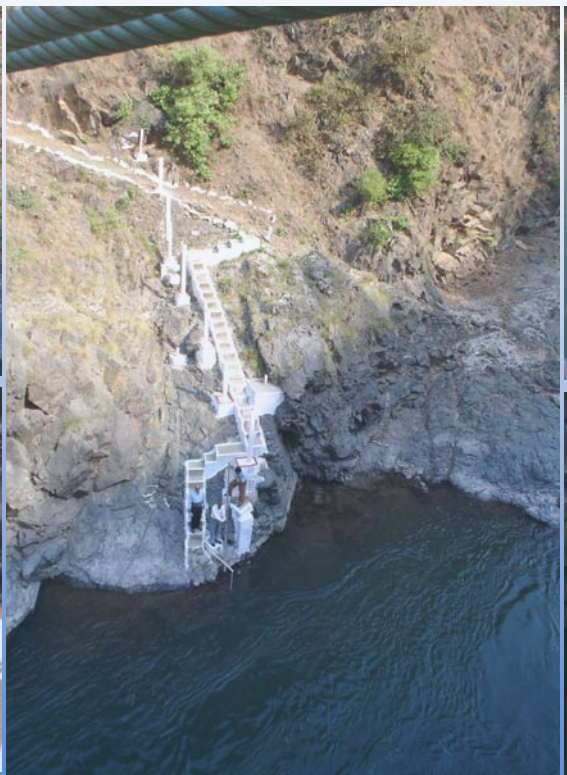
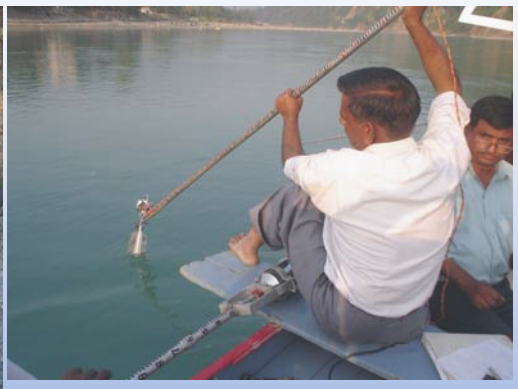
CENTRAL WATER COMMISSION

Annual Report 2010 - 11





Government of India

Ministry of Water Resources

CENTRAL WATER COMMISSION

Annual Report
2010 - 11

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 2011	1210.19 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 (2008)	3674.43 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	195.8 M ha
•	Net Sown Area	140.9 M ha
•	Gross Irrigated Area	87.3 M ha
•	Net Irrigated Area	62.3 M ha

HYDROPOWER

•	Ultimate Hydropower Potential (As per reassessment)	84044 MW at 60% L.F.
•	Potential Developed by 31st March, 2011	38100 MW (total capacity)

ANNUAL REPORT

2010 - 11

CENTRAL WATER COMMISSION

From Chairman's Desk

It is our pleasure to bring out this Annual Report of the Central Water Commission (CWC) for the year 2010–11. 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 2010-11. Officers of CWC headed several committees and contributed substantially on various issues. CWC provided technical assistance to the Ministry on various issues related to sharing of waters with neighbouring Countries and bilateral treaties and MoUs. 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 91 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 53 Major, 21 Medium and 8 ERM Projects and CAD works of 136 projects.
- Examination of proposals for Major and Medium Irrigation Projects for release of Rs. 4910.478 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 7368 flood forecasts (with 98.14 % accuracy) during the monsoon period of 2010 to help effective flood management.

(A K BAJAJ)
CHAIRMAN

HIGHLIGHTS OF THE YEAR 2010 -11

❖ DESIGNS

- Design units of CWC undertook detailed designs and drawings of various types of hydraulic structures for 91 water resources development projects.

❖ 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 2010, 7508 flood forecasts were issued out of which 7368 (98.14 %) were within prescribed limits of accuracy. Daily flood bulletins and weekly flood news letters were issued during the flood season. 107 Red Bulletins (for Unprecedented Flood Situation) and 105 Orange Bulletins (for High Flood Situation) were issued.
- Completed installation of satellite based telemetry system at 168 stations upto March, 2011 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.
- 27 Flood Management Schemes/Master Plans for Flood Control were examined/ appraised during the year 2010-11.
- Processed 110 flood management schemes for release of funds to Government of J&K, Goa, Punjab and Orissa during 2010-11 under "Flood Management Programme".

❖ WATER PLANNING

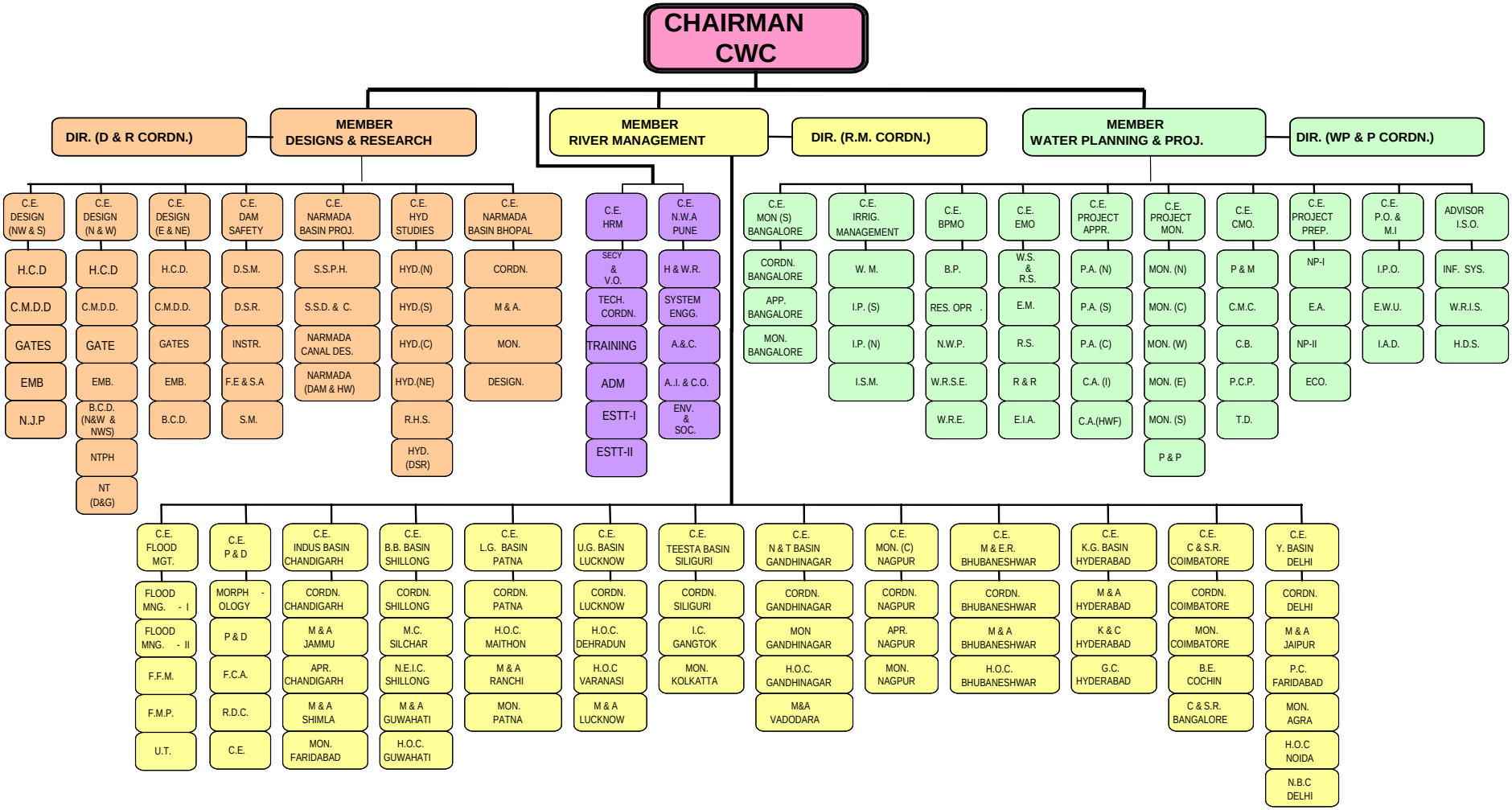
- 44 new major irrigation projects, 24 revised major irrigation projects, 45 new medium irrigation projects and 6 revised medium irrigation projects were under appraisal in CWC. 75 projects comprising 29 major, 19 medium irrigation projects and 27 flood control projects were accepted for investment clearance 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 ` 4910.478 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 37 training programmes including Workshop/Seminar for 954 officers of Central / State Governments and Public sector undertakings.

C O N T E N T S

Organogram of Central Water Commission 2010 – 11



CHAPTER-I

AN OVERVIEW

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 2010-11 were:

1.	**Chairman**, CWC	:	Shri A.K.Bajaj
2.	**Member** (D&R)	:	Shri A.K. Ganju (19.06.2009 to 07.05.2010) Shri V.K.Jyothi (07.05.2010 to 30.06.2010) Shri A.K. Ganju (01.07.2010 to 31.01.2011) Shri S.P. Kakran (31.01.2011 A.N. to till date)
3.	**Member** (WP&P)	:	Shri Indra Raj (19.06.2009 AN to 30.06.2010) Shri R.C. Jha* (01.07.2010 to 27.01.2011) Shri A.D.Bhardwaj (28.01.2011 to 31.01.2011) Shri M.E.Haque (01.02.2011 to till date)
4.	**Member** (RM)	:	Shri R C Jha

* Additional Charge (Current Duties)

1.3 BROAD FUNCTIONS

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

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

- To carry out Techno-economic appraisal of Irrigation, flood control & multipurpose projects proposed by the State Governments.
- To collect, compile, publish and analyse the hydrological and hydro-meteorological data relating to major rivers in the country, consisting of rainfall, runoff and temperature, 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.
- 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 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 and erosion control, anti-water logging measures, drainage and drinking water supply;
- To undertake construction work of any river valley development scheme on behalf of the Government of India or State Government concerned;
- To advise and assist, when so required, the State Governments (Commissions, Corporations or Boards that are set up) in the investigation, surveys and preparation of river valley and power development schemes for particular areas and regions;
- To advise the Government of India in respect of Water Resources Development, regarding rights and disputes between different States which affect any scheme for the conservation and utilization and any matter that may be referred to the Commission in connection with river valley development;
- To impart training to in-service engineers from Central and State Organizations in various aspects of water resource development;
- 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, flood forecasting and development of related computer software;
- To conduct studies on dam safety aspects for the existing dams and standardize related instrumentation for dam safety measures;

- To carry out morphological studies to assess 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 organizations, each headed by a Chief Engineer at CWC headquarters, New Delhi. Out of which, nine organizations are under WP&P wing, six organizations are under D&R wing and two organizations 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 organizations 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 Important Schemes and Programmes

Accelerated Irrigation Benefits Programme

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 165 ongoing projects under AIBP which are getting grant and are being monitored by CWC.

