High Dam M.P. Project(DPR)
94	Kulsi H.E. Project(DPR)	130	Sun Kosi Dam (DPR)
95	Jadukata H.E. Project-Stage I&II (DPR)	131	Pancheshwar M.P. Project (DPR)
96	Ganol H.E. Project (Const.)	132	Sun Kosi Storage-cum-Diversion Scheme (DPR)
97	New Umtru H.E. Project (Const.)		**Sp. Problem Projects**
98	Umngot H.E. Project (DPR)		**Andhra Pradesh**
	Mizoram	1	Neradi Barrage
99	KolodyneH.E. Project(Stage - I) (Const.)		**Bihar**
100	Tuivawl H.E. Project(Const.)	2	Dagmara H.E. Project
101	Tuirini H.E. Project (Const.)		**Himachal Pradesh**
102	Tuichang H.E. Project (DPR)	3	Pandoh Dam
	Orissa		**Maharashtra**
103	Anandpur Barrage Project (Const.)	4	Shivsagar Dam
104	Control Structures across Jouranalla & Indravati Rivers (Const.)		**Madhya Pradesh**
	Tripura	5	Ken-Betwa Link Project-NWDA
105	Manu Medium Irri. Project -(Const.)		**Punjab**
106	Kalasi Barrage (Const.)	6	Ranjit Sagar Dam
107	Champaichera Dam Project (Const.)		**Rajasthan**
108	Howarah Dam Project(Const.)	7	Lhasi Irrigation Project
	Tamil Nadu		**Uttar Pradesh**
109	Mulla Periyar Baby Dam (Const.)	8	Matatila Dam
	Uttarakhand		**Sri Lanka**
110	Tehri Dam Project(Const.)	9	Senanayake Samudra Reservoir
111	Tapovan Vishnugad Project - NTPC (Const.)		
112	Tehri Dam Project (Const.)		
113	Koteshwar H.E. Project(Const.)		
114	Loharinag Pala H.E. Project-NTPC(Const.)		
115	Tehri Pumped Storage Scheme (Const.)		
116	Kishau H.E. Project(Const.)		

6

CHAPTER-VI

WATER MANAGEMENT, RESERVOIR SEDIMENTATION AND POST PROJECT EVALUATION

6.1 Monitoring of Reservoir Storage

During the water year 2008-09, Centre Water Commission 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	
		2007-08 (upto March, 31)	2008-09 (upto March, 31)
Number of Reservoirs monitored		81	81
Total designed live storage at FRL		151.77	151.77
As on June, 1 *(Start of water year)*	Storage (BCM)	31.12	29.495
	Storage as percentage at FRL	21	19
	Storage as percentage of 10 years average storage	152	139
As on September, 30 (*End of Monsoon Period*)	Storage (BCM)	124.15	114.262
	Storage as percentage at FRL	82	75
	Storage as percentage of 10 years average storage	124	112
As on March, 31	Storage (BCM)	48.39	36.247
	Storage as percentage at FRL	32	24
	Storage as percentage of 10 years average storage	125	95

44 more projects (each having storage capacity of 0.250 BCM or more) have been identified for inclusion in the monitoring system. A bulletin on the status of reservoir storages is being issued every week. The weekly bulletin contains current storage position vis-à-vis storage status on the corresponding day of the previous year and average of last 10 years on the corresponding day. The information presented in the bulletin is also used by the Crop Weather Watch Group constituted by Ministry of Agriculture for reviewing the crop planning strategy based on the availability of water in the reservoir.

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. Four such bulletins are issued every month. Special bulletin are also prepared at the time of meeting of Coauvery Monitoring Committee headed by the Secretary (WR).

6.3 Watershed Management and Reservoir Sedimentation

6.3.1 Capacity survey of important Reservoirs in the country

Capacity Survey of reservoirs has been a continuing scheme, initiated during VIII Plan and continued through IX and X Plan.
Upto the end of X Plan, the survey works of total 23 reservoirs were completed in all respect and report finalization of another 3 reservoir was in progress.

During XI Plan, an SFC Memo for covering 20 more reservoirs under Capacity Survey at an estimated cost of Rs. 410.00 lakh, sanctioned by MOWR on 20th February, 2008. The spillway works of 3 reservoirs have been completed. A proposal for 5 new reservoirs for taking up survey out of above 20 reservoirs is being carried out.

6.3.2 Status Report on Watershed Management and Water Harvesting

A status report on Watershed Management and Water Harvesting was published during 2004-05 giving the current status of watershed Management activities in the country as reported by various State Govt. Departments and field functionaries in the field. The 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 2008-09 is as under:

1. Satellite Remote Sensing based Reservoir Sedimentation study of Four (04) reservoirs (viz. **Upper Indravati, Sholayar, Edamalayar and Bargi** reservoir) was undertaken for In-house studies during 2008-2009. One in house study of **Sholayar** reservoir has been completed. Draft report of two reservoirs have been prepared and circulated to concerned field authorities for comments/observations and remaining one study is under progress. Two studies (Spillover 2007-08) of **Sukta** reservoir and **Dantiwada** reservoir have also been completed during 2008-09.

   Work of estimation of sedimentation in Reservoirs using Remote Sensing Technique of 25 reservoirs awarded to RRSSC-ISRO, Jodhpur. Out of 25 reservoirs, 12 reservoirs found feasible and draft report of all the 12 reservoirs have been submitted by the consultant. The draft reports are being scrutinised.

2. For the development of web enabled Water Resources Information System (WRIS) during 11th plan, the work has been awarded to RRSSC-ISRO, Jodhpur. Under this information system 30 GIS Layers will be developed. MoU has been signed between CWC and ISRO for development of Water Resources Information System (WRIS). An amount of Rs. 16.59 Cr. has been released to ISRO and the work is under Progress.

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

In order to update the Status of the data of Working Group Report, 1991, by Ministry of Water Resources on Water logging, Salinity & Alkalinity, a study on "Assessment of Waterlogged and Salinity and/or Alkalinity affected areas in irrigated Commands of all Major and Medium Projects throughout India using Remote Sensing Technique" has been taken up by Central Water Commission in collaboration with Regional Remote Sensing Service Centre (RRSSC), Jodhpur during the period Oct 2003-June 2008. In the

third and fourth phases of the study, eleven reports in respect of Uttar Pradesh, Uttarakhand, Jammu & Kashmir, Kerala, Andhra Pradesh, Tamilnadu, Orisa, West Bengal, Himachal Pradesh, North Eastern States and Union Territories were prepared. These reports were approved in the 6th and 7th TAC Meeting held on 06/10/2008 & 07/10/2008 respectively. All the 23 reports in this regard are expected to be completed by June, 2009.

6.6 Performance Evaluation Studies

CWC is entrusted with Post Project Performance Evaluation Studies covering System Performance, Agro-economic, Socio-Economic and Environmental Impact Assessment Studies of completed Major & Medium irrigation Projects through consultants during X Plan. Performance Evaluation Studies in respect of nine projects viz. Samrat Ashok Sagar (Madhya Pradesh), Kanchi Weir (Jharkhand), Salki (Orissa), Sukla (Assam), Chandan Reservoir (Bihar), Itiadoh (Maharashtra), Kodayar (Tamilnadu), Loktak (Manipur), and Nanak Sagar (Uttar Pradesh) were taken up. Studies of all these projects were continued during 2007-08. Final Reports of Kanchi Weir & Samrat Ashok Sagar, Draft Final Reports of Sukla, Chandan reservoir, Nanak Sagar, Kodayar and Itiadoh have been received. T.A.C. 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.

6.7 Benchmarking of Irrigation Projects

Benchmarking in Water Resources Sector 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.

- **Guidelines for 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 Organizations 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).

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 it is felt that there is a need to improve the same. It is therefore proposed to construct a data-bank relating to water use efficiency of all major and medium projects.
The objective of the study is to cover:

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. In this matter, a Technical Advisory Committee headed by Member (WP&P), CWC was constituted to oversee and guide in conducting the aforesaid studies. So far, 57 Major and Medium Irrigation Projects across the country have been taken up for these studies. Out of 57 study 43 study were found acceptable and approved by MOWR. , 35 Draft Final Reports received from WALMIs/Reserch institutes have been considered by TAC in its 7th meeting. Out of 38 Final Reports 30 reports have been examined and approved by core group in XIth core group meeting held on 2nd & 3rd Feb, 2009.

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 view of various Central Govt Organisation 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 the project, the Advisory Committee of Ministry of Water Resources (MoWR) on Irrigation, Flood Control and Multipurpose Projects headed by Secretary, Water Resources (WR) considers the project for acceptance and thereafter recommends the same for investment clearance by the Planning Commission. Besides these, the Hydro-power projects proposed by State Electricity Boards / Private Sector Organisations for REC clearance by Central Electrical Authority (CEA) 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 State Governments /Ministry of Urban Development.

A similar function is discharged by the Project Preparation Organization (PPO) under a Chief Engineer in respect of Major, Medium Irrigation and Water Resources Consolidation Projects, which are posed for external assistance.

7.2 National Projects

Central Govt. has declared 14 water resources projects namely (1) Teesta Barrage (W.Bengal), (2) Shahpur Kandi (Punjab), (3) Bursar (J&K), (4) 2nd Ravi Vyas Link (Punjab), (5) Ujh Multipurpose Project (J&K), (6) Gypsa Project (HP), (7) Lakhvar Vyasi (Uttrakhand), (8) Kishau (HP/Uttaranchal), (9) Renuka (HP), (10) Noa-Dehang Dam Project (Arunachal Pradesh), (11) Kulsi Dam Project (Assam), (12) Upper Siang (Arunachal Pradesh), (13) Gosikhurd (Maharashtra) & (14) Ken Betwa (Madhya Pradesh) as National Projects. For these projects, 90% project cost of irrigation, drinking water component is to be provided as Central Grant.

List of National Water Resources projects

Sl. No.	Name of the Project	1)Irrigation (ha.) 2) Power (MW) 3) Storage (MAF)	State
1.	Teesta Barrage	1) 9.23 lakh 2) 1000 MW 3) Barrage	West Bengal
2.	Shahpur Kandi	1) 3,80 lakh 2) 300 MW 3) 0.016 MAF	Punjab
3.	Bursar	1) 1 lakh (indirect) 2) 1230 MW 3) 1 MAF	J&K
4.	2nd Ravi Vyas Link	Harness water flowing across border of about 3 MAF	Punjab
5.	Ujh multipurpose project	1) 0.32 lkh ha 2) 2) 280 MW 3) 0.66 MAF	J&K
6.	Gyspa Project	1) 0.50 lakh ha 2) 240 MW 3) 0.6 MAF	HP
7.	Lakhvar Vyasi	1) 0.49 lakh ha 2) 420 MW 3) 0.325 MAF	Uttranchal
8.	Kishau	1) 0.97 ha 2) 600 MW 3) 1.04 MAF	HP/Uttranchal
9.	Renuka	1) drinking water 2) 40 MW 3) 0.44 MAF	HP
10.	Noa-Dehang Dam Project	1) 8000 ha 2) 75 MW 3) 0.26 MAF	Arunachal Pradesh
11.	Kulsi Dam Project	1) 23900 ha. 2) 29 MW 3) 0.28 MAF	Assam
12.	Upper Siang	1) Indidrect 2) 9500 MW 3) 17.50 MAF 4) Flood moderation	Arunachal Pradesh
13.	Gosikhurd	1) 2.50 lakh 2) 3 MW 3) 0.93 MAF	Maharashtra
14.	Ken Betwa	1) 6.46 lakh 2) 72 MW 3) 2.25 MAF	Madhya Pradesh

7.3 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 Central Water Commission and acceptance by 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 soon and the project can be started without waiting for different clearance from different sources. The revised procedure of two stage clearance is applicable w.e.f. October, 2001. During the year 2008-2009, 68 new major and 43 Revised Major irrigation projects were under appraisal in Project Appraisal Organisation. In principle consent of CWC for DPR preparation was communicated in respect of 2 major irrigation proposals. A Pie Chart showing state wise distribution of new major irrigation projects is shown in Fig. 7.1

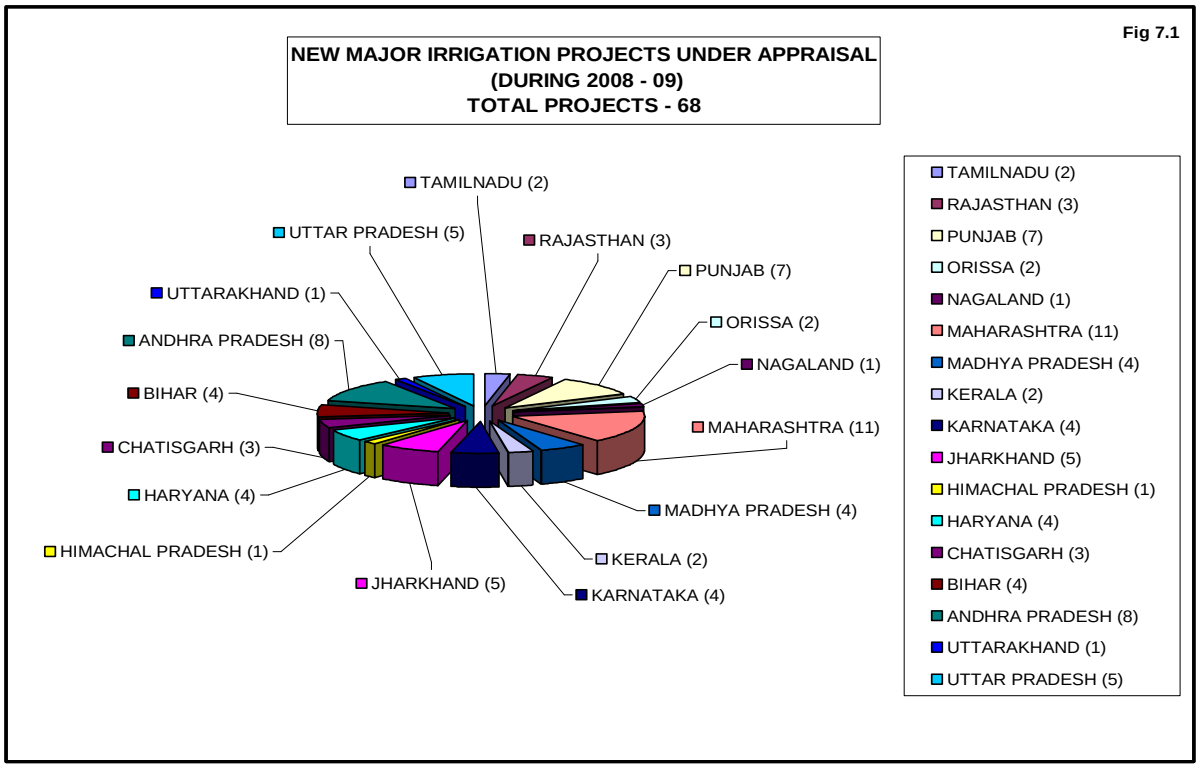


Fig. 7.1 - State wise distribution of New Major Irrigation Projects under Appraisal **(as on 31.03.2009)**

7.4 Appraisal of Medium Irrigation Projects

For medium irrigation projects (CCA 2,000 to 10,000 ha) , State Governments are required to submit only a Performa report to the Appraisal and Monitoring Units of the CWC's field formations. The remaining procedure for appraisal remains as stated in 7.3. During the year 2008-09, 58 New Medium Irrigation projects were under appraisal in various Regional Offices of CWC 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. Pie Chart showing the State wise distribution of new medium irrigation projects is shown in Fig. 7.2.