A grant of ` 4910.478 crore has been released to 77 Major & Medium Irrigation Projects under AIBP during 2010-11 till 31.03.2011. The cumulative total Central Loan Assistance / Grant provided to States is ` 40944.992 under AIBP since its inception of the programme till 31.03.2011to 287 projects. As reported by the State Govts. 6.325

million hectare of additional irrigation potential has been created under AIBP since the start of the scheme till March, 2011.

Flood Management Programme

The Government of India approved in principle in November, 2007 "Flood Management Programme", a State Sector scheme under Central Plan, to provide Central assistance amounting to ` 8000 crore to States during XI plan for taking up flood control, river management, drainage development, flood proofing and anti-sea erosion works. The appraisal of schemes for the States for other than Ganga Basin and appraisal of all schemes for drainage development and anti-sea erosion works is done by CWC. Under "Flood Management Programme" the 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. The works under this scheme are 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 schemes are being monitored by Central Water Commission (CWC), Ganga Flood Control Commission (GFCC) and Brahmaputra Board, in their respective jurisdiction.

Development of Water Resources Information System (WRIS)

CWC & ISRO has jointly undertaken the work of development of Water Resources Information System (WRIS) of the country during 11th Plan. The estimated cost of the project is 78.3164 crores for which the approval from MOWR has been received & MOU has been signed between the two parties in Dec' 2008 with 4 years time as the completion period. The First full version of website of INDIA WARIS has been launched on 7th December, 2010 in New Delhi by Hon'ble Minister of Water Resources. The URL of the website is www.india-wris.nrsc.gov.in/webgis.php# can be seen for more details. Further, the development of Information System is under progress and is to be completed by end of year 2012.

Farmers Participatory Action Research Programme (FPARP)

The Ministry of Water Resources, Government of India took up Farmers Participatory Action research Programme (FPARP) throughout the country with the help of

Agricultural Universities, ICAR research institutes, ICRISAT, WALMIs, and NGOs for demonstrating that it is now possible to increase the yield and income per drop of water through combination of water, variety and agronomic practices.

After successful implementation of first phase and considering the overall benefit of the programme in terms of water saving, increase in yield leading to more crop per drop of water etc., MoWR has decided to take up 2nd Phase of programme 5,000 demonstrations at a cost of ` 25 crore during remaining period of XIth Five Year Plan i.e. year 2010-11 & 2011-12 are contemplated. The programme is being monitored by the Regional Offices of CGWB and CWC. In general, the demonstrations show the saving of water between 10 to 30% yield improvement of between 10 to 40% depending upon crop, location, technology adopted etc.

National Projects

Central Govt. has declared 14 water resources projects indicated in Table 7.1 as National Projects. For these projects, 90% project cost of irrigation, drinking water component is to be provided as Central Grant.

The Union Cabinet in its meeting held on 7th Feb. 2008, constituted a "High Powered Steering Committee for Implementation of the Proposals of National Projects" with the Secretary (WR) as Chairman and Chief Engineer (PPO), CWC as Member-Secretary with the terms of reference as under:

i. To recommend implementation strategies for National Projects
ii. To monitor implementation of National Projects
iii. To examine the proposal (if any) for inclusion of new projects as National Projects and make appropriate recommendation to the Government.

During 2010-11, Central assistance of ` 1412.94 Cr. (` 635.28 Cr.+ ` 777.66 Cr.) for Gosikhurd Project, ` 81.00 Cr. for Teesta Barrage Project and ` 15.236 Cr. for Shahpurkandi Project were released. A potential of 719.00 ha. was created upto November, 2010 from Gosikhurd Project during 2010-11.

Consultancy Services

The Designs & Research Wing and the investigation circles of CWC have been providing consultancy to Central Departments, State Governments and Public Sector

Organizations in planning, surveys & investigation and design of river valley projects in India and abroad.

Modernization and Renovation works in CWC HQ

Modernization and Renovation works of Sewa Bhawan/ West Block-I & II were entrusted to CPWD which includes some Departmental works. Renovation of various toilets of West Block-I & II and installation of DG set (power back up at Sewa Bhawan) by CPWD are at advance stage of completion. 9th floor works of Sewa Bhawan are at finishing stage and south wing of 9th floor have been completed.

Besides above mentioned activities, CWC officers at the level of Chief Engineer are also handling additional responsibilities of Vice Chairman, Brahmaputra Board, Executive Member, Narmada Control Authority (NCA), Member (Civil, Power and E&R) of NCA, and Chief Engineer Brahmaputra River Board in addition to their work in CWC.

1.7 Implementation of Biometric Based Attendance Monitoring System (BBAMS) at Central Water Commission (HQ)

With a view to improve efficiency in monitoring the attendance, leave records and over all working environment, Biometric Based Attendance Monitoring System (BBAMS) has been introduced w.e.f 30.12.2010 in Central Water Commission.

Adequate number of machines have been installed to avoid long queue and inconvenience during office opening time on each floor of Sewa Bhawan, New Library Building, West Block-I & II and Data Centre, CSMRS Building machines are installed for marking the attence by officers and members of staff. One individual smart card has been issued to all officers/staff of CWC.

CC TV cameras have also been installed in the buildings for surveillance and security purpose.

All the officials of CWC are able to mark their attendance in any of the machines. BBAMS is working satisfactorily since its installation and is being monitored regularly.

1.8 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. It is one of the module on internet portal (SANGAM) having data base of nearly 26000 publications. It has collection of over ` 1.25 lakh books and ` 3.50 lakh journals/bulletins/newsletters/ reports etc. and growing every year with more and more additions of books/journals and other publications.

The library is regularly subscribing of journals and other publications, Indian as well as foreign, for the past many years and is also receiving nearly hundred numbers of technical and non-technical journals/bulletins/newsletters/publications from various government, non-government, educational institutes and societies on complementary basis during 2010-11. The Library is also engaged in the procurement of books/publications requisitioned by other directorates of CWC for their mini libraries.

The Library has been shifted to newly constructed three storied library building in the month of March, 2008 and functioning properly from there. 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.

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. 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 organized at Central Water Commission headquarter, in which 51 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. For the effective implementation of the official language policy and to create awareness about Raj Bhasha, Hindi Fortnight was organized from 14th to 29th September, 2010. Various competitions like Hindi noting /drafting, competeion on the knowledge of the Administrative and Technical Glossary, Kavya Spardha were organized and winners were awarded cash prizes and certificates. Raj Bhasha Shields for the year 2008-09 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-I, Lucknow, Tapi Division, Surat, Gujarat, Krishna & Godavari Organization, Hyderabad and Establishment-IX Section. Plant and Machinery Directorate within the Commission for doing their maximum work in Hindi during the year. Letter received in Hindi are invariably replied in Hindi.

5. Apart from translation of documents falling under section 3(3) of the Official Language Act, the Annual Report of the Central Water Commission, 2008-09

and other urgent translation material received form MoWR were translated into Hindi.

1.10 Personnel Management

The staff strength of CWC in position as on 31.3.2011 was 3003 as against the sanctioned posts of 4901. Summary of sanctioned and filled posts in different groups is given in Table 1.1.

Table 1.1

Group-Wise Details of Posts Sanctioned and Filled

Sl. No.	Category	Sanctioned	Filled
1	Group "A"	766	479
2	Group "B"	2297	1420
3	Group "C"	1838	1104
	Total	**4901**	**3003**

Note *All the Group D posts of CWC on upgradation as Group "C" (with grade pay of ` 1800/-) have been merged and redesignated as 'Skilled Work Assistant' as per accepted recommendation of VIth CPC in r/o Group "D". Therefore the figure of Group "D" staff is included in figure of Group "C" staff above.*

1.11 Reservation for SC, ST & OBC

The representation of SC, ST & OBC officials in different grades is given in Table 1.2.

Table 1.2

Representation of SC & ST Officials in Different Grades

(As on 1-01-2011)

Category	No. of Filled posts	No. of SCs	No. of STs	No. of OBCs
Group A	479	59	34	48
Group B	1420	199	23	33
Group C	1104	241	97	38
Total	**3003**	**499**	**154**	**119**

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 other cadres cadre controlled by Deptt. of Economic Affairs & Deptt. of Statistics.*

1.12 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 31.03.2011 is given in Table 1.3. Efforts are being made to fill up the backlog vacancies.

Table 1.3

Number of Disabled Persons in Position

(As on 31.03.2011)

GROUP	OH	VH	HH	TOTAL
'A'	4	0	0	4
'B'	12	0	1	13
'C'	2	5	2	9
Total	**18**	**5**	**3**	**26**

OH – Orthopaedic Handicapped **VH** – Visually Handicapped
HH – Hearing Handicapped
Group D employees converted to Group C as per 6th pay recommendation.

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 other cadres controlled by Deptt. of Economic Affairs & Deptt. of Statistics.*

1.13 Welfare Measures and Incentives

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

1.13.1 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 ` 15,000/-
- Long Term Relief upto ` 10,000/- payable in ten monthly installments.

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 ` 10/- (ten) per month. During the year 2010 - 11 there were seven cases of immediate relief approved by the Governing Body of the Benevolent Fund.

1.13.2 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 ` 1,50,000/- and emergency loan of ` 10,000/-, recoverable in 60 and 10 monthly installments 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 for best cooperative society of Delhi.

1.13.3 Sports and Cultural Activities

Shri Narottam Singh Rawat, Hindi Translator, CWC represented India as Trainer in the XIX Commonwealth Games, 2010 held at New Delhi and contributed to the stupendous performance of Indian Boxing Team. Mr. Rawat also extended logistic support to Indian contingent being a Technical Officer (Sports Services Coordinator) in the Commonwealth Games.

He led Delhi State Boxing team in prestigious Men Federation Cup held at GOA which won 1 Gold, 1 Silver & 1 Bronze Medal. He also coached Delhi Team in 34th National Games at Jharkhand (2 Silver and 2 Bronze Medals) and State Youth Men Team which stood 4th in the National Championships with 1 Gold and 3 Bronze medals. Mr. Rawat's achievements in Indian Boxing have been duly recognized by Indian Boxing Federation by appointing him the Chairman, Referee/Judge Commission of India (Boxing) in February, 2011.

Shri Ashwani Kumar, Assistant, CWC brought accolades to CWC by winning 2 Bronze Medals at National Level in 200 mtr. & 4x100 relay race in the 32nd National Master Athletics Championship, 2011 held at Chandigarh.

S/Sh. Ashwani Kumar,Asst., Devender Kumar, MTS, Vijayalakshmi S, PA, Kamlesh Gauba, Asst., R. Laxmi Ganguly, PS, Indersh Kumar, PPS, Arvind Pandey, PS, P.K. Rawat, AD-II, S. Das Gupta, SO and Y.I. Singh, UDC has also brought medals in athletics, badminton, swimming & table tennis at Delhi State/ Inter Ministry level.

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

CHAPTER-II

WATER RESOURCE 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, March, 2009.

In order to appropriately address the present and future water demand and food grain requirements of the society, the 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 41.637 m ha. till the end of X Plan. The target for Eleventh Plan is to achieve an additional irrigation potential of 13.707 m ha. in the MMI sector. The cumulative figures of potential created in the successive plan periods are given in Figure 2.1

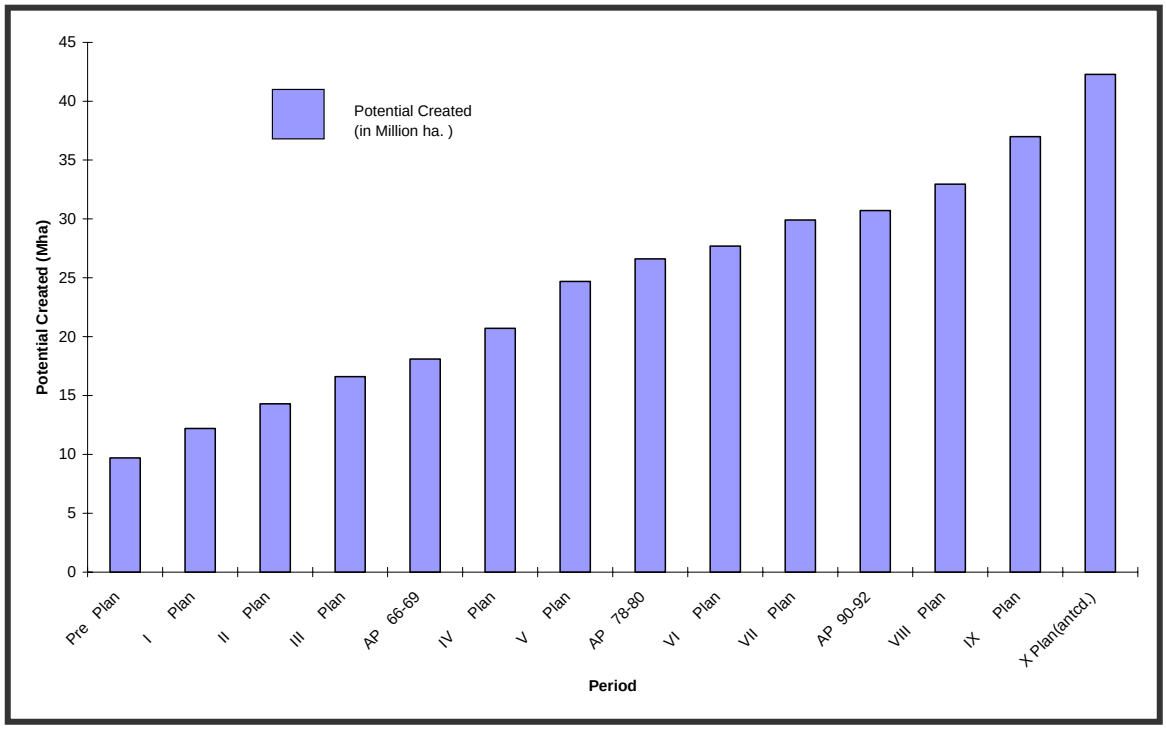


Fig 2.1 - Growth of Irrigation Potential Created During Pre-Plan and Plan Period (Cumulative) (Major and Medium Irrigation Sector)

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, 813 medium and 120 ERM projects have been reportedly completed by end of X Plan (As on 31-03-2008) as given below in Table 2.1. The cumulative irrigation potential created till the end of X Plan is 41.637 m ha. and target kept for XI Plan is 13.707 m ha. State wise cumulative potential created through major and medium projects upto end of IX Plan and 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 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	813	956	273
ERM	-	215	215	-	120	120	98
Total	**217**	**1670**	**1887**	**217**	**1119**	**1336**	**553***

*** Out of these, 82 Projects (10 major, 41 minor, 31 ERM) have been reportedly completed by March, 2010.**

Source: Planning Commission

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	3600.21
2	Arunachal Pradesh	0.00	0.00	1.2	1.20
3	Assam	970.00	243.92	68.98	302.69
4	Bihar	5223.50	2680.00	279	2879.00
5	Chattisgarh	1146.93	922.50	888.18	1810.68
6	Goa	62.00	21.17	16.48	33.75
7	Gujarat	3000.00	1430.37	788.13	2230.50
8	Haryana	3000.00	2099.49	91.87	2193.70
9	Himachal Pradesh	50.00	13.35	2.1	15.45
10	Jammu & Kashmir	250.00	179.69	23.61	203.30

11	Jharkhand	1276.50	354.47	249.5	1137.00
12	Karnataka	2500.00	2121.12	6.63	2127.75
13	Kerala	1000.00	609.49	480.98	1090.47
14	Madhya Pradesh	4853.07	1386.90	65.00	1451.90
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	1.00	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	41637.86

Source: Planning Commission

Table 2.3

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

Period	Outlay/ Expenditure (` Crore)	Cumulative Expenditure (` 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	4.59	41.64	33.74

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.

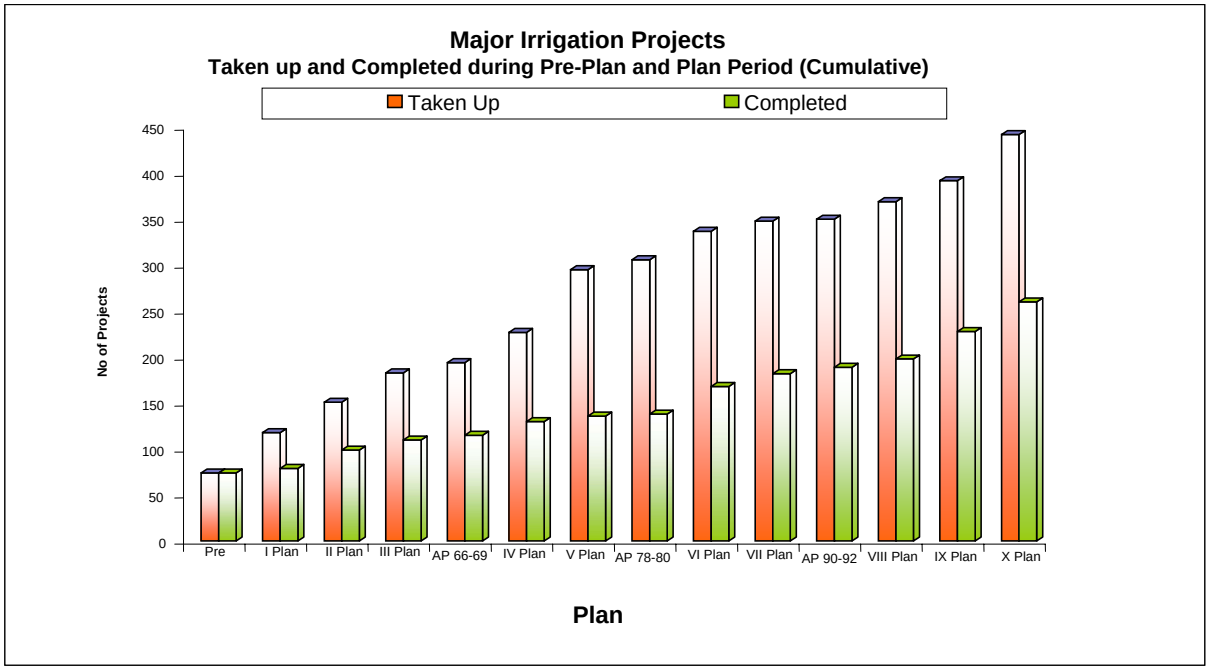


Fig 2.2 Major Irrigation projects taken up and completed during pre-plan and plan period (Cumulative)