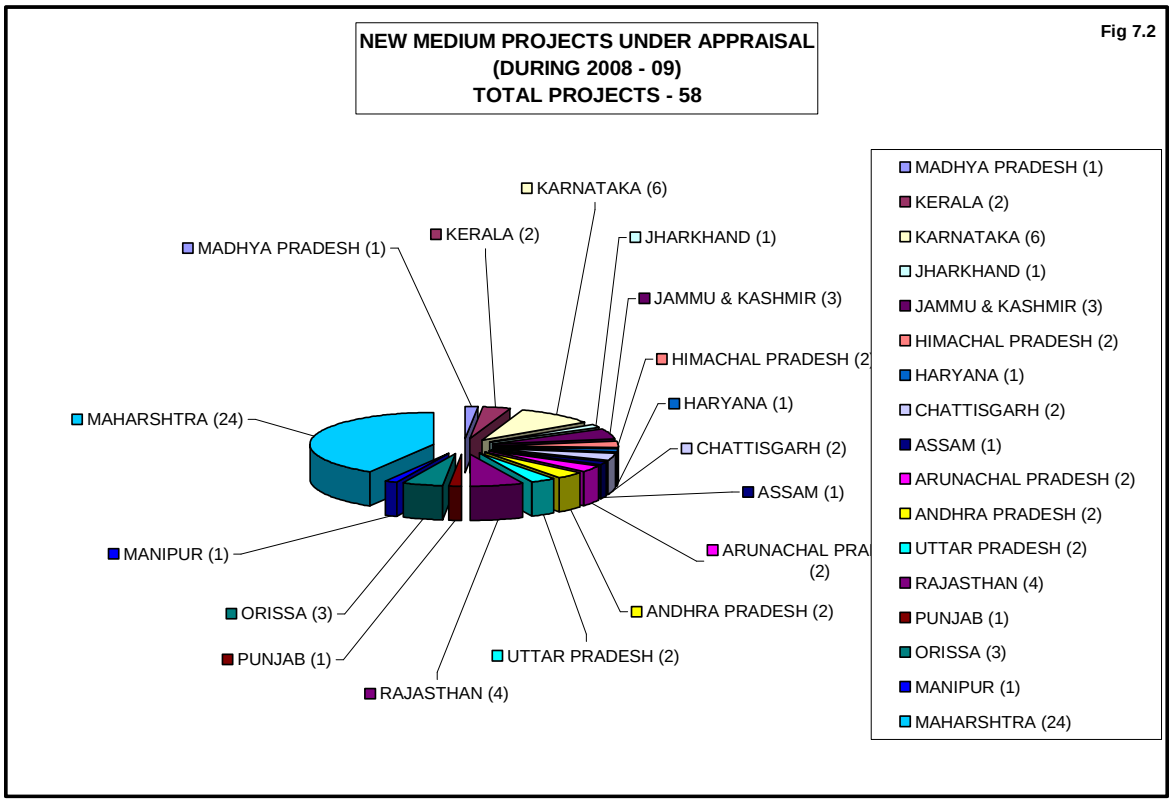


FIG. 7.2 - State wise distribution of New Medium Irrigation Projects under Appraisal
(As On 31.03.2009)

7.5 Interaction with State/Project Authorities

To expedite the appraisal process, Central Water Commission interact frequently with 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 Central Design Organisation and to set up State Level Multidisciplinary Committees so that the scope and extent of scrutiny at the Centre can be minimized.

7.6 Meeting of the Advisory Committee

In November 1987, Ministry of Water Resources reconstituted the Advisory Committee for Irrigation, Multipurpose and Flood Control Projects with the Secretary (WR), as Chairman and Chief Engineer (PAO), CWC as the Member Secretary. The Committee is entrusted with the function of examining proposals scrutinized in CWC and conveying the decision on the techno-economic viability of the projects. During year 2008-2009 the Advisory Committee met on 22.05.2008, 09.07.2008, 20.01.2009, 16.02.2009 and 27.03.2009 under the Chairmanship of Secretary (WR) and considered 35 projects out of which 1 project was deferred and 34 projects were accepted comprising 15 major, 7 medium irrigation and 12 flood control projects. The details of the projects accepted by Technical Advisory Committee & approved by Planning Commission are given in Table 7.1.

Out of these 34 accepted projects by Advisory Committee during 2008-09, 22 are irrigation projects which will provide additional annual irrigation benefits of 33,98,594 hectare in the States of Assam, Andhra Pradesh, Bihar, Chattisgarh, Himachal Pradesh, Jammu & Kashmir, Maharashtra, Orissa, Punjab, Uttar Pradesh & West Bengal. 12 Flood Control Scheme in the States of Bihar, Jharkhand, Assam and West Bengal will provide protection of an area of 121,83,601 hectare thereby saving on an average of about Rs. 1091.30 crore annually. Pie Chart showing State wise distribution of projects accepted by Technical Advisory Committee during the current year is given Fig. 7.3. The details of projects accepted by Technical Advisory Committee is shown in Table 7.1

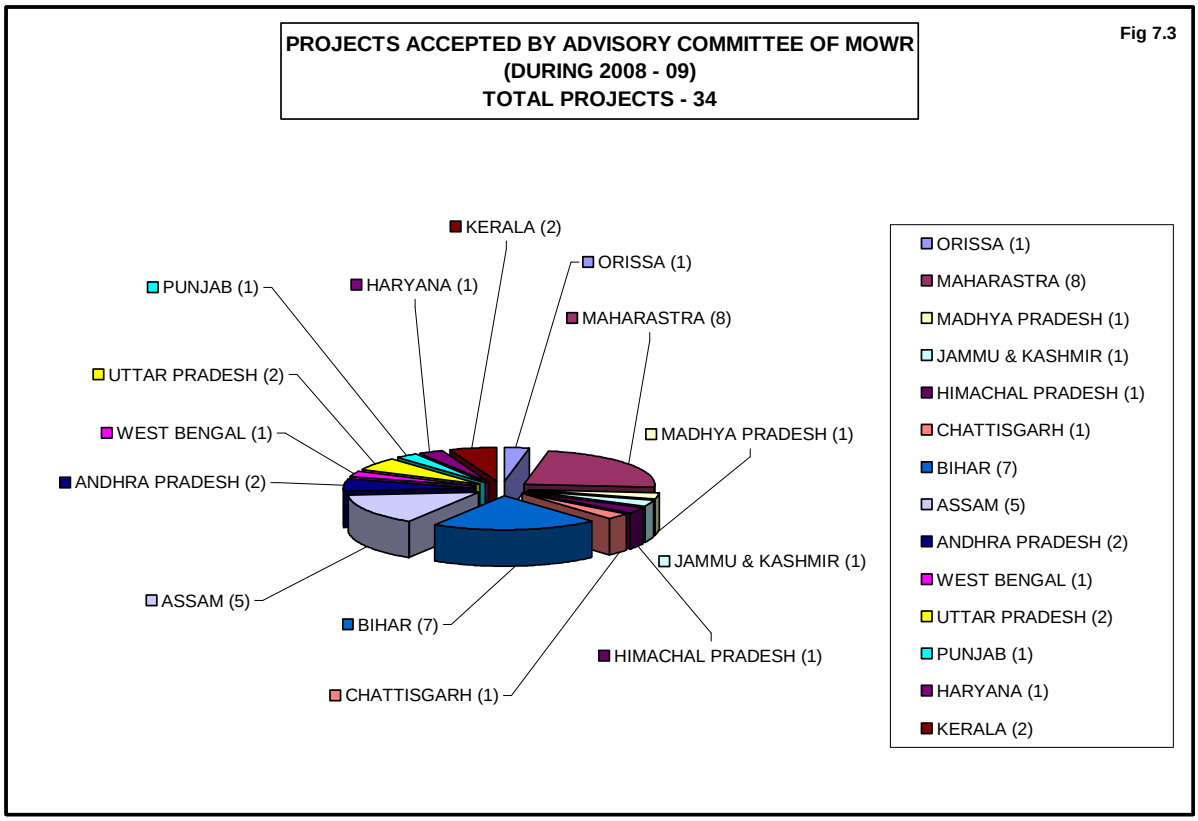


FIG. 7.3 - STATE WISE DISTRIBUTION OF PROJECTS ACCEPTED BY ADVISORY COMMITTEE OF MOWR
(As On 31.03.2009)

Table : 7.1 List of Projects Accepted By Technical Advisory Committee & Approved by Planning Commission

Sl. No.	Meeting Number	Date of Meeting	Project Name	Name of the State	Major/ Medium	Estimated Cost (Rs. Cr.)	Benefits in Ha. /MW	Date of Approval by Planning Commission
1	93rd	22.05.2008	**Orissa Integrated & Water Management Investment Programme (OIIAWMIP)-Tranch-1.**					08.08.08
			a) Mahanadi Chitropola Irrigation Project (Revised)	Orissa	Major	395.45	25160	
			b) Improvement of Taladanda Main Canal Project (ERM)	Orissa	Major	101.32	53602	
			c) Improvement of Gohira Irrigation Project (ERM)	Orissa	Medium	23.10	12456	
			d) Improvement of Remal Irrigation Project (ERM)	Orissa	Medium	12.57	5607	
			e) Improvement in Sunei Irrigation Project (ERM)	Orissa	Medium	25.93	14159	
2	93rd	22.05.2008	Kudali Irrigation Project	MH	Medium	271.79	8480	
3	93rd	22.05.2008	Modernization of New Pratap Canal	J & K	Medium	47.60	13309	
4	93rd	22.05.2008	Anti Erosion Scheme for Protection of Khaipur, Raghopur, Akidatpur villages from river Ganga.	Bihar	Flood Control	23.5581	---	04.08.08
5	93rd	22.05.2008	Raising & Strengthening of Tirhut Embankment from 29.61 km to 83.40 km on the Left Bank of river Gandak.	Bihar	Flood Control	26.2765	---	
6	94th	09.07.2008	Lower Goi Irrigation Project	M.P.	Major	360.37	15686	12.08.08
7	94th	09.07.2008	Lower Pedhi Project	Maha-rashtra	Major	283.10	17023	14.08.08
8	94th	09.07.2008	Upper Kundlika Project	Maharashtra	Medium	72.70	2800	09.09.08
9	95th	20.01.2009	Protection of Sialmari Area from the erosion of River Brahmaputra (Construction of Land Spurs and Tie Bund)	Assam	Flood Control	25.73	--	
10	95th	20.01.2009	Protection of Bhojaikhati, Doloigaon and Ulubari Area from The erosion of River Brahmaputra (Construction of Land Spurs and Tie Bund)	Assam	Flood Control	27.92	--	
11	95th	20.01.2009	Raising & Strengthening to Brahmaputra Dyke From Sissikalghar to Tekeliphuta including closing of breach by retirement and anti Erosion Measures	Assam	Flood Control	142.42	--	
12	95th	20.01.2009	Raising, strengthening and construction of Bituminous road over Eastern and Western Kosi Embankments	Bihar	Flood Control	339.39	--	
13	95th	20.01.2009	Raising, strengthening and extension of existing embankments along Bhutahi Balan river	Bihar	Flood Control	37.14	--	
14	95th	20.01.2009	Breach Closure of Eastern Afflux Bund in Nepal	Bihar	Flood Control	143.42	--	
15	95th	20.01.2009	Proposal for Kosi Barrage Restoration Work	Bihar	Major	86.65		

16	95th	20.01.2009	Kelo Irrigation Project	Chhattisgarh	Major	606.91	22810	
17	95th	20.01.2009	Channelisation of Bata River from RD10230 to 19700 Mtr.	Himachal Pradesh	Medium	34.67	1537.81	
18	95th	20.01.2009	Revised Project Estimate for widening, strengthening and providing 10 m wide road way on Alipur bund on left bank of river Yamuna.	Uttar Pradesh	Flood Control	46.17	--	
19	95th	20.01.2009	Indira Sagar(Polavaram) Project-	Andhra Pradesh	Major	10151.04	436000	
20	95th	20.01.2009	Utawali Medium Irrigation Project, (Revised Estimate)	Maharashtra	Medium	109.64	5394	
21	95th	20.01.2009	Lower Panjara Irrigation project	Maharashtra	Medium	34.73	7585	
22	95th	20.01.2009	Nandur Madhameshwar Irrigation Project (Revised Estimate)	Maharashtra	Major	941.33	45124	
23	95th	20.01.2009	Kamani Tanda Medium Irrigation Project	Maharashtra	Medium	78.49	4750	
24	95th	20.01.2009	Kandi Canal Extension from Hoshiarpur to Bachaur (RD 59.50 to 130.00 km) Stage-II (Revised Estimate)	Punjab	Major	346.62	23326	
25	95th	20.01.2009	Teesta Barrage project 1st sub stage of Stage-I of phase-I (Revised)	West Bangal	Major	2988.61	527000	
26	96th	16.02.2009	Protection of Majuli Island from Flood and Erosion Phase-II & III,	Assam	Flood Control	115.03	--	
27.	96th	16.02.2009	Restoration of Dibang and Lohit rivers to their original course at Dholla Hatighuli (old name: Avulsion of Brahmputra at Dholla Hatighuli).	Assam	Flood Control	53.11	--	
28	97th	27.03.2009	Flood protection works along river Yamuna	Haryana	Flood Control	173.75	--	
29	97th	27.03.2009	Rajiv Bhima Lift irrigation Project	Andhra Pradesh	Major	1969.00	82151	
30	97th	27.03.2009	Wester Kosi Canal Project	Bihar	Major	1307.21	234800	
31	97th	27.03.2009	Malampujha Irrigation Project	Kerala	Major	11.08	45108	
32	97th	27.03.2009	Chiturpujha Irrigation Project	Kerala	Major	34.57	33880	
33	97th	27.03.2009	Punand Irrigation Project	Maharashtra	Major	340.56	10846	22.05.08
34	97th	27.03.2009	Restoring capacity of Sharda Sahyak system	Uttar Pradesh	Major	319.23	1750000	

7.7 Appraisal of Power Projects

24 numbers of Hydroelectric Power Project up to March, 2009 were apprised, out of which 4 numbers of Hydel Projects having total installed capacity of 860 MW were finally cleared by CEA. During the year 2008-2009, 9 numbers of Thermal Power Schemes received from various State Govts /Public Sector undertakings were under appraisal.

7.8 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 2008-09, 29 numbers of flood management schemes have been examined/appraised.

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 in 1975. At Central level, this work was entrusted to CWC. The main objective of monitoring of Major and Medium irrigation Projects 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 2008-09, a total of 95 irrigation projects were being monitored by CWC (Table 8.1). The list of monitored Projects is reviewed on yearly basis.