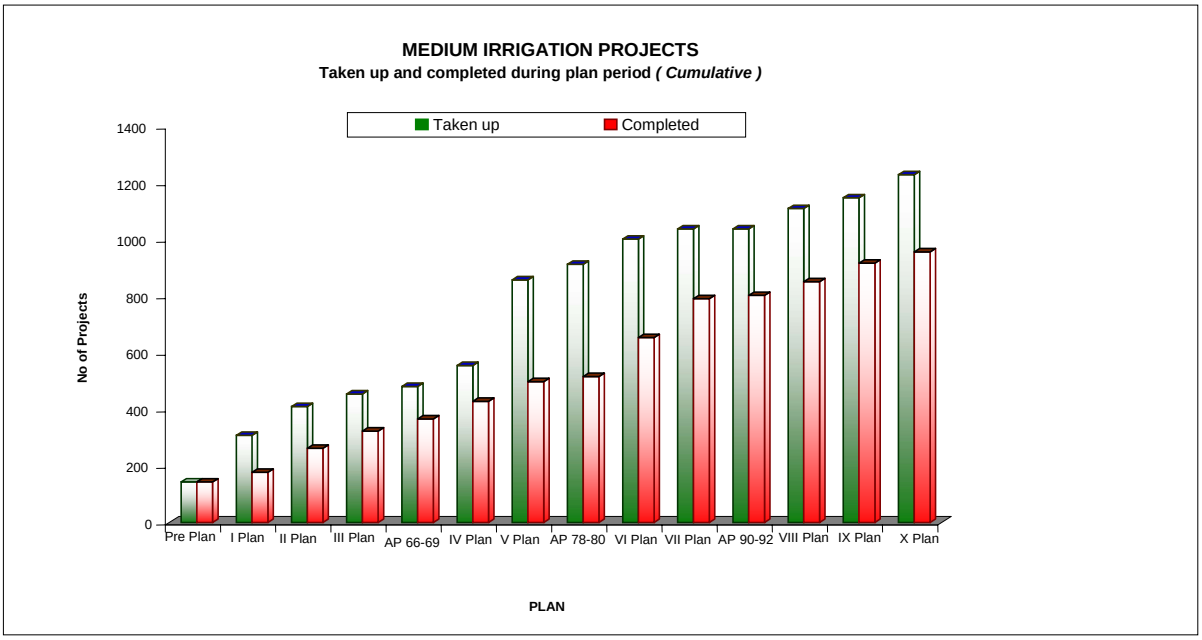


Fig 2.3 Medium Irrigation projects taken up and completed during pre-plan and plan period (Cumulative)

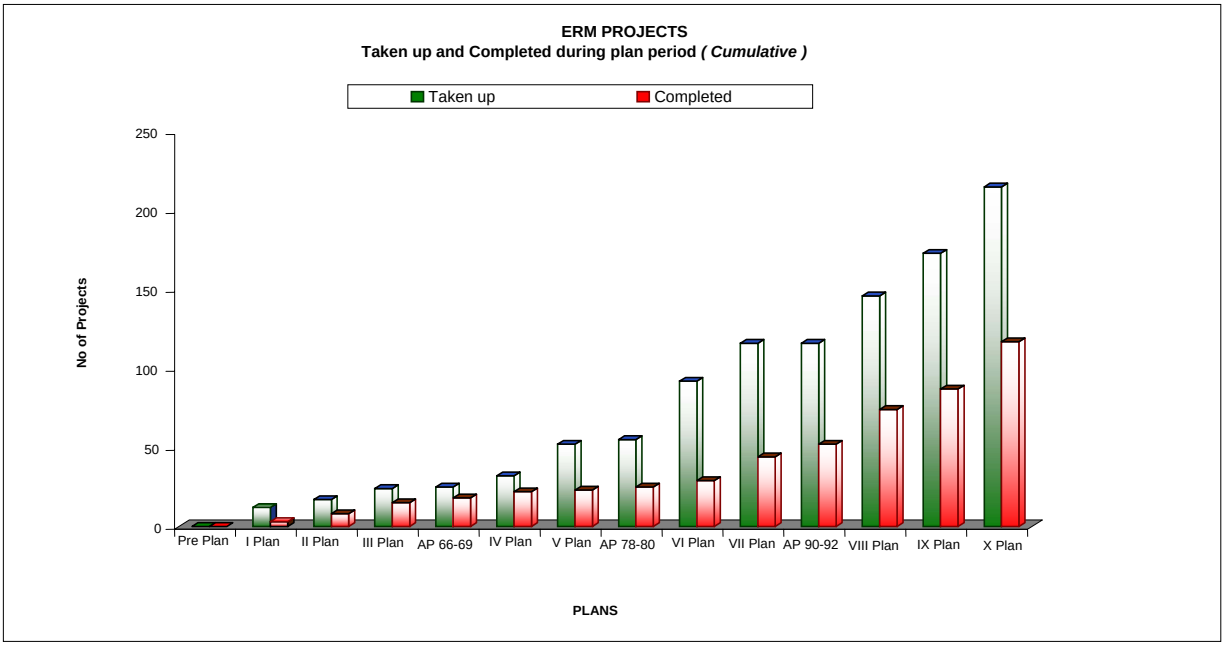


Fig 2.4 Modernisation of ERM Projects taken up and Completed during pre-plan and plan period (Cumulative)

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.

CHAPTER-III

RIVER MANAGEMENT

3.1 Systematic Collection and Compilation 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

S. No.	Name of Basin	No. of Sites
1.	Brahmani-Baitarni Basin	15
2.	Cauvery Basin	34
3.	East Flowing rivers between Mahanadi and Pennar	13
4.	East Flowing rivers between Pennar and Kanyakumari	19
5.	Ganga/Brahmaputra/Meghna/Barak Basin	440
6.	Godavari Basin	75
7.	Indus Basin	24
8.	Krishna Basin	53
9.	Mahanadi Basin	39
10.	Mahi Basin	13
11.	Narmada Basin	28
12.	Pennar Basin	8
13.	Sabarmati Basin	13
14.	Subernarekha Basin	12
15.	Tapi Basin	18
16.	Teesta Basin	11
17.	West Flowing Rivers from Tadri to Kanyakumari	27
18.	West flowing rivers from Tapi to Tadri	21
19.	West flowing rivers of Kutchh and Saurashtra including Luni	15
	TOTAL	**878**

The basic data collected by field units is processed and validated at the Sub-Division, Division and Circle level and the authenticated data in the form of Water Year Books, Sediment Year Books and Water Quality Year Books are published. The dissemination of data to bonafide users is processed as per the request for data received in Regional offices of CWC.

At headquarter level, P&D Organisation is maintaining hydrological data pertaining to all rivers of India. The data is provided to the bonafide users on request following a set procedure and guidelines for release of data by concerned field chief Engineer of CWC. Computerized data is now available for all basins 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.

Five Regional Data Centres were set up at Nagpur, Bhubneshwar, Hyderabad, Gandhinagar and Coimbatore for storage of data under Hydrology Project. At National Surface Water Data Centre, New Delhi, 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 (HP-I) spread over the 9 peninsular States of India with the World Bank Assistance which started in 1996. 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. 9 States and 6 Central agencies participated in HP-I.

Central Water Commission has 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, Phase-II (HP-II), which has been launched after the implementation of HP-I, envisages establishment of Hydrological Information System (HIS) 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 to be executed by 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 CWC is development of Hydrological Design Aids (Surface Water) (HDA (SW)) software.

The estimated cost of the HP-II component of CWC is `2962.98 lakh. Mid-term review of the project was conducted by World Bank and Cost Table has been revised. The revised cost is ` 2964.20 lakh.

I. Institutional Strengthening:

Under this component it is proposed to consolidate the achievement made under HP-I by way of strengthening of capacities through training, up gradation/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, organization and management and getting the software developed indigenously. Up-gradation of the data storage centre software (WISDOM) is also envisaged for making data storage and dissemination more effective.

National Water Academy (NWA), Pune has been entrusted with the responsibility of organizing 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, which includes construction of class room and extension and modernization of hostel etc.

II. Vertical Extension:

Hydrological analysis to determine the water availability and design flood is the first step in formulation of a river valley project. For uniformity in project formulation, it is essential that the CWC, State Design Organisations and other Central Agencies, PSUs and also the private sector, should all adopt standard hydrological design practices. Development of Hydrological Design Aids (HDA) under HP-II is an important step in overcoming the limitations of the current design practices and to standardize these practices for uniform use all over the country.

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 between the Government of India and the World Bank was signed on 19th January, 2006. Status of major activities of CWC under the project is as given under:

- **Development of Hydrological Design Aids (SW):** The work of development of HDA (SW) has already commenced from December, 2009 and is being carried out by Central Water Commission through Consulting Engineers Services (India) Pvt. Ltd. The duration of the study is 37 months. The HDA (SW) has the following three major components.

  1. Assessment of Water Resources Potential - Availability/yield Assessment;
  2. Estimation of Design Flood and

3. Sedimentation Rate Estimation.

- **Construction of NWA Building:** After the administrative approval for the works at NWA, the bid documents for this work were prepared by CPWD. The bids were floated after receipt of "No Objection" from the World Bank. The work was awarded after getting NOC from the World Bank and the construction work has started.

- **Purpose Driven Studies (PDS):** 18 proposals received from the States of Andhra Pradesh, Maharashtra, Orissa, Madhya Pradesh, Gujarat, Kerala, Tamilnadu, Himachal Pradesh as well as from National Institute of Hydrology (NIH) and Bhakra Beas Management Board (BBMB) were examined and cleared by Hydrological Information System Management Group (HISMG-Tech.) and concurrence of World Bank on these proposals was received in June, 2008. Subsequently, two proposals were received from the State of Chhattisgarh and one from the State of Karnataka which were also examined and cleared by HISMG(Tech) in September, 2009. The PDS have been started by the respective agencies and a review of the progress of the PDS was made on 20-21, October 2010.

- **Up-gradation of Hydrological Observation Sites:** Four Acoustic Doppler Current Profilers have been procured and got installed for discharge measurement of river flow. GIS package software has been also procured and installed at National Surface Water Data Centre (NSWDC), CWC, New Delhi and CWC, Hyderabad for various GIS based application in water resources sector.

3.1.2 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. physio-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 Year Book, Status Reports and Bulletins. Water Quality Year books are published and WQ Bulletins are issued regularly. A proposal for strengthening & restructuring of water quality laboratories of CWC is under consideration.

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 Committees (WQRC).

Central Water Commission is providing necessary technical advice and data to Ministry of Environment and Forest for preparation of Ganga River Basin Management Plan.

3.2 Flood Forecasting & Warning Services

Flood forecasting and warning system has been planned parallel to structural measures of flood management, as advance knowledge of incoming floods plays as important role in reducing flood damage and better planning of rescue/relief operations. Flood forecast (Level forecast and Inflow forecast) also helps in optimum regulations (of multipurpose) reservoirs with or without flood cushion.

Flood Forecasting activities in India in a scientific manner made a beginning in 1958 when the erstwhile Central Water and Power Commission (CW & PC) set up a Flood Forecasting Unit (FFU) for issuing advance warning of floods in river Yamuna at the National Capital, Delhi. This service has since been expanded by CWC to cover almost all major flood prone interstate 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 and 15 States, viz., Andhra Pradesh , Assam, Bihar, Chattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Tripura, Uttaranchal, Uttar Pradesh & West Bengal and one Union Territory Dadra & Nagar Haveli and National Capital Territory of Delhi.

On an average, over 6000 forecasts are being issued every year by the 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 more than 700 Gauge and discharge sites and hydro-meteorological data over 500 rain gauge stations and communicated through a network of about 550 wireless stations. Synoptic weather situations, weather forecast/heavy rainfall warnings etc. are also being collected from FMO's (Flood Meteorological Offices of IMD).

3.2.1 Flood Forecasting Performance during 2010

During the flood season 2010 (15th May to 15th Oct.), 7508 flood forecasts were issued which included 6489 level forecasts and 1019 inflow forecasts. Out of total 7508, 7368 forecasts (98.14%) were found within accuracy limit of ± 15% for level forecast & ± 20% for inflow forecast. During the flood season, the real time hourly data of over 250 stations (most of flood forecasting stations and few base stations), hourly gauge and rainfall data of about 100 telemetry stations under KGBO, Hyderabad were collected through web and telemetry data of Chambal Divisions, Jaipur was collected through VSAT which were compiled, analyzed and were used to generate flood report of the regions.

During the flood season of 2010, out of 147 level forecasting stations, unprecedented flood situations, (where the highest flood level attained during the flood season exceeded their respective previous H.F.L.) were witnessed at 7 Flood Forecasting stations.

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 analyzed. This information was 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 Central Control Room at Sewa Bhawan, New Delhi. The vital information was disseminated to National Disaster Management Division (Min. of Home Affairs) on real time basis, 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 2010, 105 nos. of Orange Bulletins for High flood situation were issued twice daily and 107 nos. Red Bulletins for Unprecedented Flood situation issued on 3 hourly basis as per Standard Operating Procedure (SOP) issued by NDMA (MHA). In addition 169 daily flood situation summary (daily bulletins) were issued, which included both level and inflow forecasts information. During Flood season of 2010, flood forecast and bulletins were also transmitted through e-mails and SMS to the concerned user agencies from CWC HQ as well as from each Division.

3.2.3 Communication System of CWC used for Flood Forecasting Purposes

Central Water Commission is operating about 550 wireless stations covering almost all river basins to transmit and receive the data from across the country. Telephone, FAX and E-mail links are also available at all the divisional control rooms and central flood control room. The Central Flood Control Room at Delhi operates on all week days including holidays. Round the clock operation is also made in case of high floods in rivers. The data received in Central Flood Control Room are passed on to various users and disaster management Wing of MHA through Phone/Fax/E-mail/SMS daily.

3.2.4 Modernization of Flood Forecasting Services

The Central Water Commission is making a constant endeavor to upgrade and modernize the forecasting services. The forecasting of flood involves a number of steps: namely, data observation, transmission, compilation and analysis, formulation of forecasts and their dissemination. To make the flood forecasts more accurate, effective and timely, the modernization activities are being taken up on a continuous basis.

During 9th Plan, telemetry system at 55 stations was installed in Chambal and Upper Mahanadi basins for real time data collection and transmission to forecast formulation centers under World Bank aided DSARP scheme. During 10th Plan, telemetry system

at 168 stations has been installed under the scheme "Establishment & Modernization of Flood Forecasting Network in India including Inflow Forecast" in different river basins as per following details:

S. No.	Basin	Telemetry stations
1	Godavari basin	63
2	Krishna basin	41
3	Brahmaputra basin	21
4	Damodar basin	20
5	Yamuna basin	15
6	Mahanadi basin	8

The modeling centers are at Dibrugarh (Assam), New Delhi (UYD), Agra, Hyderabad (LKD & LGD), Kurnool, Bhadrachalam, Guwahati, Asansol and Maithon where the hourly data will be transferred from existing earth stations located at Jaipur (Rajasthan) and Burla (Orissa) through VSAT. During XI plan period, installation of 222 telemetry stations, 1 Earth Station and 10 Modelling Centres are in progress.

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. Up gradation of DOS based MIKE – 11 to latest Window based MIKE – 11 software (12 Nos.) and procurement of Arc view & BD Analyst software has been completed.

3.3 Flood Management Programme

The Government of India approved in principle in November, 2007 "Flood Management Programme", a State Sector scheme under Central Plan, to provide Central assistance amounting to ` 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 are 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 are 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 schemes are being monitored by Central Water Commission (CWC), Ganga Flood Control Commission (GFCC) and Brahmaputra Board, in their respective jurisdiction.

The appraisal of Flood Management schemes in respect of the States other than those in Ganga Basin and all schemes for drainage development and anti-sea erosion works in the country is carried out by CWC. CWC is providing assistance to the Ministry of Water Resources for processing and coordination of cases for release of funds under "Flood Management Programme". Under the above plan scheme following cases were processed in CWC during 2010-11 for the release of central assistance:

Central Assistance to "other than the Ganga basin states" has been released as detailed below:

S.N	State / Number of Schemes	Estimated Cost	Central Share	Central Share Released (` in Lakh)				
				2007-08	2008-09	2009-10	2010-11	Total
	States							
A	Goa (2)	2273.00	1704.75	0.00	181.50	241.00	575.75	998.25
B	Gujarat (1)	794.31	595.73	0.00	0.00	0.00	200.00	200.00
C	Haryana (1)	17375.00	13031.25	0.00	0.00	4691.00	0.00	4691.00
D	Himachal Pradesh (1)	18724.00	16851.60	0.00	0.00	2700.00	7425.00	10125.00
E	Jammu & Kashmir (20)	30616.84	27555.16	675.00	3002.00	4118.39	5809.11	13604.50
F	Kerala (2)	14361.30	10770.98	0.00	0.00	0.00	2242.50	2242.50
G	Orissa (71)	20637.86	15478.40	0.00	4590.00	2586.61	2406.59	9583.20
H	Punjab (4)	14238.00	10678.50	0.00	2151.00	1308.00	0.00	3459.00
I	Tamil Nadu (5)	63554.00	47665.50	0.00	0.00	111.00	5871.00	5982.00
J	Uttar Pradesh (2)	5663.30	2277.21	0.00	0.00	1605.00	572.86	2177.86
	Sub-total -States (109)	188237.61	146609.08	675.00	9924.50	17361.00	25102.81	53063.31
	Union Territories							
K	Puducherry (1)	13967.00	10475.25	0.00	0.00	0.00	750.00	750.00
	Sub-total –UTs (1)	13967.00	10475.25	0.00	0.00	0.00	750.00	750.00
	Total Schemes States + UTs (110)	**202204.61**	**157084.33**	**675.00**	**9924.50**	**17361.00**	**25852.81**	**53813.31**

3.3.1 Flood Plain Zoning

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

Central Water Commission has been continuously impressing upon the States for necessary follow-up action to implement Flood Plain Zoning approach.

The work of 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, communication, vegetation, existing flood control works i.e. embankment, anti erosion works etc.) was initiated and provision has been kept in the plan scheme "Flood Forecasting" for XI plan. The total cost of the work as initiated by Survey of India (SoI) is ` 179.00 lakh as per details given below:

S. No.	Item of Work	Amount (` in lakh)
1	Updating of existing 800 nos. flood plain zoning maps covering the area of 54.740 sq. km. of the State of U.P., Bihar, West Bengal, Punjab, Haryana, Delhi, Assam and J&K	91.00
2	Digitization of 800 nos. above maps @ ` 11,000/- per map	88.00
	Total	**179.00**

3.4 Morphological Studies

The study of river morphology and implementation of suitable river training works 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.

With a view to have a multi disciplinary approach, a '*Standing Committee for Morphological Studies of Indian Rivers*' having members from MoWR, CWC,

Brahmaputra Board, CWPRS, Pune, NIH, Roorkee, NRSC, Hyderabad, Space Application Centre, Ahmedabad, GSI, IWAI & Water Resources/Irrigation Departments of State Government of the concerned basins was constituted by MoWR under the Chairmanship of Member (RM).

During the 11th Plan, morphological studies of seventeen rivers were taken up under the Plan Scheme, 'R&D Programme in Water Sector'. The rivers are Ganga (Allahabad to Buxer), Sharda, Rapti, Yamuna, Brahmaputra, Subansiri, Pagladia, Mahanadi, Kosi, Bagmati, Mahananda, Tapi, Krishna, Tungbhadra, Ghaghara, Sutlej and Gandak. Two main components of the proposed works during 11th Plan are –

i) Morphological study using remote sensing images and other historical information like topo-sheets etc. and preparation of comprehensive report;
ii) Collection of field data like cross-sections of river, discharge and silt data etc. for studies in future.