Out of 95 Major, Medium and ERM projects taken up for monitoring by CWC during 2008-2009, 14 projects (9 major & 5 ERM) were being monitored from HQ and remaining 81 projects (53 Major, 25 Medium and 3 ERM) were monitored by the Regional offices.

In the year 2003-04, 30 Major pre-Fifth / Fifth Plan ongoing projects were identified for completion by the end of X Plan and were put on vigorous monitoring by CWC field units requiring more than one visit in a year. The task of vigorous monitoring was assigned to the specific field officers to ensure their completion as stipulated. Out of these 30 projects, 14 projects were completed by the end of 2007-08 and remaining 16 projects were included in the list of 95 projects which were monitored during 2008-09.

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. Chart showing the State-wise distribution of monitoring of ongoing Major, Medium and ERM projects 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 (2008 - 09)

		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	2	3	-	-	0	1	-	1
2	Assam	-	2	2	-	1	1	-	-	0
3	Bihar	-	4	4	-	-	0	-	1	1
4	Chhattisgarh	-	2	2	-	-	0	-	-	0
5	Goa	-	2	2	-	-	0	1	-	1
6	Gujarat	-	-	0	-	1	1	1	-	1
7	Haryana	-	1	1	-	-	0	-	-	0
8	Himachal Pradesh	1	-	1	-	1	1	-	-	0
9	Jammu & Kashmir	-	-	0	-	-	0	-	-	0
10	Jharkhand	1	2	3	-	3	3	-	-	0
11	Karnataka	-	7	7	-	7	7	-	1	1
12	Kerala	-	2	2	-	1	1	-	-	0
13	Madhya Pradesh	1	8	9	-	1	1	-	-	0
14	Maharashtra	2	9	11	-	2	2	-	-	0
15	Manipur	-	2	2	-	-	0	-	-	0
16	Meghalaya	-	-	0	-	1	1	-	-	0
17	Orissa	1	4	5	-	1	1	-	-	0
18	Punjab	-	-	0	-	-	0	-	1	1
19	Rajasthan	1	2	3	-	-	0	1	-	1
20	Tamil Nadu	-	-	0	-	1	1	-	-	0
21	Tripura	-	-	0	-	1	1	-	-	0
22	Uttar Pradesh	1	3	4	-	-	0	1	-	1
23	West Bengal	-	1	1	-	4	4	-	-	0
	Total	**9**	**53**	**62**	**-**	**25**	**25**	**5**	**3**	**8**
	Grand Total	**62 (Major) + 25 (Medium) + 8 (ERM) = 95**								

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

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

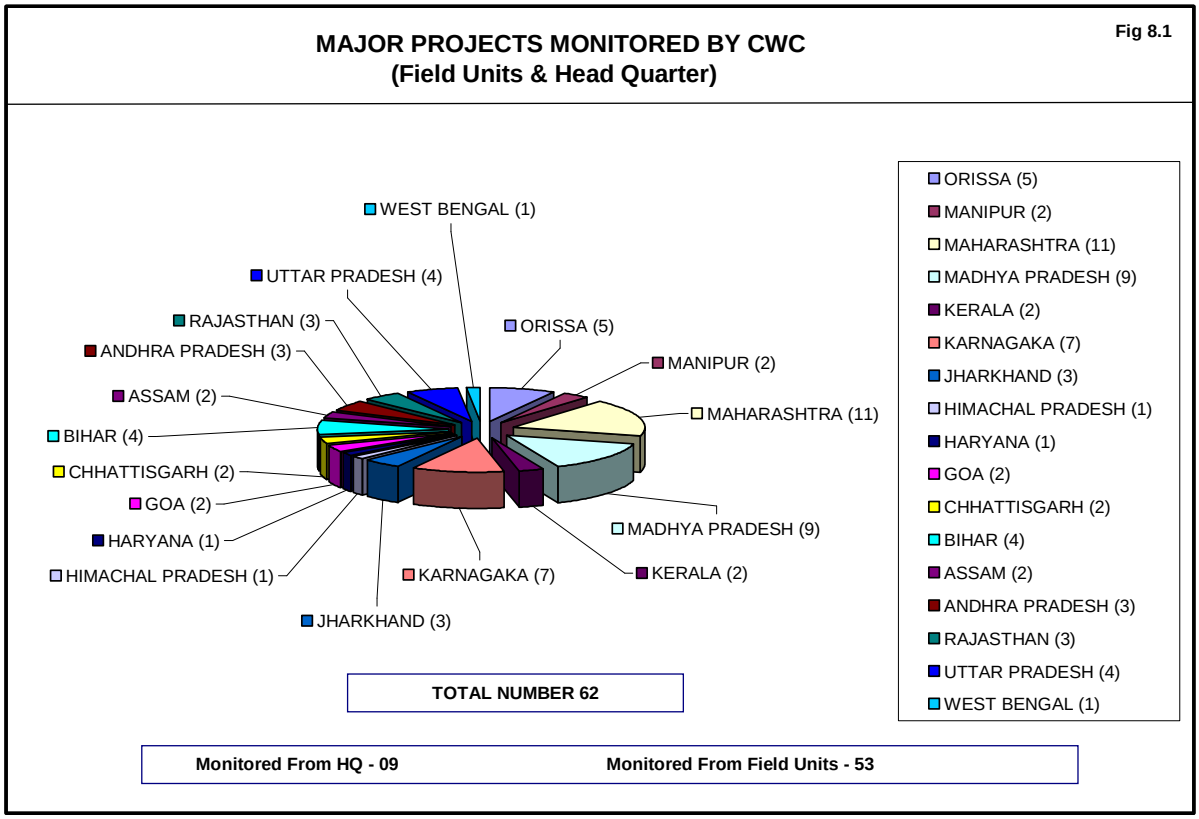


Figure 8.1- Major Projects monitored by CWC Regional office & HQ

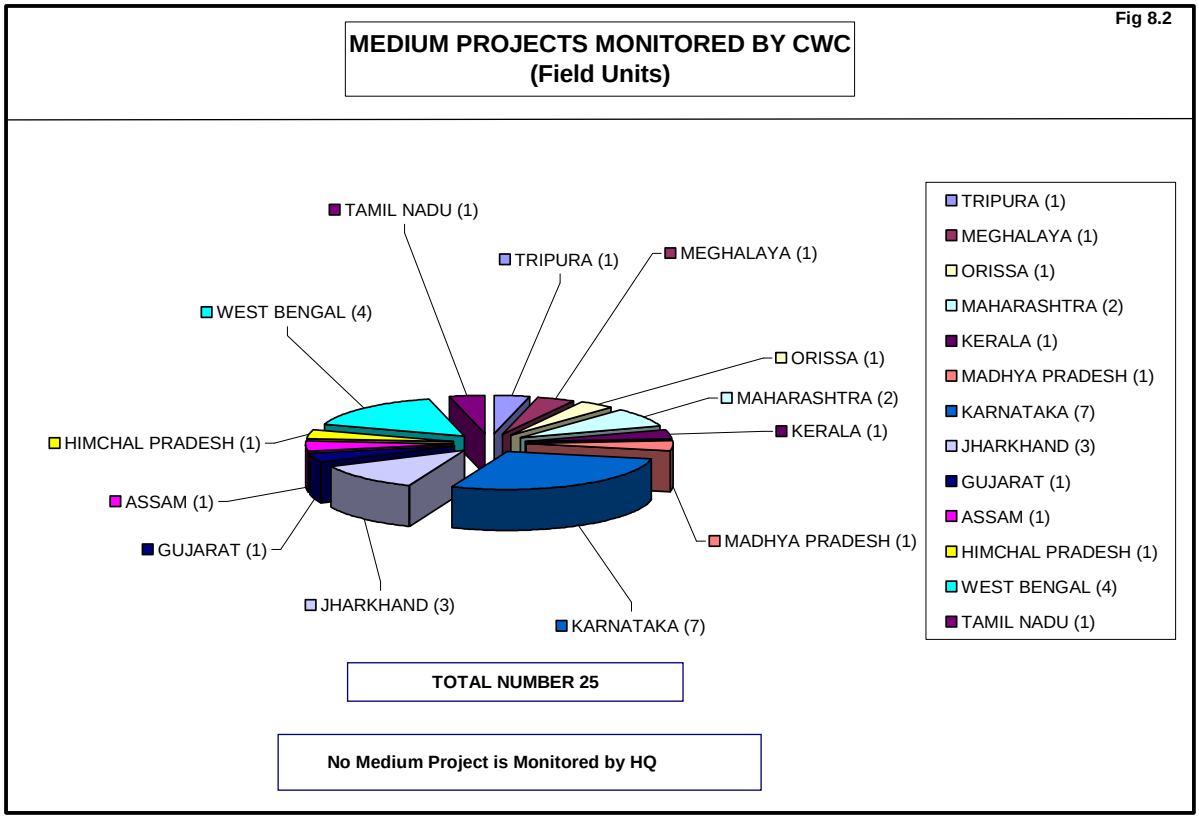


Figure 8.2- Medium Projects monitored by CWC Regional Offices

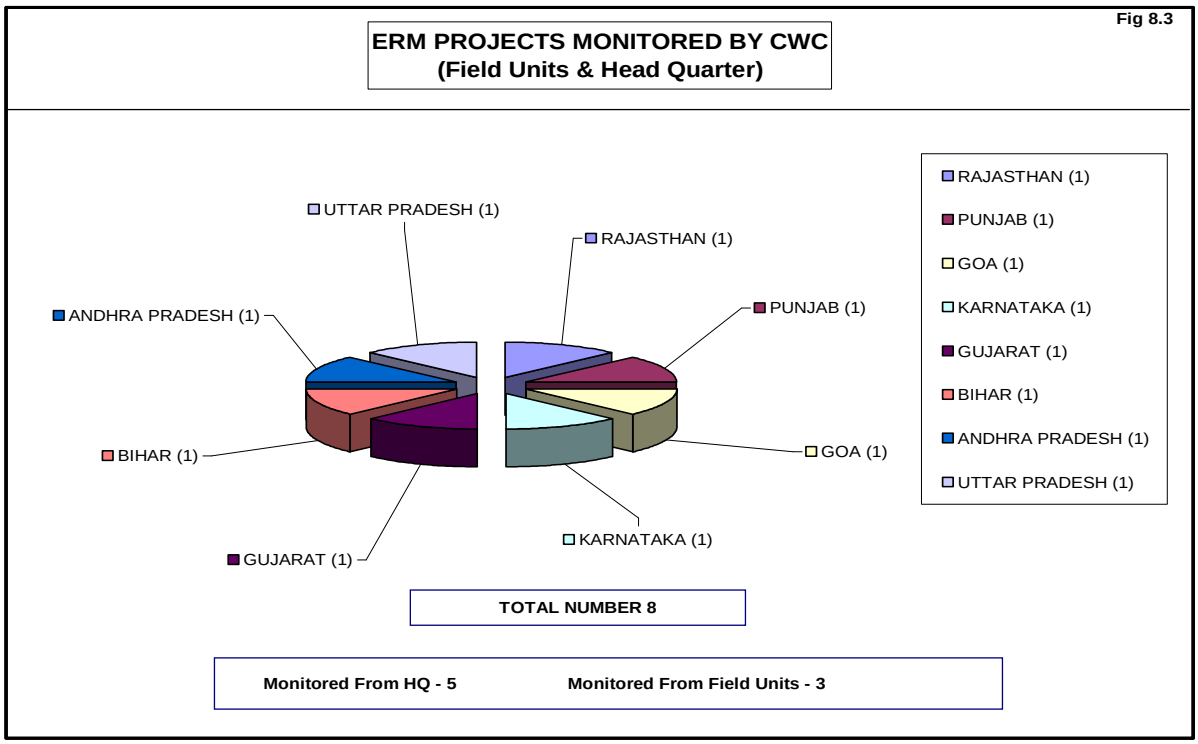


Figure 8.3 - ERM Projects monitored by CWC Regional Office & HQ

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 in Karnataka and Teesta Barrage in 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 up the projects on a National Scale covering about 10 million Ha of irrigation potential spread across different states in India. At a 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 1996-1997, 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 were also given to those projects which were benefiting Tribal and Drought Prone Areas. 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 8.5 gives details of state wise Major, Medium & ERM projects presently under AIBP. Table 8.2 gives State wise list of Major & Medium projects completed under AIBP.

A grant of Rs. 5647.90 crore has been released to 133 major / medium irrigation projects under AIBP during 2008-09 till 31.3.2009. The cumulative total Central Assistance / Grant

provided to States for Major, Medium and ERM Projects is Rs. 30846.109 crore under AIBP since its inception of the programme to 267 projects. Details are given in Table 8.3 & Figure 8.6.

The number of States benefited from the programme is 24 till 13.4.2009. Out of 267 projects, 100 projects have been completed and 4 projects were deferred up to 13.4.2009 as a result of AIBP. As reported by the State Governments, 5.37 million hectare of additional irrigation potential has been created under AIBP since the start of the scheme till March, 2008.

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 163 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.