Out of an outlay of ` 295 crore for the 'R&D Programme in Water Sector' for the 11th Plan, ` 21.18 crore was kept as component for the morphological studies.

3.5 Coastal Erosion

The Indian coastline is extending to a length of about 7516 km. Almost all the maritime States/UTs are facing coastal erosion problem in various magnitudes. Consolidated status of coastal erosion and protection in India is as under.

Coastal Length (km) given by National Hydrographic Office (NHO)	Coastline Affected by Erosion(km)	Coastline Protected (km)	Coastline yet to be protected (km)
	(Consolidated data as reported by State/UT's)		
7516.60	1770	820	950

3.5.1 Coastal Protection and Development Advisory Committee (CPDAC)

Considering the need of overall planning and cost effective solution to the coastal problems, the Govt. of India constituted Beach Erosion Board in the year 1966 under the Chairmanship of Chairman, CWC (erstwhile CW & PC). The Beach Erosion Board

was reconstituted and renamed as Coastal Protection and Development Advisory Committee (CPDAC) by the Ministry of Water Resources, Govt. of India, in April, 1995, under the Chairmanship of Member (RM) and representatives of all coastal States and related Central Departments. Based on the decision taken in the 11th meeting, preparation of Shoreline Changes Atlas of India in collaboration with Space Application Centre (SAC), Ahmedabad has been initiated during 2010-11 at estimated cost of ` 60 lakh. 12th CPDAC meeting was organized at Bhubaneswar, Orissa during 3-4th Mar, 2011.

3.5.2 External Assistance

Realizing the severity of sea-erosion problems in certain reaches of the coastline, Ministry of Water Resources initiated the process of preparing a National Coastal Protection Project (NCPP) with the external assistance. As an out come of discussions between the Government of India and the Asian Development Bank (ADB), a Project Preparatory Technical Assistance (PPTA) programme with ADB grant of $1.0 Million for preparing a Sustainable Coastal Protection and Management Project for the states of Maharashtra, Karnataka & Goa was implemented in 2009. The Technical Assistance broadly supports NCPP. ADB loan of about $250 Million is in the pipeline for implementing sustainable Coastal Protection works which would be phased out in three tranche for a period of 8 years.

In furtherance to the concept of PPTA-1, ADB under Country Partnership Strategy (CPS) has included PPTA-2 with a grant of 1 million USD proposed for year 2011.

A loan of $200 Million is in pipeline for Integrated Coastal Protection & Management Programme-2 which is likely to start from 2012 covering states of Gujarat and Tamil Nadu.

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 Union Minister of Water Resources is the Vice-Chairman, and Minister of State for Water Resources, concerned Union Ministers/ Ministers of State, Chief Ministers of all States & Lieutenant Governors/ Administrators of the Union Territories are the Members. Secretary, Ministry of Water Resources is the Secretary of the Council. The composition of the Council is shown in the Fig. 4.1. The council has held five meetings so far. In the 5th meeting of the National Water Resources Council held on 1st April, 2002, the National Water Policy, 2002 was adopted by the Council.

4.3 National Water Board

To review the progress achieved in the implementation of the National Water Policy and to report the progress to the National Water Resources Council from time to time, the Government of India has constituted a National Water Board in September 1990 under the Chairmanship of Secretary (WR). Secretaries of Union Ministries of Agriculture, Rural Development, Urban Development, Surface Transport, Environment & Forests, Planning and Science & Technology, Chairman, Central Water Commission, Chief Secretaries of all States/Union Territories are its Members and Member (Water Planning & Projects), Central Water Commission is the Member

Secretary. The composition of the board is given at Fig. 4.2. The Board has held thirteen regular and two special meetings so far.