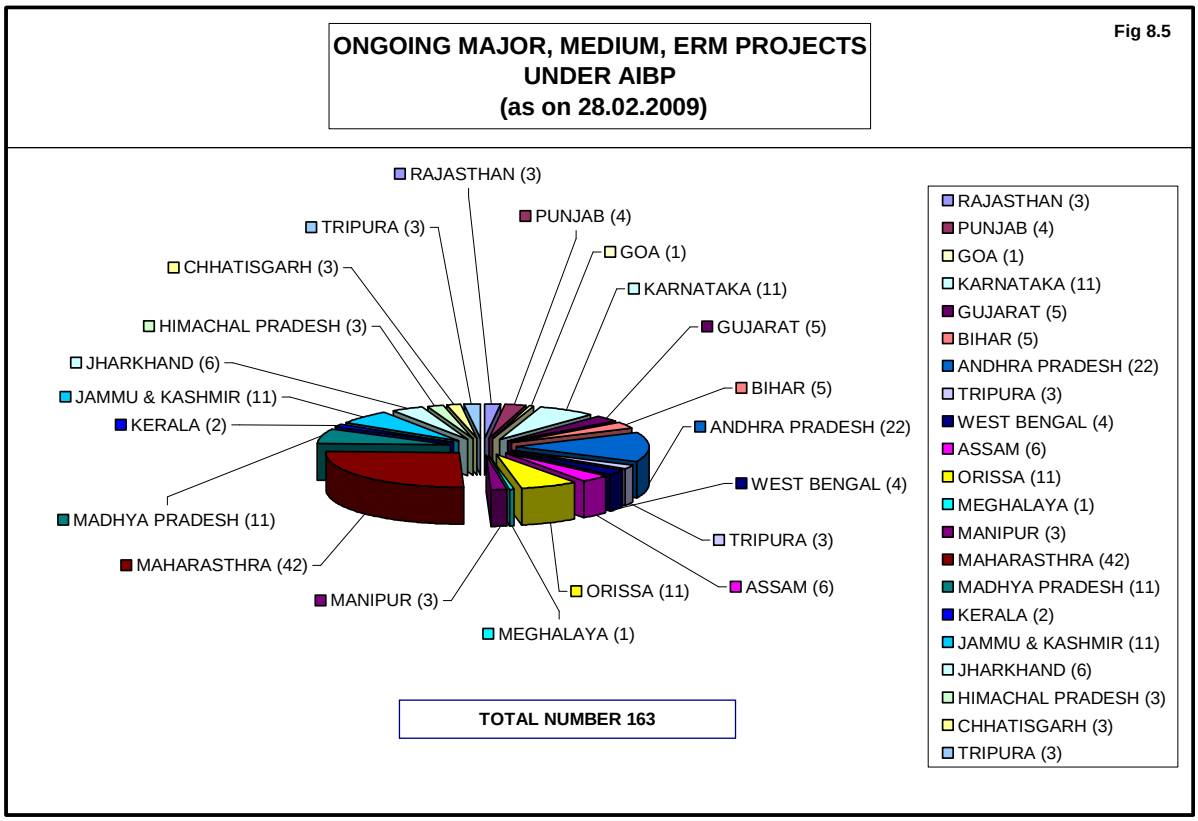


Figure 8.5 - Major, Medium & ERM Projects under AIBP

Table 8.2 – State wise Major & Medium projects completed under AIBP

Sl. No.	State	Project	Sl. No.	State	Project
1.	Andhra Pradesh	Cheyyeru (Annamaya)	48.		Madhya Ganga and Upper Ganga Mod.
2.		Nagarjunsagar	49.		Rajghat Dam
3.		Sriramsagar St.I	50.		Sarda Sahayak
4.		Madduvalasa	51.		Providing Kharif Channel in H.K. Doab
5.		Priyadarshini Jurala	52.		Tihri
6.		Maddigeda	53.		Jarauli Pump Canal
7.		Somasila	54.	Karnataka	Maskinallah
8.		Gundalavagu	55.		Hireballa
9.		Alisagar	56.	Kerala	Kallada
10.		Vamsdhara St-II Ph I	57.	Madhya Pradesh	Banjar
11.	Assam	Bordikarai	58.		Upper Wainganga
12.		Rupahi	59.		Urmil
13.		Hawaipur lift	60.		Bansagar Unit I
14.		Kolanga	61.		Sindh Ph I
15.		Integrated Irrigation Scheme in Kollang Basin	62.	Maharashtra	Jawalgaon
16.	Bihar	Bilasi	63.		Jayakwadi Stage-II
17.		Orni Reservoir	64.		Kadvi
18.		Upper Kiul	65.		Kasari
19.	Chhattisgarh	Shivnath Div.	66.		Kasarsai
20.		Hasdeo Bango	67.		Khadakwasla
21.		Jonk Diversion	68.		Upper Tapi
22.		Barnai	69.		Wan
23.	Goa	Salauli	70.		Vishnupuri (Works)
24.	Gujarat	Damanganga	71.		Bahula
25.		Deo	72.		Kumbhi
26.		Harnav-II	73.		Surya
27.		Jhuj	74.		Bhima
28.		Karjan	75.		Patgaon
29.		Sipu	76.	Orissa	Upper Kolab
30.		Sukhi	77.		Potteru
31.		Umaria	78		Sason Canal
32.		Watrak	79		Salki Irrigation
33.		Mukteshwar	80.		Naraj
34.	Haryana	Gurgaon Canal	81.		Salandi Left Main Canal - Ambahata
35.		WRCP	82.	Punjab	Ranjit Sagar
36.	Jharkhand	Latratu	83.		Remodelling of UBDC
37.		Tapkara Res.	84.	Rajasthan	Gambhiri Mod.
38.	Jammu & Kashmir	Mod. of Zaingir Canal	85.		Jaisamand Mod
39.		Marwal Lift	86.		Chhapi
40.		Lethopora Lift	87.		Panchana
41.		Koil Lift	88.		Chauli
42.		Mod of Pratap Canal	89.		Mahi Bajaj Sagar
43.		Mo of Kathua Canal	90.		Bisalpur
44.		Igophey	91.	West Bengal	Kangsabati
45.	Tamil Nadu	WRCP	92.		Mod. of Barrage and Irrigation System of DVC
46.	Uttar Pradesh	Gunta Nala			
47.		Gyanpur Pump Canal			

Table 8.3: Year wise CLA/Grant Disbursement under Normal and Fast Track AIBP for major/medium irrigation projects (upto March, 2009**)**

(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
2008-09*	5647.900
Total	30846.109

(For Proposals received during 2008-09)*

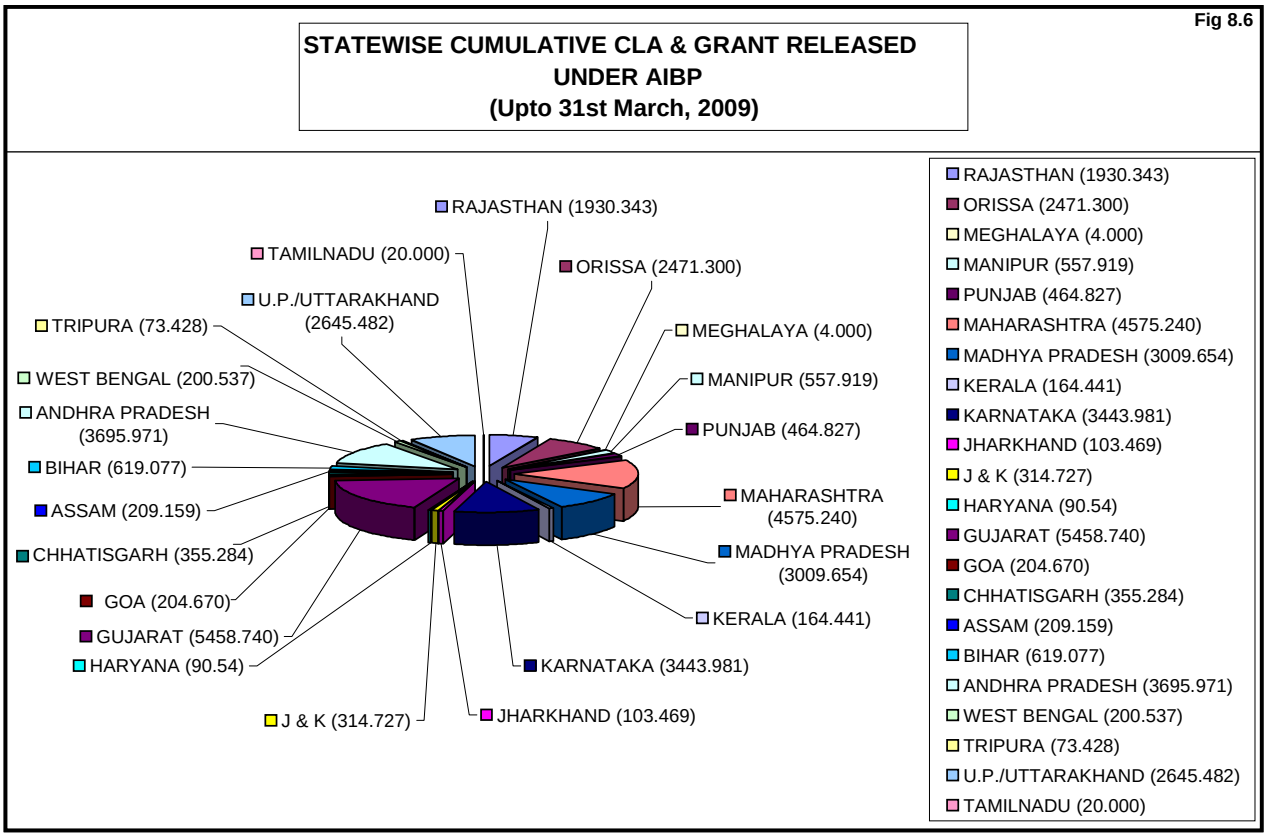


Figure 8.6 – State Wise Cumulative CLA released for Major, Medium under AIBP

8.5 State-wise 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 in the state, 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 134 projects in 28 states and monitoring status reports received from the Regional offices were also examined and observations / comments were communicated wherever necessary. The field units of CWC have monitored almost all projects allotted to CWC. During the year 2007-08, 73 nos. & during the year 2008-09, 35 nos. of half yearly status reports were received from the field units and these reports were examined and comments/observations were made wherever necessary.

8.8 Monitoring and 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 1098 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. These projects cover 1098 water bodies with total original culturable command area of 1.72 lakh hectares was targeted under the scheme. Physical works for restoration of 939 water bodies have been completed in 14 States by March, 2009.

Under the scheme of RRR of water bodies with external assistance, the World Bank Loan Agreement has been signed with Tamil Nadu for Rs. 2182 crore to restore 5763 water bodies having a CCA of 4 lakh hectares, with Andhra Pradesh for Rs. 835 crore for restoration of 3000 water bodies with CCA of 2.5 lakh hectares, with Karnataka for Rs. 268 crore for restoration of 1225 water bodies having a CCA of 0.52 lakh hectare and with Orissa for Rs. 478 crore for restoration of 900 water bodies with CCA of 1.2 lakh hectare. The West Bengal project is at appraisal stage.

8.9 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 Reservoir was examined and commented upon during the period.

9

CHAPTER-IX

CONSTRUCTION EQUIPMENT PLANNING AND MANAGEMENT

CMC Dte. under Central Mechanical Organisation of 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, contract management, costing/estimating, rehabilitation of spare parts and data processing.

9.1 Project Appraisal

During the year, 37 project reports of Irrigation, Power and Multipurpose projects of various States of the country were technically examined from plant planning angle. Out of this, 23 project reports were accepted with provision worth Rs. 21261.80 lakh in respect of construction equipment. In respect of the remaining 14 project reports, the observations / comments were conveyed to the project authorities for compliance and further review.

9.2 Consultancy

(i) Consultancy assistance rendered to project authorities in preparation of DPR of following projects by preparing a chapter on "Construction Equipment Planning & methods" including carrying out equipment planning, scheduling and preparation of construction programme:
   (a) Ken-Betwa Link Project.
   (b) Kolodyne HEP, Stage-II, Mizoram.

(ii) Technical assistance rendered in tender evaluation of following components in respect of Punatsangchu Hydro Electric Project, phase-I, Bhutan:
   (a) Supply of construction equipment.
   (b) Techno-commercial bid for civil contract packages.

(iii) Technical Specifications of Hydraulic Excavator with super long arm with 0.40 cum back hoe bucket to be procured by Mechanical Division-II, Irrigation and Flood Control Deptt., Govt. of NCT of Delhi was finalised and furnished to Flood Control Deptt.

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 a quarterly basis on equipment performance. The data is analysed in P&M Dte. of CMO unit with a view to identify reasons for low performance/utilisation of equipment.

5 No. quarterly returns were received during the year 2008-09 from Punjab State.

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

Director (P&M) visited Eastern Ganga Canal Construction Division Haridwar, Upper Ganga Canal Modernisation Division Haridwar and Irrigation Works Division Saharanpur during the period from 8.4.2008 to 11.4.2008 to fix the reserve price of T&P articles and Surplus, Spares amounting to Rs. 17, 99, 917/-.

Director, P&M visited Etah (UP) during the period from 9.6.2008 to 11.6.2008 under Irrigation Work Circle Aligarh of U.P. Irrigation Department to attend Regional Disposal Committee meeting to fix the reserve price of unserviceable construction equipment & heavy earthmoving machinery and special T&P amounting to Rs.11,20,650/- lying at Irrigation Division, Etah.

9.5. Manpower Planning

A special study on "Employment Generation in the Operation & Maintenance stage in Major and Medium irrigation projects" has been launched by Central Water Commission. The purpose of the study is to know the trend of Employment potential, Employment norm per thousand hectare, Expenditure on Manpower, equipment & machines and other items in operation and maintenance stage project during the five years period from 2000-01 to 2004-05. 36 Major & Medium projects were selected for study, out of these the information of 25 irrigation projects has been received in the Commission so far.

In order to achieve the purpose of the study, additional 30 major & medium projects were also selected through purposive Random Sampling method. Data collection as per prescribed Proforma from the State Governments/Project authorities and field Monitoring Directorate of CWC, is in progress.

9.6 Other Activities

- 6th meeting of the committee to monitor and supervise the overall work for preparation of DPR of Ken-Betwa Link Project was held on 19.06.2008. Sh. J.R. Boro, DD and Sh. B. Saikia, DD attended the meeting.

- Sh. B. Lenka, Director (CMC) and Sh. J.R. Boro, Dy. Director (CMC) visited Ken-Betwa Link Project, during the period from 12.07.08 to 14.07.08.

- An estimate of Rs. 11.28 Lakh for "Review & assistance in preparation of construction schedule, finalization of construction methodology and equipment planning" to Tehri Hydro Development Corporation (THDC) for updation of the DPR of Sankosh Multipurpose Project, Bhutan, has been prepared and sent to the Director, CMDD (E&NE) Dte. CWC.
- Director, CMC visited Phuentsholing, Bhutan to participate in the meeting of tender evaluation for supply of construction equipment in respect of 'Punatsangchu Hydro Electric Project, phase-I, Bhutan' from 14th to 17th Nov 2008.
- Director, CMC visited Phuentsholing, Bhutan to participate in the meeting of tender evaluation for Techno commercial bid for civil contract packages in respect of 'Punatsangchu Hydro Electric Project, phase-I, Bhutan' from 29th to 31st Nov 2008.
- An estimate of Rs. 11.60 Lakhs for consultancy services for examination of Construction Methodology & Equipment Planning and preparation of construction schedule submitted to NWDA in respect of Preparation of Detailed project Reports of Par-Tapi-Narmada & Damanganga-pinjal Links.
- An estimate of Rs. 5.98 Lakhs for consultancy services for examination of Construction Methodology & Equipment Planning and preparation of construction schedule submitted to M&A Dte, CWC, Jammu in respect of Preparation of Detailed project Reports of Ujh multipurpose HE Project (280MW)
- Procurement of stores comprising 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 2008-09 was to the tune of Rs. 3.2 Crore.
- During the financial year 2008-09, procurement of 9 Nos. of photocopier machines, 1 No. Duplicating machine, 16 No. of fax machine, 40 desert coolers, 2 water coolers, 12 air conditioner, 5 Nos. R.O. systems etc. were purchased to facilitate & provide better quality of work in various Units.
- CWC Library and Information Bureau have been shifted from West Block-II to New Library Building and it has started its functioning. Map Record Section situated at 9th Floor, Sewa Bhawan has also been shifted in the New Library Building. About 7000 Nos. Project reports pertaining to Cost Appraisal Directorate and NWP Directorate along with 54 Nos. of racks have been shifted from Room No. 520(N) and 840 (S), Sewa Bhawan to New Library Building.
- Modernisation/ Renovation of 9th floor CWC Sewa Bhawan has been taken up with the help of CPWD.