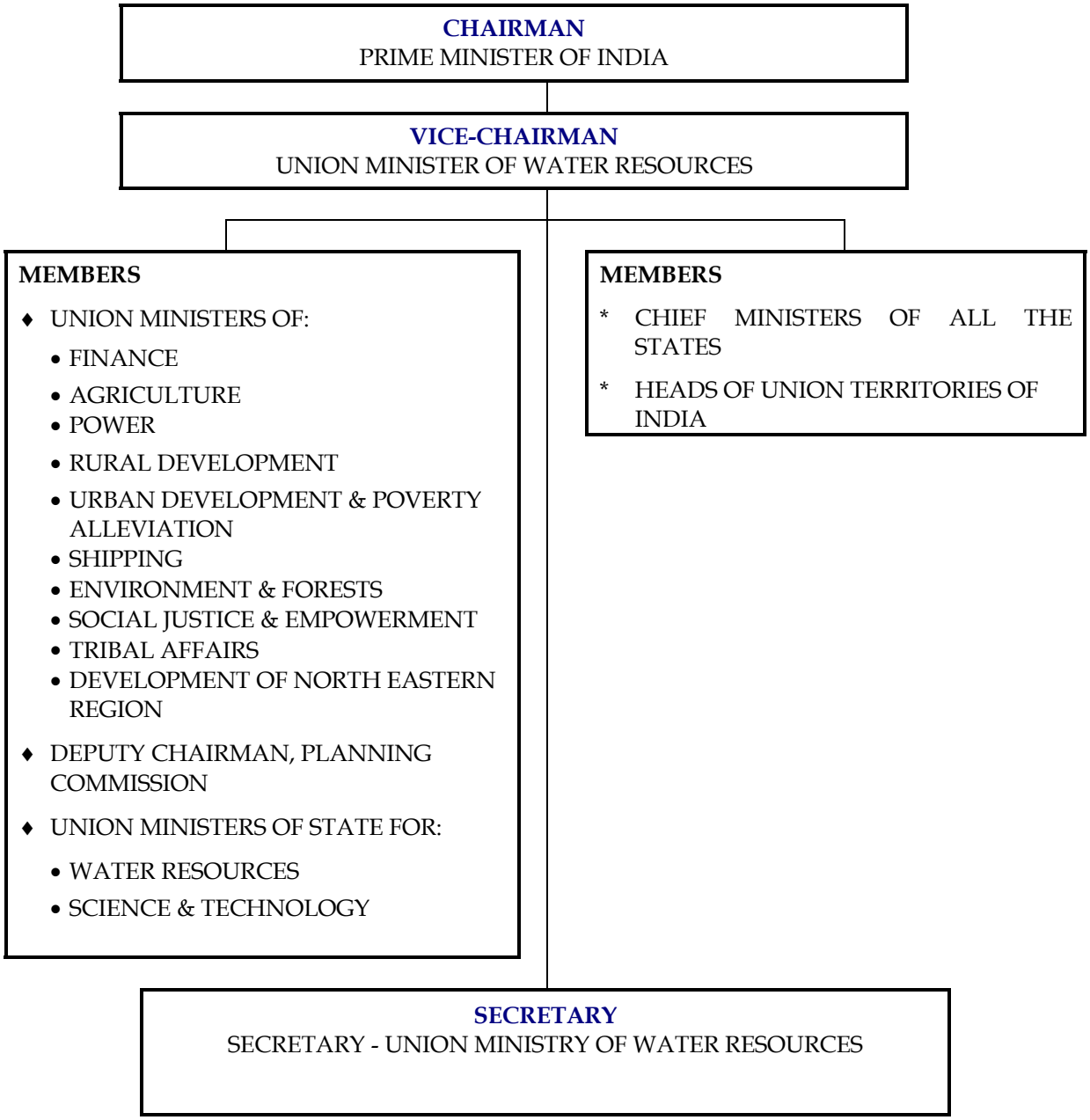


Fig. 4.1 - National Water Resources Council

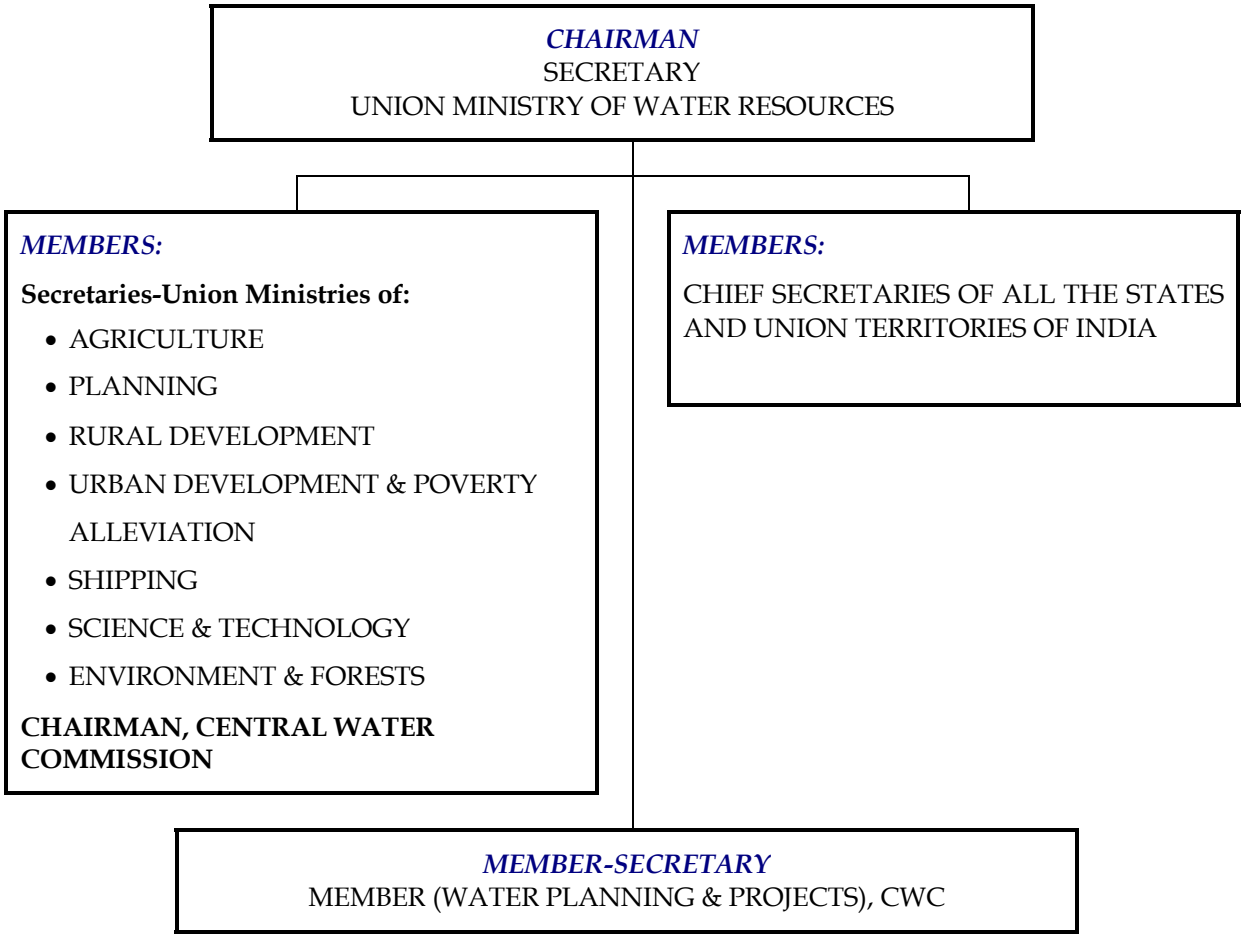


Fig. 4.2 - National Water Board

4.4 Review of National Water Policy-2002

The National Water Policy states that it may be revised periodically as and when need arises. Further, the National Action Plan on Climate Change (NAPCC) states that "the National Water Policy would be revised in consultation with states to ensure basin level management strategies to deal with variability in rainfall and river flows due to climate change". Accordingly, the Ministry of Water Resources has initiated the process of revision of National Water Policy-2002. It is proposed to organize various workshops with a view to have wider consultation with the stakeholders for review of National Water Policy. Consultation with Policy Makers, Brainstorming Session with Academia, Experts and Professionals and Consultation with NGOs have already been organized by MoWR.

Central Water Commission is actively involved in the process of review of National Water Policy. The concluding consultation with the stakeholders is proposed to be held at the National Workshop, to be organized by CWC at New Delhi. An Organising Committee has been constituted under the chairmanship of Chairman, Central Water Commission to look into the technical and organisational aspect of the review. A Core Technical Committee and a Drafting Committee has also been constituted to give technical feedback to the Organising Committee.

4.5 Inter–Basin Transfer of Water & Interaction with NWDA

The National Water Development Agency is engaged in carrying out water balance studies and link canals studies for diversion of surplus waters to water deficit areas including inter-basin transfers. It also carries out requisite field surveys and investigations for preparation of feasibility reports of the link canals. Now NWDA's mandate has been extended/amended to prepare pre-feasibility/feasibility/DPR of links under National Perspective Plan (NPP) 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.

4.5.1 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.

39th TAC meeting was held on 24th February, 2011 and the following technical issues were discussed:

- Follow up action on Important decisions of the 38th Meeting of the TAC held on 22nd January, 2010 at New Delhi.
- Status of Studies pertaining to the Peninsular Rivers Development Component of NPP.
- Feasibility Reports of Mahanadi– Godavari– Krishna– Pennar– Cauvery– Vaigai– Gundar Linkage System.
- Status of Studies pertaining to Himalayan Rivers Development Component of NPP and Intra– State link proposals.

- Intra– State link proposals received from various State Govts. and their status.

4.5.2 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 ten meetings of the consensus group have been held. The 10th Consensus Group meeting was held on 23rd July, 2010 to discuss the various issues regarding Mahanadi–Godavari– Krishna– Pennar– Cauvery- Vaigai link system.

4.5.3 Expert Committee

MOWR has constituted a committee of environmentalists, social scientists and other experts on interlinking of rivers with a view to make the process of proceeding on interlinking of Rivers (ILR) in a fully consultative manner. Secretary, MOWR is the Chairman and Chairman, CWC is a member of the committee. So far eight meetings of the committee have been held

4.5.4 Committee to Monitor and Supervise the preparation of DPRs of Link Projects

Ministry of Water Resources had constituted a 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 in February, 2006. NWDA has now taken up the work of preparation of the DPRs of Par-Tapi-Narmada (P-T-N) & Damanganga-Pinjal link projects (D-P). Subsequently, MoWR has decided to include monitoring and supervision of all the DPRs by NWDA in the functions of the above Committee.

Three meetings of Committee to monitor and supervise the overall work for preparation of DPR of P-T-N & D-P link projects have been held so far. The second and third meeting was held on 31st August, 2010 and 14th March, 2011 respectively. Various issues regarding the preparation of DPR of P-T-N & D-P link projects were discussed.

4.6 Basin Planning and Related Issues

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

One of the strategies identified for implementation under the National Water Mission is "Reassessment of basin wise water situation" under present scenario including water quality by using latest techniques, which inter-alia may include:

- Development or adoption of comprehensive water balance based model,
- Fitting models to basin using current data, and
- Assessment of likely future situation with changes in demands, land use, precipitation and evaporation.

The methodology for carrying out the pilot studies in two selected river basins i.e Godavari and Brahmani-Baitarani was finalized after detailed deliberations among the officers of CWC, NRSC, CGWB and NIH. The study is being jointly executed by CWC and NRSC.

During the year, CWC has actively collaborated with NRSC in the following works:

a. Collection of historical Gauge & Discharge data, Reservoir data, Ground water data from various agencies including field formations of CWC, CGWB etc and processing in appropriate formats for model input.

b. Interaction with Krishna & Godavari Basin Organisation (KGBO) and Mahanadi & Eastern Rivers Organisation (MERO), CWC to sort out the issues related to delineation of basins/sub-basin boundaries in Godavari and Brahmani-Baitarni river basins.

c. A meeting was held under the Chairmanship of Member (WP&P) on 17.03.2011 to review the status of the pilot studies. Preliminary results on Water Resources of Godavari Basin during 2004-05, 2006-07, and Brahmini Basin during 2004-05 are computed and presented during the meeting.

4.6.2 Integrated Water Resources Management

Central Water Commission is actively involved in encouraging holistic approach towards development and management of water resources, considering river basin as

'hydrological unit'. National Water Mission also highlights the importance of principles of Integrated Water Resources Management (IWRM). In this regard, draft guidelines on 'Integrated Water Resources Development and Management' were prepared and submitted to the Ministry of Water Resources.

A paper titled 'Need for IWRM in India' was presented in the Convention organized by Global Indian Scientists and Technocrats (GIST) at Pune during 26-27 Dec'10. Another paper entitled 'Need for IWRM in Urban Areas' was presented during World Water Day-2011 on 22.3.2011 at NASC Complex, New Delhi.

4.6.3 Decision Support System (Planning)

Under World Bank funded Hydrology Project-II, the preparation of a Decision Support System (Planning) is in the process at National Institute of Hydrology, Roorkee, which is the nodal agency for this work. A 'Review Committee' has been constituted under the chairmanship of Director (NIH) and Director (RO) CWC is one of the members of the 'Review Committee'. So far, three meetings of 'Review Committee' have been held. In the third meeting the Review Committee accepted the Database Development Report submitted by the Consultants (DHI-Denmark) and made suggestions on preparing a blueprint by the Consultants (in consultation with NIH) on complete hardware / software, networking, other communication facilities and space requirements etc.

4.6.4 Technical Expert Committee (TEC) for WAR (Winning, Augmentation and Renovation) of Water

Chairman (CWC) is one of the members of TEC on WAR for water solutions constituted by Ministry of Science and Technology in 2009. During 2010-11, 4th and 5th meeting of TEC took place.

During the fourth meeting held on 9.6.2010, TEC interalia recommended that Consortium approach, involving also the NGOs and Enterprise, may be adopted for meeting the demand of water holistically. TEC, in the fifth meeting held on 17.1.2011, recommended about preparation of spreadsheet indicating the details of clusters, water challenges solutions proposed, networking of all stakeholders through organizing of meetings between Enterprise and NGOs, identification of few more clusters maintaining a regional balance and geographical spread for implementing

pilot plants for water challenges not covered so far, and adoption of integrated approach and models addressing both quality and quantity aspects.

4.6.5 Working Group on 'Water Governance' for the Twelfth Five Year Plan (2012-2017)

CWC is represented by Chief Engineer, BPMO as one of the members of the Working Group on 'Water Governance' for the Twelfth Five Year Plan (2012-2017) constituted by Planning Commission, Government of India. Inputs were provided on national and international experiences on water governance, constitutional and legal aspects related to water governance, regulatory mechanisms, etc. during the meetings of the Working Group.

4.6.6 Joint Operation Committee of Rihand Reservoir

The 23rd meeting of Joint Operation Committee of Rihand Reservoir was held in New Delhi on 19th October 2010 under the chairmanship of Member (WP&P) in which the actual releases made from Rihand reservoir during 2009-10 were discussed and the operation plan for 2010-11 was finalized.

4.6.7 Delhi Mumbai Industrial Corridor (DMIC)

Chairman, CWC is special invitee on a Committee to look into the availability of water in Delhi-Mumbai Industrial Corridor (DMIC) region. CWC provided detailed observations on the background note on water supply projects in DMIC region prepared by Delhi-Mumbai Industrial Corridor Development Corporation Limited.