10

CHAPTER-X

INTER-STATE MATTERS

10.1 Inter-State River Water Disputes

CWC continues to provide technical assistance to MoWR to settle inter-State water disputes among the States amicably 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 apportioned the 50% dependable yield of Cauvery of 740 TMC at lower Coleroon anicut at the delta and has apportioned between 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 in Arabian Sea. A small portion of the catchment area lies in Maharashtra also. The Government of Karnataka in the past prepared proposal for diversion of Mandovi water outside the basin. Ministry of Water Resources in April, 2002 conveyed 'in principle' clearance for diversion of 7.56 TMC of water from Mandovi basin to the adjoining Malaprabha sub-basin (Krishna basin) for drinking water purposes. In view of the strong protest from the Government of Goa, MoWR during September, 2002 kept the 'in 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 officials 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.

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. A meeting of Chief Secretaries of basin states was taken by Secretary 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, an official level meeting was proposed by Chairman, CWC 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 between the states 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 Orrisa 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

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. Subsequently CWC with the help of joint working Group comprising 2 members each from Government of Andhra Pradesh and Orissa has reassessed the 75% dependable yield of Vamsadhara basin as 105 TMC at Gotta barrage.

A number of inter state meeting have been held. As a follow up of the meeting taken by the Chairman, CWC on 17.12.07, an inter-state meeting was held under the Chairmanship of the Chief Engineer, MBO, CWC on 22.01.08 to firm up additional studies. The Government of Andhra Pradesh vide letter dated 16.07.08 has requested for an Inter–Sate meeting to further negotiate the matter with the State of Orissa and taken action, if any. The matter is still under negotiation.

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 sub-Judice, 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. So far, two inter-Sate meeting have been held. In the second meeting held on 26.08.2008, it was decided to carry out hydrological studies by CWC jointly with the State officials for further deliberations in the next meeting. In the month of September' 2008, HSO, CWC has conveyed the modalities and data requirements for carrying out the studies jointly and also requested both the sate Governments for nomination of their representatives. The nominations from the two states have been received. The State Government have been requested to chalk out the programme of hydrological studies in consultation with the HSO, CWC.

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 "Journallah" a small rivulet which joins Kolab-Sabari River and consequently causing drinking water supply problems in Jagdalpur town and downstream villages in Chhattisgarh.

As per the provisions of the Godavari Water Disputes Tribunal (GWDT) Award vide Annex-IV under Annex-'A' i.e. Agreement dated 9.12.1975 between the States of Orissa and

Madhya Pradesh, Orissa is to ensure at its border with Madhya Pradesh a flow of 45 TMC in the Indravati and its tributaries at 75% dependability for use by Madhya Pradesh. However there is no specific stipulation regarding monthly quantum to be made available.

Member (WP&P) took four inter-State meetings of Secretaries of Orissa, Chhattisgarh and Regional Chief Engineers of CWC up to the April, 2003. An inter-State meeting at the level of Engineer-in-Chief, Water Resources Department, Governments of Chhattisgarh and Orissa was held on 24th December , 2003 at Raipur in which, among other points, the water supply problems faced by Jagdalpur Town and downstream areas was also discussed. It was decided in the meeting that CWC would be requested to take up the design work and Chhattisgarh would pay the consultancy charges to CWC. Accordingly, Director, BCD (E&NE), CWC inspected the site of proposed structures in March, 2004 and sent the inspection note to both the State Governments indicating the field and laboratory investigations to be carried out and data to be collected and supplied for taking up the design work. 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. Engineer- in- Chief, Water Resources Department, Government of Chhattisgarh had intimated in July 2008 that Government of Orissa has not started construction work. CWC has accordingly requested Government of Orissa for an early action in the matter and to intimate the status to CWC.

10.3 River Boards Act, 1956

Under Entry 56 of List-I of the Constitution, the River Boards Act, 1956 was enacted for the establishment of River Boards for the regulation and development of inter-State River and River Valleys. The Central Government can constitute a River Board under the provision of the River Boards Act, 1956 with the concurrence of the State Governments. The Central Govt. has not been able to constitute any River Board under this Act, so far. The role of the River Boards as envisaged in the said Act is only advisory in nature. The National Committee for Integrated Water Resources Development Plan has recommended the enactment of a new Act called the "Inter State Rivers and River Valley (Integrated and Participatory Management) Act" in place of existing River Board Act, 1956.

10.4 Control Boards for Inter-State Projects

10.4.1 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 concerned 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.

River Sone has immense potential for development of irrigation and power to benefit the famine and scarcity hit areas in addition to providing much needed power for exploiting the industrial potential of eth area which is rich in minerals. The project will cater for the irrigation needs of large parts of chronic scarcity affected areas in Shahdol, Sidhi, Satna and Rewa districts of M.P., Mirzapur district of U.P. and Palamau district of Bihar.

The total catchments area of the Sone river is 69,284 sq km of which 47,848 sq km or about 68.9% lies in Madhya Pradesh ad the rest in U.P. and Bihar. The catchments area up to the dam site is 18, 648 sq km. The rainfall in the upper part of the catchments area is fairly high and the river has sizeable water resources. The quantity of water available, however, has so far not been utilized for irrigation except for the irrigation developed in Bihar under the Sone canal system and development of power and Rihand Dam in Uttar Pradesh.

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 works in respective territories jurisdiction is being carried out by the concerned states independently and work of power Houses 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 total expenditure for an amount of Rs. 1459.77 crore upto March, 2009 has been incurred on the project.

The work on the Dam including Crest Gates has been completed in June, 2006 and the reservoir has been filled upto EL 336.48 m against FRL of 341.65 m during the year 2008-2009. Power generation was 1517 million unit upto 31.03.2009 in the financial year 2008–2009.
The project will provide annual irrigation to 2.49 lakh hectares in Madhya Pradesh, 1.5 lakh hectares in uttar Pradesh & 0.94 lakh hectares in Bihar towards stabilizing its existing Sone canal system.

So far, 72 meetings of the Executive Committee have taken place. An area of 36677 Ha of 336 nos. of village has been acquired till 31.3.2009. The award for the total land has been passed and the compensation for 36415 Ha (around 99.30%) has been paid.

All 18 nos. spillway blocks have been completed at RL 347 M have been completed. All irrigation sluices, spillway bridges, 6 saddle dams, rock fill dam upto RL347 M have been completed.

10.4.2. 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, 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. The Executive Committee may exercise any power and do any act or thing which may be exercised or is done by the Board subject to the rules and the directions of 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. Now O&M stage of the project has been started. The Executive Committee, Betwa River Board to formulate of Rajghat Dam joint Board for O&M of Rajghat Dam project. Accordingly a draft MOU was prepared and sent to Party States for their comments/views. The comments views are still awaited from the party States.

The Rajghat Dam with appurtenant structure has been constructed across River Betwa to provide Irrigation facilities to 1.38 lakh hectares in Uttar Pradesh and 1.21 lakh hectares in Madhya Pradesh with power generation of 45 MW through Rajghat Hydro Electric Project at the toe of dam on left flank. The cost as well as benefits of the project is to be shared equally by both the States. Construction work of Dam and Power House is almost completed.

The Dam submerges 38 villages in U.P. and 31 villages in M.P. State. Compensation in M.P. area is completed. In U.P. the District Administration, Lalitpur had paid the land compensation of 25 villages and for balance 13 villages; the land property is being acquired through mutual negotiation by the Betwa River Board.

The filling of reservoir upto FRL of R.L. 371.00 M may not be possible till the acquisition of land and property of balance 13 submergence villagers is completed.

The reservoir (FRL 371.00 m) was filled up to 370.15 m during the year2008-09. The three units of Power House have been tested and commissioned during 1999-2000. Power generation was 132 million units during 2008-2009.

So far 82 meetings of the Executive Committee of BRB have taken place. The 82nd meeting of Executive Committee was held on 09.07.2009. The committee discussed/decided the financial, technical and administrative matters of the Board.

10.5 Inter-state Committees

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

10.5.1 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.

21st Meeting of Ghaghar Standing Committee was held on 21.01.2009 under the chairmanship of Member (RM). Chairman of the Committee again emphasised the importance of the Master plan in a holistic manner so that optimal use of water can be derived from the basin. He also requested to the Chief Engineer , Haryana to explore the possibility of using small rubber dams for irrigation purposes. It was felt by the Members of the committee that Master plan may be accepted as a "Master Plan for Flood Control in Ghaggar Basin" and which was agreed to by the Chairman of the committee.

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.

10.5.2 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. 74th meeting of Yamuna Standing Committee was held on 17.07.2008 under the chairmanship of Member (RM), CWC. The minutes of the meeting were finalized and circulated among the members of the Committee.

10.5.3 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 floods in the basin since 1978.

10.5.4 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.

The 29th meeting of Committee was held at Amritsar from 17-11-08 to 20-11-08. the report has been finalised and circulated among the members.

10.6 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.

11

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 to monitor the implementation of environmental safeguards of irrigation, multipurpose and flood control projects. The Committee is entrusted with the work to review 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).

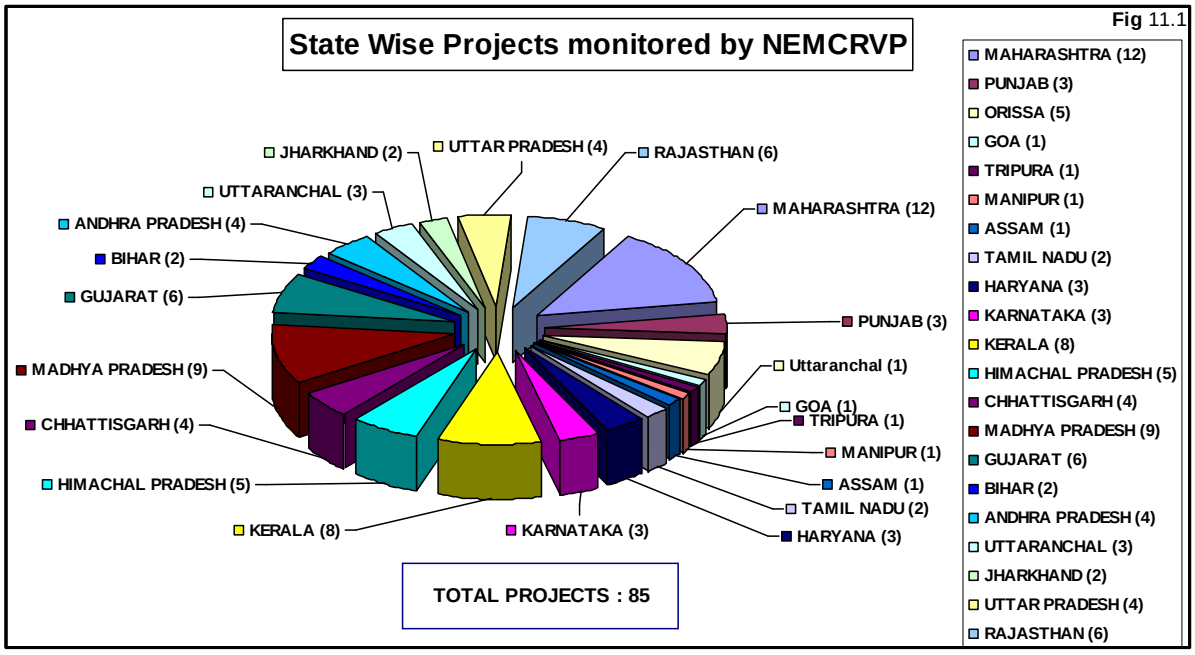


Figure 11.1 - State Wise Projects monitored by NEMCRVP

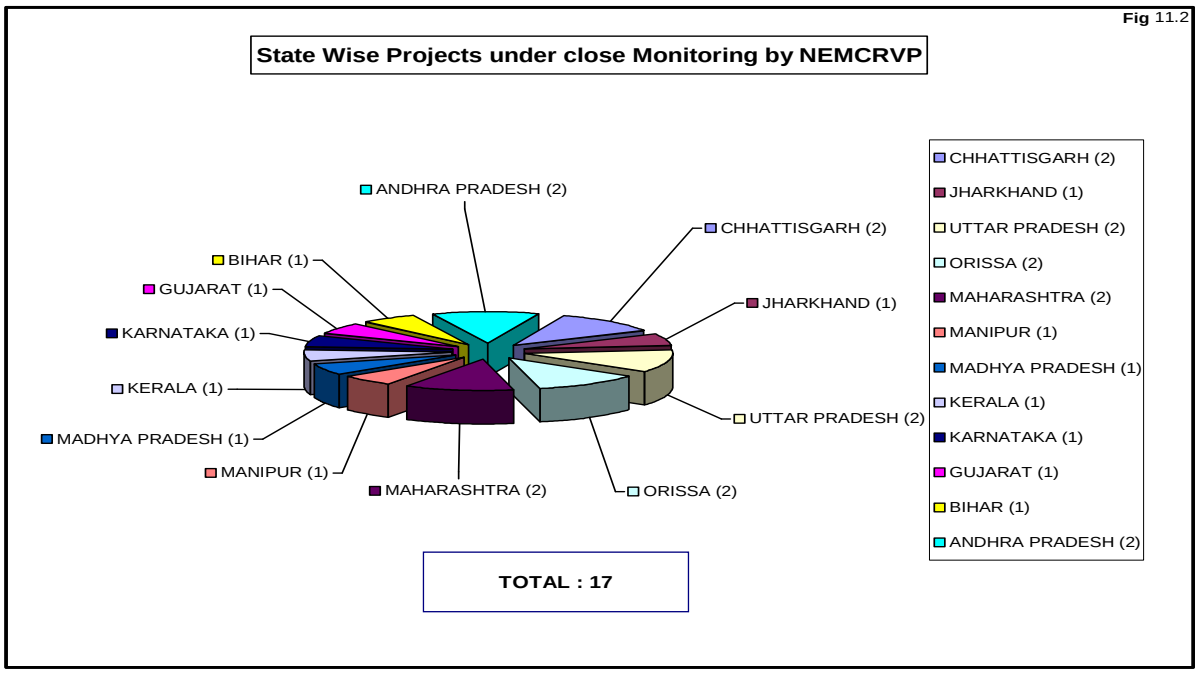


Figure 11.2 - State Wise Projects under closed monitored by NEMCRVP

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 Affairs, Planning Commission and CWC are members of the committee. The Chief Engineer (EMO), CWC is the Vice-Chairman and Director (EM), CWC is the Member-Secretary. Environment Management Directorate, CWC functions as Secretariat of NEMCRVP.

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 60 meetings since 1990.

It 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, 20 states have already constituted SEMCs under the Chairmanship of Secretary, State Water Resources/Irrigation Department. PEMCs have been constitute fro 68 out 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 for the Project. Chief Engineer (EMO)/Director (EM), CWC is the Member of the SEMCs whereas Regional Chief Engineer,

CWC is the Special Invitee to these Committees. Director (Appraisal & Monitoring) of Regional office represents CWC in PEMCs.

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

Various publications have been published 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.

11.1.4 Activities of NEMCRVP during 2008-09

National Environmental Monitoring Committee of River Valley Projects held its 60th meeting on 27.8.2008 at Gulbarga, Karnataka and visited Bennithora Irrigation Project, Karnataka to monitor the compliance of environmental safeguards stipulated during clearance of the Project.

The draft revised Guidelines for Environmental Monitoring of River Valley Projects have been circulated among members of NEMCRVP and are in the process of being finalized.

11.2 Environmental Impact Assessment

11.2.1 Environmental Impact Assessment (EIA)

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 final stage. Studies on four more projects viz Mahanadi Delta (Orissa), Mahi Bajaj Sagar (Rajasthan), Ram Ganga Dam (U.P.) and Singur Project (A.P.) have been taken up during XI Plan . These projects are in progress.

11.2.2 Appraisal of EIA Reports

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 Appraisal Committee for River alley & HE projects have been held and the Committee has recommended 37 projects for environmental / prior environmental clearance.

Feasibility reports/ DPRs of 5 projects have been examined from an environmental angle for grant of "In Principle" consent by CWC.

11.3 Rehabilitation & Resettlement

Rehabilitation and Resettlement (R&R) aspects of displaced/affected persons of Water Resources projects are monitored by the Rehabilitation and Resettlement Directorate of Central Water Commission. 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 245 existing /ongoing major & medium reservoir projects, data on rehabilitation measures have been collected and a data base has been updated.

Examination of Mega Lift Irrigation Project (Orissa) and Lower Indira Project (A.P.) has been done from R&R point of view and comments/observations have been sent to the Director (PP-C) Directorate, CWC.

28 nos. half yearly progress reports on going projects received from State Governments examined and observations sent to concerned project authorities for clarifications.
20 nos. of General/AIBP monitoring reports received from various field offices of CWC have been examined.

12

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 Japan Bank of International Cooperation (JBIC) Asian Development Bank (ADB) have also been providing assistance for implementation of irrigation projects. The Ministry of Water Resources and its organizations assist the State Governments in tying up the external assistance from different funding agencies to fill up the resources gaps, both in terms of funds and technological update for rapid development of country's water resources.

12.1.1 Role of Central Water Commission

The important activities of Central Water Commission in externally aided projects are:-

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

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

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

12.1.2 Techno- economic appraisal & clearance of projects

Three major projects proposed for World Bank funding and 15 medium projects for JBIC assistance and one major project for Asian Development Bank assistance were under appraisal in CWC during 2008-09. Details of the project are given in table 12.1, 12.2 and 12.3.

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 Coastal 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

Table 12.3 Major projects proposed for World Bank Assistance

Sl No	Name of project	Estimated cost (Rs. crore)
1.	Orrisa Integrated Irrigation Agriculture and Water Management Investment programme	829.00

12.2 World Bank Assistance

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

12.2.1 WATER SECTOR RESTUCTURING 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 being 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.

12.2.2 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 12.4

Table 12.4 - 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**

12.2.3 On-going Credits / Loans Agreements

There are four projects under World Bank funding. The assistance utilized is as given in Table 12.5:-

Table 12.5 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 3/08
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	325.00	72.58
2.	**Rajasthan** Water Sector Restructuring Project	Cr.3603-IN	IDA	03-2002	03-2008	8305.07	8305.07	140.00	96.29
3.	**Uttar Pradesh** Water Sector Restructuring Project	Cr.3602-IN	IDA	03-2002	10-2008	8351.00	8351.00	149.20	57.61
4.	**Madhya Pradesh** Water Sector Restructuring Project	Ln.4750-IN	IBRD	01-2005	03-2011	20402.23	20402.23	394.02	79.38
	Total							1008.22	305.86

* Project not cleared by CWC/TAC as DPR of the project is still awaited.

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 12.6

Table 12..6 - External Assistance to Project (JBIC)

SL No	Name of Project	Loan Agreement No.	Loan period		Estimated cost	Total Assistance (M Yen)	Assistance utilized ending 12/08 (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	5531.83	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	2811.78	On-going
3	AP Irrigation and Livelihood Improvement Project	IDP 181	3/07	07/13	11377	23974	38	On-going
	Total					58898	29002.88	

13

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.
- A new Memorandum of Understating (MoU) upon provision of Hydrological Information of the Brahmaputra/ Yeluzandu River in Flood Season by China to India with a validity of five years has been signed with China on 05.06.08 during the visit of Hon'ble External Affair Minister of India to Beijing from June 4-7, 2008. In pursuance, the China side has started supplying the data w.e.f. 08.09.2008.

- The 2nd meeting of Expert Level Mechanism (ELM) on Trans-Boarder Rivers was held at New Delhi from 10-12th April, 2008. During the meeting, work regulations of the Expert Level Mechanism were agreed and signed by the two sides.

  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.

  - The water level, discharge and rainfall data of 3 stations i.e. Nughesha, Yangoun and Naxia was supplied by the Chinese side to UBD, CWC, Dibrugarh from 06.09.2008 upto 15.10.2008.

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.

14

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

Software Management Directorate of CWC is operating the Plan Scheme " Infrastructure Development for Dir(SM)" costing Rs. 6.0 crore which is part of a larger EFC namely "Infrastructure Development Scheme in Ministry of Water Resources" costing Rs.115.0 crore. In the course of operation of the plan scheme, SMD has procured hardware, software and networking items. It has also provided for maintenance of IT items at CWC Hq. by outsourcing the same to M/s Consortium Hi-Tech Pvt. Ltd. During the year 2007-08 an expenditure of Rs. 46.77 lakh was incurred and during the year 2008-09 the proposed expenditure will be about Rs. 60.00 lakh.

14.2 Water Resources Data

14.2.1 Hydrological Data

Hydrological data for non-classified basins collected from the observation sites of CWC, are compiled in Hydrological Data Directorate of ISO for inclusion in the publication entitled "Integrated Hydrological Data Book". The publication consist the following information:

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

The publication for the year 2007 containing data upto 2003-04 has already been up-loaded on the web site of CWC and the preparation of the publication for the year 2008 with the available data upto the year 2006-07 is under progress.

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 Central Water Commission Flood Damage- Area Affected 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 as well as minor Irrigation etc.
- 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 The publication on 'Pricing of Water in Public System in India' was last brought out in 2004 containing the following information upto 1999-2000:

1. Water Rates, Revenue and Operational Expenses.
2. Fixation of Water Rates / charges in States/UTs.
3. Assessment and Collection of Revenue.
4. Remission of Water Revenue.
5. Financial Performance of Irrigation Projects in India – An overview.
6. Water Rates by Crops
7. Water Rates by States/UTs.

The water rates for domestic & industrial use and lift & flow irrigation as prevailing during 2008 across the country is being compiled for the publication "Water Rates in Public System in India".

14.2.4 The publication on "Financial Aspects of Irrigation Projects in India" is brought out with an intention to provide data on various financial parameters in particular having bearing on the operation and management of the system in a form usable by the researchers, analysts, programme administrators and managers. The publication contains States/UTs wise the following information:

1. Financial Aspects of Major & Medium Irrigation Projects – Commercial, Non-Commercial and all

2. Financial Aspects of Minor Irrigation Schemes
3. Financial Aspects of Command Area Development Programmes

The publication has been updated with the information for the year 2005-06 and placed on the website. The publication for the year 2006-07 is under compilation.

14.2.5 Documentation of Data

Hand Book on Water & Related Information, March 2008, is posted on the CWC internet portal for office use.

Water and related Statistic-2008 is available on CWC website under the hyperlink "Water Resources Statistics".

14.3 Information Support to Management

The publications are intended to cater to the need of water resources planners, managers, administrators and researches and the public at large.

14.4 Data Bank

A new plan scheme "Development of Water Resources Information System" has been initiated in the XI Five-Year Plan. Under the scheme, it is intended to set up a data bank as mandated by the ISRWD 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.

15

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 and Third part of the 22nd Induction training course was conducted at CWC Headquarters from 20th Oct, 2008 to 24th Oct, 2008, and 17th Feb, 2009 to 18th March, 2009 whereas second part of the 22nd ITP was conducted at NWA, Pune from 4th of Nov'2008 to 13th of Feb'2009 ,in which 17 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.

During the year 2008-09, in all 26 numbers of training programmes including Workshop/Seminar were conducted by NWA. During the year 586 number of officers from various states/central Govt. organizations, PSUs were trained by NWA with a total number of man weeks accomplished to the tune of 1010. First International Training Programme (for Ethiopian Professionals), was conducted at NWA on 16.02.2009 to 06.03.2009. 12 Professionals participated in this training programme.

Out of 26 training programmes conducted by NWA, following programmes/ Workshops were introduced for the first time.

- Workshop on Water Awareness (30th June, 2008)
- Management Development Programme for Bramhaputra Board officials (21-25 July, 2008)
- Off-campus Workshop on "Web Based Financial Reporting" at Bhubaneshwar (18th October, 2008)
- Off-campus training programme on "Operational Hydrology" at PWD, Chennai (9-13 February, 2009)
- Off-campus training programme on "Operational Hydrology" at PWD, Chennai (10-14 February, 2009)
- International Training Programme for Professionals from Ethiopia (16th February to 16th March, 2009)
- Training Programme for Group D (Non Matric) officials in pursuance of letter from Planning Circle, CWC, Faridabad
- Management Development Programme for Non Technical Officers.

Reconstituted Advisory Board under the Chairmanship of Chairman, CWC consists of the Chairman, CWC as the Chairman, Commissioner (PP), MoWR, Financial Adviser, MoWR, Director General, WALAMTARI, Govt. of A.P., Chief Engineer (HRM), CWC, New Delhi, Director, Central Water & Power Research Station, Pune, Head, Civil Engg. Department, IIT, Mumbai, Director, Indian Space Research Organisation, Bangalore, Representative of Planning Commission, Director WRDTC, Roorkee, Director, Gujarat Engg. Research Institute, Vice-Chairman, Action for Agriculture Renewal in Maharashtra (AFARM) and Vice-Chancellor, University of Pune. The Chief Engineer, NWA, Pune is Member Secretary.

The board oversees overall functioning of NWA and advises on matters related to the training activities. 15th meeting of the Advisory Board was held on 18th September, 2008.

Various training courses, workshops and seminars organized by NWA at Pune during 2008-09 are given at Annex—XV-1(c)

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 2008 – 2009 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	104
2	Sponsoring officers for training, attending seminars/ workshops, etc. abroad	19

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 2008-2009, 16 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, 61 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 2008-09

Sl. No.	Training Programme	Duration of the Course	Venue of the Course	No. of Participants
1.	Hindi Workshop	24-25th June., 2008	New Delhi	17
2.	Training Programme on "Construction Management"	22-23rd June, 2008	Pune	1
3.	Training Programme on " Use of Computer & Related Software for Beginners"	12-14th June, 2008	Lucknow	30
4.	Use & Implementation of generalized PMP Atlas over the Krishna River Basin using geometric s software for estimation of Design Flood & Design Storms	7-18th July, 2008	New Delhi	23
5.	Capacity Building for Under Secretary/Section Officers in MOWR, CWC (HQ), CSMRS & CGWB (HQ)	22-24th July, 2008	New Delhi	17
6.	Preparation of Pension Papers	7-18th August, 2008	Lucknow	30
7.	Hindi Workshop	24-25th Sep., 2008	New Delhi	18
8.	22nd Induction Training Programme for newly recruited Assistant Directors	20-24th Oct., 2008	New Delhi	13
9.	Use of Mathematical Model Like-11 for flood forecasting	3-7th Nov., 2008	Lucknow	7
10.	Analysis of Biological Parameters	17-19th Nov., 2008	New Delhi	30
11.	SWDES-Software	25-27 Nov., 2008	Dehradun	18
12.	Training on SWDES	8-12th Dec., 2008	Gandhinagar	10
13.	Training on SWDES	15-17th Dec., 2008	Hyderabad	29
14.	Refresher Course on MS Ofice	18-20th Dec., 2008	Hyderabad	26
15.	Hindi Workshop	22-23rd Dec., 2008	New Delhi	12
16.	Training Programme on use of "HYMOS" software	12-16th January, 2009	Gandhinagar	14
17.	Training course on Water Quality Monitoring	9-13th February, 2009	Chennai	20

18.	22nd Induction Training Programme (3rd Part) for newly recruited Assistant Directors	17th Feb to 18th March , 2009	New Delhi	17
19.	Training Programme on Use of Mathematical Model MIKE-II for flood	3-7th March, 2009	Maithon	14
20.	Training Programme on SWDES	16-20th March, 2009	Bangalore	20

Annexure XV-1(b)

List of officers deputed abroad for various training/ seminar/ symposia/ conferences, etc. during 2008-2009

Sl. No.	Topic of the programme /Venue / Period	Participant S/Shri
1.	International Training Seminar on "The use of new teaching technology in the training and retraining of Hydro meteorological specialist", St. Petersburg, 12-16th May, 2008	Pramod Narayan, DD
2.	Inspection of Turbine Runner of Myntdu Leshka H.E. Project, Spain. 8-13th June, 2008	Rakesh Tuteja, DD
3.	18th Session of the Inter Governmental Council of the International Hydrological Programme (IHP)- Unesco, Paris 9-14th June, 2008	A. K. Khariya, Director
4.	Training Workshop on the International Guidelines for National Programme on Sustainable Consumption and Production, Kathmadu (Nepal), 18-21th June, 2008	Narmadeshwar Jha, DD
5.	Visit of Salma Dam Project, Afganistan, 5-21st September 2008	Y.P. Singh , Director M. Ramesh Kumar , DD P.K. Saxena, Director S.K.G. Pandit , Director S. Ahluwalia., Director
6.	3rd Meeting of Joint Committee on Water Resources , Nepal , 28th September to 1st October , 2008	A K Bajaj, Chairman R.C. Jha, Member (RM)
7.	20th International Congress and 59th IEC meeting of ICID, Lahore , 6-17th October , 2008	A K Bajaj, Chairman Yogesh Paithankar , Director
8.	First International Conference on Water Resources and Climate Change in the MENA Region, Muscat, 2-4th November, 2008	C. S. Mathur, Chief Engineer
9.	13th Session of the WMO Commission for Hydrology, Geneva, Switzerland, 4-12th November, 2008	R.K. Gupta , Director
10.	First Regional Workshop on the development of ECO-efficient Water Infrastructure for socio-Economic Development in Asia and the Pacific Region, Seoul , 10-12th November, 2008	S. K. Sengupta
11.	Study tour on Knowledge Management for Enhanced Operational Effectiveness organized by ADB, Australia , 22–29th November, 2008	A K Bajaj, Chairman
12.	Joint Hydrological Observation at Harding Bridge , Bangladesh, 29th December to 22nd February , 2009	Neeraj Kr Manglik , DD A.K. Rao , AD

Annexure - **XV-1(c)**

Training Courses organized by NWA, Pune during the year 2008-09

Sr. No.	Training Programme	Dates	Duration (Weeks)	Course Coordi-nator	No. of partici-pants	Man-weeks
A	**Training Programmes**			**S/Sh.**		
1.	Training Programme on Flood Forecasting	21-25 April 2008	1 week	RKS	16	16
2.	Rainwater Harvesting and Groundwater Recharging	28th April to 2nd May 08	1 week	TSP	12	12
3.	Irrigation Sector Reforms (PIM) Benchmarking, Volumetric Supply)	5-9 May 2008	1 Week	PK	12	12
4.	ToT in Hydrometry including use of SWDES Software	12-23 May 08	2 weeks	RBW	16	32
5.	Preparation of DPR of Multipurpose River Valley Projects	26th May to 6th June 2008	2 weeks	PK	28	56
6.	Water Quality Management	10-20 June	2 weeks	RBW	19	38
7.	Construction Management	23-27 June 2008	1 week	TSP	15	15
8.	Workshop on Water Awareness	30th June 2008	1 Day	TSP	34	7
9.	Application of Geo-Informatics in Water Sector	8-18 July 2008	2 weeks	RKS	35	70
10.	Management Development Programme at Guwahati	21-25 July 2008	1 Week	AKS	25	25
11.	Hydrological Studies for Water Resources Projects (Project Hydrology) under Hydrology Project-II	18-22 August 2008	1 week	RKS	30	30
12.	Analysis and Design of Gravity Dams	1-12 Sept. 2008	2 weeks	PK	32	64
13.	DSS Planning for IWRDM	16-26 Sept. 2008	2 Weeks	RKS	24	48
14.	Workshop on "Web Based Financial Reporting" at Bhubaneshwar	18th Oct. 2008	1 Day	DSC	60	12
15.	Hindi Computer Training Programme	20-24 October 2008	1 week	-	25	25

16.	22nd Induction Training Programme for newly recruited Assistant Directors of CWC.	04.11.2008 to 13.02.2009	15 Weeks	SK & all other faculty members.	17	255
17.	Dam Safety and Instrumentation	17-21 Nov. 2008	1 Week	PK	17	17
18.	Surface Water Data Processing and Validation using HYMOS Software.	24.11.08 to 05.12.2008	2 weeks	AKS	10	20
19.	Management Development Programme	10-22 Dec. 2008	2 Weeks	PK	22	44
20.	Hydrological Design Aids	5-9 Jan. 2009	1 Week	RKS	23	23
21.	Training Programme on Operational Hydrology (At PWD, Chennai)	9-13 Feb. 2009	1 Week	AKS	32	32
22.	Training Programme on Operational Hydrology (At PWD, Chennai)	10-14 Feb. 2009	1 Week	AKS	32	32
23.	International Training Programme for Ethiopian Professionals	16.02.2009 to 06.03.2009	3 Weeks	AKS	12	36
24.	Fourth Orientation Programme for newly promoted Extra Assistant Directors of CWC	16-27 Feb. 2009	2 weeks	PK	15	30
25.	Fifth Orientation Programme for newly promoted EADS (Degree Holders)	9-27 March 2009	3 Weeks	SK	18	54
26.	Training Programme for Group D (Non Matric) officials.	25-26th & 30-31 March '09	4 Days		10	10
				Total	**591**	**1015**

Total number of officers = 586
Manweeks = 1010

Abbreviations :

TSP - Shri T S Patil, Director
RBW - Shri R B Walimbe, Director
PK - Shri Pradeep Kumar, Director
RKS - Shri R K Suryawanshi, Director
SK - Shri Sushil Kumar, Director
DSC - Shri D S Chaskar, Deputy Director
RNS - Dr. R N Sankhua, Deputy Director
AKS - Shri A K Srivastava, Deputy Director

16

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 2008-09, 13 complaints were received and taken up for investigation. Final decision was taken in respect of 26 cases out of which in 4 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	15	14	6
b)	No. of cases added during the year	10	3	-	-
c)	No. of cases disposed of during the year	17	6	1	2
d)	No. of cases pending at the end of the year (a+b+c)	15	12	13	4

Vigilance Awareness Week was observed at CWC headquarters from 3rd to 7th November, 2008.

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.	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 Member (D&R)	Chairman Member
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	Chairman
7.	Committee of Technical Experts for advising on the problems relating to O&M of Bhakra Nangal & Beas Project (Irrigation Wing)	Chairman, CWC	Chairman
8.	Working Group of National Water Board	Chairman, CWC Member (WP&P)	Chairman Vice-Chairman
9.	Indian National Committee on Hydrology (INCOH)	Chairman, CWC	Chairman
10.	Indian National Committee on Irrigation and Drainage (INCID)	Chairman, CWC Member (WP&P)	Chairman Member
11.	Selection Committee for i) JAIN-INCID Sookshma Sinchai Puraskar ii) JAIN-INCID Krishi Sinchai Vikas Puraskar	Chairman, CWC	Chairman
12.	Executive Committee of Betwa River Board	Chairman, CWC Member (WP&P)	Chairman Member
13.	Executive Committee of Bansagar Control Board	Chairman, CWC Member (WP&P)	Chairman Member
14.	Committee of International Commission on large dams, India	Chairman, CWC	**Vice President**
15.	Regulation Committee of Bansagar Reservoir	Chairman, CWC Member (WP&P)	Chairman Vice Chairman

16.	Standing Committee on Education & Training	Chairman, CWC	Chairman
17.	Committee for expediting Environment /Forest clearance of TAC cleared projects	Chairman, CWC	Chairman
18.	Advisory Board of NWA, Pune	Chairman, CWC Member (WP&P)	Chairman Member
19.	Office Council of CWC	Chairman, CWC Member (WP&P) Member (D&R) Member (RM)	Chairman Member Member Member
20.	Joint Panel of ICAR-CWC with the problems relating to optimizing the return from the investment in Irrigation	Chairman, CWC Member (WP&P)	Chairman/ Associate Chairman Member
21.	Joint Group of Experts on Pancheshwar Multipurpose Project	Chairman, CWC Member (RM)	Team Leader Spl. Invitee
22.	Steering Committee for the preparation of Status Report on Water Resources Requirements and its availability for urban areas.	Chairman, CWC Member (RM)	Co-Chairman Member
23.	**Governing Council for Central Soil & Materials Research Station, Pune.**	Chairman, CWC	Member
24.	International Commission on Irrigation & Drainage (ICID)	Chairman, CWC	Vice-President
25.	ICID Working Group on comprehensive approaches to Flood Management (WG-CAFM)	Chairman, CWC	Member
26.	Departmental Council of MoWR	Chairman, CWC	Member
27.	Governing Council for the Central Water and Power Research Station, Pune	Chairman, CWC	Member
28.	National Institute of Hydrology Society	Chairman, CWC Member (D&R)	Member Member
29.	Governing Body of National Institute of Hydrology	Chairman, CWC	Member
30.	Monitoring Committee for the National River Conservation Plan (NRCP)	Chairman, CWC	Member
31.	Steering Committee of National River Conservation Plan (NRCP)	Chairman, CWC	Member
32.	Water Quality Assessment Authority (WQAA)	Chairman, CWC	Member
33.	High Powered Review Board of Brahmaputra Board	Chairman, CWC Member (RM)	Member Permanent Invitee
34.	Board of Governors (BOG) of National Institute of Construction Management and Research (NICMAR)	Chairman, CWC	Member
35.	Indo-Nepal Joint Committee on Water Resources	Chairman, CWC	Member
36.	**Farakka Barrage Control Board**	Chairman, CWC	Member
37.	Sardar Sarovar Construction Advisory Committee	Chairman, CWC Member (WP&P)	Member Invitee
38.	Society of National Water Development Agency	Chairman, CWC Member (D&R) Member (WP&P)	Member Member Member

39.	Governing body of National Water Development Agency	Chairman, CWC Member (D&R) Member (WP&P)	Member Member Member
40.	National Water Board (NWB) of the National Water Resources Council	Chairman, CWC Member (WP&P)	Member Member-Secretary
41.	High Powered Committee (HPC) on Maintenance of Minimum Flow of River Yamuna	Chairman, CWC	Member
42.	Cauvery Monitoring Committee (CMC)	Chairman, CWC	Member
43.	Standing Committee on Water Resources (SC-W) of Planning committee of National Natural Resources Management System (PC-NNRMS) of Planning Commission	Chairman, CWC	Member
44.	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
45.	Ganga Flood Control Board	Chairman, CWC	Invitee
46.	Narmada Control Authority	Chairman, CWC	Invitee
47.	Review Committee of Narmada Control Authority	Chairman, CWC	Invitee
48.	Executive Committee of Betwa River Board	Chairman, CWC	Invitee
49.	Executive Committee of Bansagar Control Board	Chairman, CWC	Invitee
50.	Upper Yamuna River Board	Member (WP&P)	Chairman
51.	National Environmental Monitoring Committee	Member (WP&P)	Chairman
52.	Joint Operation Committee for Rihand Dam	Member (WP&P)	Chairman
53.	Contracts Works Sub-Committee of Betwa River Board	Member (WP&P)	Chairman
54.	Sub-Committee for processing tenders and proposals for purchase of stores & equipments of Bansagar Control Board	Member (WP&P)	Chairman
55.	Sub-Committee of officers to consider the claims of M/s HSCL in Earth Dam- Lot of Rajghat Dam Project	Member (WP&P)	Chairman
56.	Committee for settlement of claims of M/s N.P.C.C. Ltd of Betwa River Board	Member (WP&P)	Chairman
57.	Sub-Committee to examine and process claim cases of contractors of Bansagar Control Board	Member (WP&P)	Chairman
58.	Monitoring committee for non-structural aspects of the proposed Tipaimukh Multipurpose Project	Member (WP&P)	Chairman
59.	Technical Advisory Committee on Socio-Economic, Agro-economic and Environmental Impact studies	Member (WP&P)	Chairman
60.	Screening Committee for selection of arbitrators on Arbitration Boards.	Member (WP&P)	Chairman
61.	Joint regulation committee of Chandil Dam and Galudih Barrage	Member (WP&P)	Chairman
62.	Joint Regulation Committee of Kharkai Dam	Member (WP&P)	Chairman
63.	Sub-Committee on Irrigation, Performance Assessment History, Education, Training,	Member (WP&P)	Chairman

	Research & Development		
64.	Standing Project Appraisal committee of Central Water Commission	Member (WP&P)	Chairman
65.	Water Resources Planning Management and evaluation Sectional Committee-WRD-06 (BIS)	Member (WP&P)	Chairman
66.	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
67.	Task Force for Flood Management in the country (North Western Region)	Member (WP&P)	Chairman
68.	Committee for Cost Sharing of Hathnikund Barrage	Member (WP&P)	Chairman
69.	Sub-Group-1 for Research topics under invited reserved Category	Member (WP&P)	Chairman
70.	Sub-Group-II Rain Water Harvesting	Member (WP&P)	Chairman
71.	Committee for the Re-organised UP/ Uttaranchal States	Member (WP&P)	Chairman
72.	Committee for Re-organised Bihar/ Jharkhand States	Member (WP&P)	Chairman
73.	Upper Yamuna Review committee	Member (WP&P)	Member-Secretary
74.	Working Group of INCID on capacity building	Member (WP&P)	Member
75.	Working Team on Socio-Economic Impacts & Policy Issues (ICID)	Member (WP&P)	Member
76.	Standing Committee for overall National Perspective Water Planning and Coordination in relation to diverse use of water	Member (WP&P)	Member
77.	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
78.	Committee Constituted by Hon`ble Supreme Court of India in matters of WP (Civil) No.725/94. Regarding news item in Hindustan Times on "And quiet flow the Maily Yamuna versus Central Pollution Control Board and others".	Member (WP&P)	Member
79.	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
80.	Committee for Eastern River Waters of Indus System of River	Member (WP&P)	Member
81.	National Watershed Committee	Member (WP&P)	Member
82.	Central Loan Assistance under Accelerated Irrigation Benefits Programme	Member (WP&P)	Member
83.	Steering Committee of Indian National Committee on Hydrology (INCOH)	Member (WP&P)	Permanent Invitee
84.	High Powered Committee-Yamuna Action Plan of Ministry of Environment and Forests	Member (WP&P)	Invitee

85.	Technical Advisory Committee for Flood Control, Drainage and Anti-Sea Erosion Schemes (Goa)	Member (RM)	Chairman
86.	Subernarekha Embankment Committee (Orissa, West Bengal & Bihar)	Member (RM)	Chairman
87.	Working Group to advise WQAA on the minimum flow in the rivers	Member (RM)	Chairman
88.	Setting up of HISMG (Data and Data dissemination) for Implementation of the World Bank assisted Hydrology Project Phase –II.	Member (RM)	Member
89.	Setting up of HISMG (Technical) for Implementation of the World Bank assisted Hydrology Project Phase –II.	Member (RM)	Chairman
90.	Steering Committee for the Preparation of Status Report on Water Resources requirements and its availability for Urban Areas	Member (RM)	Chairman
91.	Coastal Protection and Development Advisory Committee (CPDAC)	Member (RM)	Chairman
92.	National Coastal Zone Management Authority (NCZMA)	Member (RM)	Chairman
93.	Ghaggar Standing Committee	Member (RM)	Chairman
94.	Yamuna Standing Committee	Member (RM)	Chairman
95.	Sahibi Standing Committee	Member (RM)	Chairman
96.	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
97.	Flood Control Board set up by the Irrigation and Flood Control Department of Govt. of NCT of Delhi	Member (RM)	Chairman
98.	Committee for Flood Control Works in Brahmaputra Valley	Member (RM)	Chairman
99.	Standing Committee to Brahmaputra Board	Member (RM)	Chairman
100.	West Bengal State Committee of Engineers	Member (RM)	Chairman
101.	Ganga Flood Control Commission	Member (RM)	Chairman
102.	Kosi High Level Committee	Member (RM)	Chairman
103.	Damodar Valley Reservoir Regulation Committee	Member (RM)	Chairman
104.	WRD 01 Sectional Committee of BIS for Fluid Flow Measurements	Member (RM)	Chairman
105.	WRD-22 River and Diversion Works Sectional Committee	Member (RM)	Chairman
106.	Sub-Committee-III (Flood Management, Drainage and Environment Impacts) of INCID	Member (RM)	Chairman
107.	Joint Group of Experts on Pancheshwar Multi-purpose project	Member (RM)	Special Invitee
108.	Joint Team of Experts (JTE) on Sapta Kosi Project	Member (RM)	Team Leader

109.	Committee for examination of technical issues regarding Baglihar Hydro-Electric projects on the Chenab Main in J&K	Member (RM)	Chairman
110.	TAC to Assam State Brahmaputra Valley Flood Control Board	Member (RM)	Chairman
111.	TAC to Cachar Flood Control Board (Assam)	Member (RM)	Chairman
112.	High Level Committee to Study the Regulation of Releases from various Hydro-Electric Projects Constructed Along Teesta	Member (RM)	Chairman
113.	Committee to study Erosion Problem of Bhutani Diara (West Bengal) and Majauli Island (Assam)	Member (RM)	Chairman
114.	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
115.	Standing Technical Advisory Committee (STAC) to the Governing Council for CSMRS, New Delhi.	Member (D&R)	Chairman
116.	Technical Committee for procurement of Instruments and working models for Instrumentation Centre (IDC)	Member (D&R)	Chairman
117.	Governing Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
118.	General Body of National Institute of Rock Mechanics (NIRM)	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 House	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.	Standing Advisory Committee (SAC) for R&D Pgogramme	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.	Steering Committee of INCOH	Member (D&R)	Chairman
129.	World Meteorological Organization	Member (D&R)	Principal Representative
130.	Board of Directors of Tehri Hydro Development Corporation	Member (D&R)	Part Time Director

131.	Group of Implementation of Hydro-Electric Projects in J&K State	Member (D&R)	Member
132.	Section Committee of Bureau of Indian standards, WRD-15	Member (D&R)	Chairman
133.	Committee to access Quantum on Excess River Water Flowing Across International Boarder and suggest its diversion	Member (D&R)	Chairman
134.	Technical Advisory Committee of the Farakka Barrage Project.	Member (D&R)	Chairman
135.	Technical Co-ordination Committee (TCC) for Tala HE Project, Bhutan.	Member (D&R)	***Co-Chairman***
136.	Board meeting of Tala HE Project Authority (THPA), Bhutan	Member (D&R)	Invitee
137.	Committee of CEA to accord of techno-economic appraisal of Power Schemes.	Member (D&R)	Permanent Special Invitee
138.	NHPC Performance Review Committee	Member (D&R)	Member
139.	Tender Committee of Farakka Barrage Project	Member (D&R)	Chairman
140.	Programme Advisory Committee (PAC) for Fly Ash Unit constituted by Department of Science and Technology	Member (D&R)	Member
141.	Committee to finalize the Action Plan on full utilization of Eastern River flowing across international Boarder	Member (D&R)	Chairman
142.	Committee for monitoring structural aspects of proposed Tipaimukh Multipurpose Projects	Member (D&R)	Chairman
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)	Member (D&R)	Chairman

7.2 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.

37th TAC meeting was held on 12th September, 2008 and the technical aspects of the following reports have been discussed:

(i) Finalisation of Water Balance Studies of NWDA in Consultation with Central Water Commission

(ii) Status of Studies pertaining to the Peninsular Rivers Development Component of NPP

(iii) Feasibility Report of 9 link System of Mahanadi-Godavari-Krishna-Pennar-Cauvery-Vaigai-Gundar Linkage

(iv) Status of Studies pertaining to Himalayan Rivers Development Component of NPP

(v) Pre-feasibility Report of Jogighopa-Tista-Farakka Link Project

(vi) Intra-State link proposals

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 59th meeting of TAC was held on 11.11.2008 at New Delhi.

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 of the Members of TAC. The 30th Meeting of TAC was held on 9th September, 2008 at Pune under the Chairmanship of Chairman, CWC. The Member-Secretary of this committee had informed that various thrust areas have been identified based on which XI plan proposal was framed in consultation with Technical Advisory Committee.

17.2.4 Technical Advisory Committee of Farakka Barrage Project

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

The 104th meeting of TAC of Farakka Barrage Project headed by Chairman, CWC was held on 20th October, 2008 AT New Delhi

17.2.5 Standing Technical Advisory Committee of CSMRS

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

Chairmanship of Member (D&R), CWC to provide an overall perspectives and guidance on technical matters (R&D) and (S&T) to CSMRS. No further meeting was held during 2008-09.

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. The Secretariat of INCH, earlier located at CWC, New Delhi has now been shifted to CWPRS, Pune with effect from September, 2008. During the year 2008-09, 20 research schemes were under implementation, out of which 2 have been completed.

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). During the year intensive discussions were held to develop a strategy for an affective participation by India in IHP VII (2008-13)

The 34th meeting was held on 27.06.2208 at Sewa Bhawan, New Delhi. The 6th R&D Session of INCOH was held w.e.f. 03.12.2008 to 05.12.2008 at Thiruvananthpuram, Kerala

(a) Research sub-Committee (Surface Water) - Two meeting of the Research Sub committee of INCOH are normally held in a year. Director, Hydrology (DSR) is the member of the sub-committee.

(b) Steering Sub-committee –Two meeting of the Steering Sub-committee are held in a year. Member (D&R) is the Chairman and CE (HSO) is the member of the sub committee.

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. the Secretariat of INCID is located in CWC 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:

- From March 2008, CWC has been entrusted the work of managing the Secretariat of INCID. IAD Directorate, CWC has been allocated this work and its Director is nominated as the Member Secretary of INCID.
- The Ministry of Water Resources through INCID is funding 34 research projects of various research institutes in the field of agriculture and irrigation during financial year 2008-09. Appraisal and monitoring of the schemes has been carried out.
- INCID is going to host the 60th International Executive Council (IEC) meeting of ICID meetings of ICID.

  The 5th Asian Regional Conference (ARC) will be held at New Delhi during December 2009. First Information Bulletin in this regard has been issued.

Two Sub-groups and one Working Group were also constituted under invited research category. During the year 2008-09 no meeting of Sub-Committee/Sub-group were held due to the winding up of the previous secretariat set up and restructuring of the new set up of INCID Secretariat.

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. 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. 60th brainstorming session of the New Delhi Centre of WWC held on 30th Jan 2009 under the chairmanship of Mr. M. Gopalkrishnan.

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.
Irrigation Planning (S) Directorate is the nodal unit for ICID.

- Committees/Working Groups under ICID

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

Sl. No.	Name of the Committee	Member
1.	Permanent Committee on Strategy Planning and Organisational Affairs (PCSPOA)	Chairman, CWC & INCID
2.	Permanent Committee for Technical Activities (PCTA)	Chairman, CWC & INCID
3.	Working Group on Comprehensive Approaches to Flood Management (WG-CAFM)	Chairman, CWC & INCID
4.	Working Group on Capacity Building, Training and education (WG-CBTE)	Chairman, CWC & INCID
5.	Committee on Public Relations and publications	Member, WP&P, CWC
6.	Working Group on History of Irrigation, Drainage and Flood Control (WG-HIST)	Chief Engineer, (POMIO),CWC

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 appraised.

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 in January, 2007. The second meeting of the newly constituted eighth panel was held on 14th August, 2008.

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.

(a) In the current year 11 draft standards and 8 amendments to IS Codes have been approved by the Chairman for adoption and printing.

(b) 11th Meeting of WRD – *05 "Geological Investigation and Sub-Surface Exploration"* was attended by Dy. Director.

(c) Bureau of Indian Standards (BIS) is preparing a Safety Code for Construction, Operation and Maintenance of River Valley Projects: Dam Safety. The basic document for the same has since been prepared by DSR Dte. of CWC. The BIS wanted elaboration of the clauses pertaining to Seismic studies, Hydrology, Documentation and Emergency Plan (Clauses 4, 5, 6 & 7) in the document. The above clauses of the draft code have been examined in relevant Directorates of DSO and comments/suggestions received have been compiled and forwarded to BIS for incorporating in the above code. Director, DSR, CWC attended the seventh meeting of the Safety in Construction, Operation and Maintenance of River Valley Projects Sectional Committee, WRD-21 held on Tuesday 21st October 2008 at Manak Bhawan, Bureau of Indian Standards, New Delhi.

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

The Ministry of Water Resources constituted an Advisory Council on Artificial recharge of Ground Water under the chairmanship of Prof. Saifuddin Soz, Hon'ble Minister of Water Resources. The first meeting of the Council was held on 22nd July, 2006 at Vigyan Bhavan, New Delhi and was inaugurated by Dr. Manmohan Singh, Hon'ble Prime Minister of India. In his inaugural address the Hon'ble 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". Chief Engineer (IMO) was Member Secretary of the sub-committee. The sub-committee held two meetings on 09.09.06 and 29.09.06 and submitted its report to MOWR on 2.10.06.

The report has inter-alia recommended implementation of 5000 Farmer's Participatory Action Research Programme through out the country. In order to implement the recommendations of the Sub-Committee, a Project Steering Committee was constituted by MoWR in December 2006 which in turn constituted a Project Implementation Team with Secretariat in CWC. The PIT has identified 60 institutions to carry out 5000 demonstrations. The Ministry has released 1st instalment of 70% of the funds to the tune of Rs. 1712.805 Lakhs to start the programme. The programme started from Rabi season 2007-08. During Rabi crop season 2007-08, 980 demonstrations were completed. During Kharif crop season 2008, 1801 demonstrations were completed. Thus 3306 demonstrations (about 55% of 5000) have been completed by the end of current Kharif season 2008. During Rabi crop season 2008-09, 1503 demonstrations were completed. It is expected that 5000 demonstrations would be completed by the end of year 2009.

18

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 13,400 number composed pages and 77,800 numbers of copies of various publications/forms were printed during the year. The press also carried out binding/trimming works for publications and reports etc.

The publications/reports/ Journals/ Pamphlets/ folders printed and brought out during the year 2008-09 are given below:

Sl. No.	Name of Publication/Job	Nodal Agency
1	2	3
1.	Guidelines for preparation of Detailed Project Report of Irrigation & Multipurpose Projects 1980	T.D. Dte.
2.	CPWD Works Manual 2003	PCP Dte.
3.	Report of EFC Memo 04 Flood Forecasting	FMP Dte.
4.	Report of Rehabilitation and resettlement of the Ministry of Rural Development	NCD Dte.
5.	Report of Back Water level at Sardar Sarover	-do-
6.	Design Memorandum of Drainage system at RDA No. 124385	NCD Dte.
7.	Indira Sagar Project (M.P.) Main Canal Design Drainage of Culvert at 11982 M	Narmda Canal Design Dte.
8.	Design Memorandum on Drainage system at RD 118644 M	-do-
9.	Design Memorandum on Drainage system at RD 116321 M	-do-
10.	Indira Sagar Project (M.P.) Main Canal Design of Drainage system at RD 11248 M	-do-
11.	Design Memorandum on Design Drainage System at RD 111141 M	-do-
12.	Design Memorandum on Design Drainage System at RD 11114 M	-do-
13.	Guidelines for preparing the comments	-do-
14.	Book "Design of small Dams"	NCD Dte.
15.	Book of Power available to CWC Officers	NCD Dte.
16.	Technical specifications with Chart	NHPD Dte.
17.	River Behaviour Management and Training	FMP Dte.
18.	Back water Report March 1989 Indira Sagar Project (M.P.)	HDC Dte.
19.	Report of Back Water Studies for Indira Sagar (M.P)	-do-
20.	Final Report of the Task Force for Flood Management/Erosion Control	FMP Dte.
21.	CPWD Works Manual	PCP Dte.

22.	CPWD Works Manual	-do-
23.	Annual Report of M/o Water Resources 2007-08 (English)	GA Section MOWR
24.	Design Memorandum on Design Feature of Upper Narmda Project & Earth Dam	ND &HW (Design) Dte. West Block 2
25.	Microsoft Internet Security and Acceleration Server 2004	SMD Dte.
26.	IS-4,5,6-2000 Code Indian Standard Plain and Reinforced Concrete Code of Practice	NCD Dte.
27.	Final Report of Task Force for Flood Management/Erosion Control	FM&P Dte.
28.	Working Group Report on Guidelines for preparation of Detailed Project Reports of Irrigation & Multipurpose project (Draft)	P&P (N&S) Dte.
29.	Term of Reference (TOR) for Conducting Water use Efficiency Studies of the Irrigation Project	IPO Dte.
30.	Design Memorandum on Features of Upper Narmda Project Part-II Masonry Dam of Upper Narmda Project	Narmda Dam & Head Works (D) Dte.
31.	Guidelines for Estimating Irrigation Water Requirement	Irrigation Planning (South Dte.)
32.	Recommendation for the Design Manufacturing Erection of Steel Penstock of Welded Construction for Hydro-Electric installation	HCD E&NE Dte., CWC
33.	Working Group Report on Guidelines for preparation of Detailed Project Irrigation & Multipurpose Projects (Drafts)	P&P (N&S) Dte.
34.	Applied Hydrology	HSO Dte.
35.	Technical Specification of Karnataka Barrage	Gates Design (NW&S) Dte.
36.	Annual Report of MOWR for 2007-08 (Hindi)	GA Section, MOWR
37.	Manual of Design fabrication Erection & Maintenance of steel Project	HCD Dte. NW&S
38.	Standard Plan for Highway Bridges	NCD Dte.
39.	Report of the Narmda Water Disputes Tribunal Volume-II	Narmda Canal Design Dte.
40.	-do-Volume –III	-do-
41.	-do- Volume –IV	-do-
42.	Compendium on Silting of Reservoir in India	Narmda Canal Design Dte.
43.	Podiumsim for India –A Report	NWP Dte.
44.	Report of the Sub –Group –I (One) on Irrigation Development	PCP Dte.
45.	Users Guide	HCD Dte.
46.	43rd Departmental Examination for Engineering Officers of CWC	MOWR
47.	Criteria for Hydraulic Design of Bucket (Eng.) Dissipaters	SSPH Dte.
48.	Booklet : Drip Irrigation	-do-
49.	Booklet : Sprinkler System of Irrigation	-do-
50.	Pamphlet : National Water Policy (English/Hindi)	
51.	Pamphlet : Water for All (English)	-do-
52.	Pamphlet : Water for All (Hindi)	-do-

53.	CWC Mission Statement	-do-
54.	Report of Damanganga Link project	Emb.(NW&S) Dte.
55.	Report on Back Water Studies for Indira Sagar Project	NCD Dte.
56.	Penh Valley Water Supply of Design Mudyama Nallah	Emb.(NW&S) Dte.
57.	Technical Specification and Schedule for Karro Barrage project	Gate Design Dte.
58.	Bhagirath Hindi April-June 2007	Bhagirath Hindi
59.	Bhagirath (English) Jan-March 2007	Bhag. English & publicity
60.	Bhag. Hindi July-Sep 2007 (Rajbhasha Visheshank)	Bhagirath Hindi
61.	National Water Development Agency Report	Emb. Hindi
62.	Bhag. Hindi Oct- Dec2007	Bhag. Hindi
63.	Preliminary consolidated Report on effect of Climate change on water Resources	P&D Dte.
64.	General Guidelines for assessing water use efficiency of Major & Medium Irrigation Projects	IPO Dte.

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 2008-09, important 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 was also published during the year 2008-2009 bilingually.

18.4 AZO Prints

Nearly 5450 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 prepared. 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.

T.D. Directorate is coordinating the works of Information, Education & Communication (EIC) activities of MOWR.

18.6 Media Plan 2008-2009 of MoWR

As per Media Plan 2008-09 of Ministry of Water Resources, CWC participated in the following exhibitions along with other departments of MoWR.

- IITF'2008: IITF 2008 at Pragati Maidan, New Delhi from 14.11.2008 to 27.11.2008.
- Asom International Trade fair 2009 at Guwahati, Assam from 04.02.2009 to 16.02.2009.
- 9th Water Asia 2009 at Pragati Maidan New Delhi from 10.12.2008 to 12.12.2008.
- All India expo Tata Nagar , Jamshedpur, from 04.02.2009 to 08.02.2009.
- National Seminar and exhibition on Climate change: Challenges and Mitigation at Kolakata from 27.02.2009 to 28.02.2009.
- Thrissur Pooram: Exhibition' 2008 at Thrissur (Kerala) from 26th March to 26th May2008

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 during the year 2008-09, which include students, professionals and people from all walks of life.