4.7 Climate Change Issues and National Water Mission

Establishment of Chair in Academic Institute

Professional Chair in four IITs and Two NITs have been established with the objective to carry out studies on water resources with special emphasis on assessment of effect of climate change on it and adaptation in respect of planning, design and management of water resources systems of different Basins as given below:

Professional Chairs established

Name of the Institute	Name of the Chair	Name of Chair-professor
NIT, Srinagar	Sheikhul Alam Sheikh Nuruddin Chair for Water Resources (for Indus Basin)	Selection in process
IIT, Roorkee	Bharat Singh Chair for Water Resources (for Indus Basin)	Selection in process
NIT, Patna	Dr. Rajendra Prasad Chair for Water Resources (for Ganga Basin)	Dr. Vivekanand Singh Associate Professor
IIT, Kanpur	Sir M. Visvesvaraya Chair for Water Resources (for Ganga Basin)	Prof. Rajesh Srivastva
IIT Guwahati	Bimla Prasad Chaliha Chair for Water Resources (for Brahmaputra Basin)	Prof. Arup Kumar Sharma
IIT Kharagpur	Brahmaputra Chair for Water Resources (for Brahmaputra Basin)	Prof. Subhasish Dey, Prof. D .J. Sen

The main objectives of the Chair are as following:

- To take part in the academic programme of the respective Institute as full time professor/ faculty in the related department and coordinate HRD programs in water resources sector.
- To develop R&D and academic programme relevant to the needs of CWC and other organizations of MoWR in the related areas.
- To initiate and develop HRD programmes relevant to the needs of CWC and other organizations of MoWR and to coordinate courses for their Officers.
- To review available design standards and suggest necessary changes/modifications to accommodate the effect of climate change in design of water resource systems.

Management committees have been constituted under the Chairmanship of the Chairman, CWC and Director of Institutes as co-chair for managing the affairs of the chairs.

CWC has also started working on Assessment of basin-wise situation in the country using modern technology and methods including mathematical modeling with the help of NRSC, Hyrdrabad to varied projected climatic condition.

S. N.	Category	Sub-Basin	Focal state	Associate States
1	Snow fed	Satluj	Punjab	Himachal Pradesh
2	Groundwater	Chambal Sub-basin	Madhya Pradesh	Rajasthan
3	Coastal	Cauvery Delta	Tamilnadu	Puducherry

National Water Mission

The comprehensive document of National Water Mission was approved in-principle by the Hon'ble Prime Minister's Council on climate change in May 2010.

The identified goals of the National Water Mission are as under:

1. Comprehensive water data base in public domain and assessment of the impact of climate change on water resources.
2. Promotion of citizen and State actions for water conservation, augmentation and preservation.
3. Focused attention on vulnerable areas including over-exploited areas.
4. Increasing Water Use Efficiency by 20%.
5. Promotion of basin level integrated water resources management.

Though all the above mentioned goals are equally important, however only quantifiable goal in "Increasing water use efficiency by 20%". An outline for taking up various activities under the goal has been finalized.

The Standing Committee under the Chairman, CWC for "Assessment of Impact of Climate Change on Water Resources" met on 03-06-10. The organizations involved in related studies presented ongoing projects and findings of completed works during the meeting.

Management Committee meetings under the Chairman CWC were held for the Chairs of IIT Roorkee and NIT Srinagar at Srinagar on 14-06-2010, IIT Kharagpur and IIT Guwahati at Kharagpur on 01-11-2010 and of NIT Patna and IIT Kanpur on 11-05-2010 at Patna. NIT Patna has conducted a Brain Storming session on "Impact of Climate Change on Water Resources with special emphasis on Ganga River Basin" on 10-12-10.

Study on "Impact of Climate Change on the Flow characteristics of Beas River at Pandoh Dam Site and Bhagirathi River at Tehri Dam Site" has been carried out by

NIH Roorkee and Draft Report has been examined and observations\comments sent for incorporation. The study and report is under modification.

Chair Professor at IIT Guwahati is formulating a proposal for development of Mathematical Model for River Brahmaputra with emphasis on Climate Change. Chair Professor at IIT Kharagpur is modifying a review Report titled as "Effect of climate change on water resource in general and river Brahmaputra in particular" after incorporating CWC's comment\observations. Chair Associate Professor at IIT Kharagpur has also submitted proposal for "Impact of climate change and anthropogenic activities on catchment erosion and reservoir / pond sedimentation in Teesta sub-basin of Brahmaputra Basin" which has been modified based on the observations of CWC/NIH. The modified proposal is under process of approval.

Under the National Water Mission Government of India sought technical support of Asian Development Bank. In response, ADB is providing technical assistance for (i) preparing strategic framework for IWRM to address climate uncertainty; (ii) assessing the potential for improving water-use efficiency; and (iii) preparing road map for effective institutions, specialist training and awareness for three distinct issues for which Basin/Sub-basin/area have been selected as (i) Snow fed basin– Sutlej, (ii) Ground Water– Shipra sub basin of Chambal basin (iii) Coastal area– Cauvery Delta.

An Inception workshop on "Support to the National Water Mission under National Action Plan for Climate Change" had been conducted at New Delhi during the month of Nov 2010 and an interim workshop has been also organized on 15-03-2011. Interim reports for the selected areas/sub-basins also framed by the ADB Consultants, which are under examination.

CWC has entrusted work of "Inventory and Monitoring of glacial lakes/water bodies on the Himalayan region of Indian river basins" to NRSC, Hyderabad. A draft report has been submitted by the NRSC, which is under examination.

CWC has also entrusted work to Develop" Snowmelt Runoff model and provide forecasts of snowmelt runoff for Chenab, Beas, Yamuna, Sutlej and Ganga basins". A status report has been submitted by the NRSC (October 2010), which is under examination.

CHAPTER-V

DESIGN AND CONSULTANCY

5.1 General

Design and Research Wing of Central Water Commission plays a pivotal role in the field of design and consultancy for 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 Detailed Project Reports of water resources development projects prepared by different agencies is also carried out in this Wing.

Major activities of D&R Wing comprises of:

1. Planning and design of water resources and hydropower projects.
2. Hydrological studies.
3. Review of safety aspects of existing dams and its monitoring.
4. Technical appraisal of multipurpose river valley projects.
5. Coordination of research, development and training.
6. Attending to distressed structures as applicable to design aspects.
7. Assisting MoWR in various design issues involved in international and Trans Boundary Projects.

5.2 Composition of Design & Research Wing

The Design and 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 Project) unit

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 and Design of Water Resources Projects

Design consultancy work in respect of 91 projects (including 18 projects with special problems) had been carried out in the design units of D&R Wing during the year 2010-2011 as under:

Sl. No.	Category	No. of Projects
1.	Projects at construction stage	41
2.	Projects at investigation and planning stage (for which detailed project reports are being prepared)	23
3.	Projects with special problems	18
	Total	**82**

State-wise breakup of the 91 projects is shown in Fig. 5.1 and list of projects is in Annex 5.1.

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

1. Ujh Multipurpose HE Project (280 MW), J&K

The project involves construction of 119 metres high dam, 0.4 km Diversion tunnel, Intake, 2.5 km Head race tunnel, Surge Tank, Pressure Shaft, Powerhouse and tail race on river Ujh in Kathua District of J&K with catchment area of 854 sq km. CWC is involved in the survey, up-gradation and preparation of DPR. The design and drawings will be finalised after receipt of requisite data.

2. 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 surface power house with an installed capacity of 4x100 MW on the right bank near village Pindaras of Tehri District, about 20 Km downstream of Tehri Dam site at Koteshwar.

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 project including dam, power house, intake and tailrace, spillway etc. During this year construction stage designs in respect of power house, elevator shaft, stair case, gantry girder, spillway bridge visitor's lounge, central recording room etc. were carried out and necessary drawings were issued.

3. 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 520 MW Tapovan Vishnugad H.E. Project 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 this project was offered by CWC. Specification stage drawings for Barrage package and further about 42 nos. construction drawings have been provided for Tapovan Vishnugad HE Project. Vetting of designs and drawings for hydro mechanical equipments are under progress.

4. Par-Tapi-Narmada & Damanganga- Pinjal Link Projects, Gujarat & Maharashtra

The link projects are located in the states of Gujarat & Maharashtra. The Par-Tapi-Narmada link consists of 7 proposed reservoirs viz. Jheri, Mohankavchali & Paikhed on Par River, Chasmandva on Auranga River, Chikkar & Dabdar on Ambica River and Kelwan on Purna river and a 401 km long link canal connecting these reservoirs. Powerhouses are proposed at the foot of the dams at Jheri, Paikhed, Chasmandva and

Chikkar. The total length of the link canal is sub-divided into two reaches viz. Par-Tapi (211 km including 5.5 km. tunnel and 33.3 Km. Feeder length), and Tapi - Narmada (190.1 km).

The proposal of Damanganga- Pinjal Link envisages construction of three storage reservoirs viz. Bhugad, Khargihill and Pinjal. The entire conveyance portion of the link canal is sub-divided into two parts, viz. (i) a tunnel of 16.85 km length to connect Bhugad and Khargihill reservoirs and (ii) a tunnel of 25.70 km length to connect Khargihill and Pinjal reservoirs.

CWC is involved in the preparation of Detailed Project Report for design of civil structures. The design and drawings will be finalised after receipt of requisite data/input which is still awaited.

5. 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 4 projects at construction stage for which design consultancy is being provided by D&R wing of CWC. In addition, there are 3 projects for which DPRs are under preparation. The projects in North Eastern Region presently being dealt in D&R wing are listed below:

Arunachal Pradesh		
1	Kameng HE Project	DPR stage
Manipur		
2	Thoubal Multipurpose Project	Construction stage
3	Dholaithabi Barrage Project	Construction stage
4	Khuga Multipurpose Project	Construction stage
Meghalaya		
5	Myntdu HE Project	Construction Stage
6	New Umtru HE Project	DPR Stage
Sikkim		
7	Kalez Khola HE Project	DPR stage

5.4 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 2010-11 HSO has dealt with 172 projects from hydrological point of view which includes 12 projects for consultancy and 160 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 into 26 hydro-meteorologically homogeneous sub-zones for this study. So far flood estimation reports covering 24 sub-zones have been published. Development of regional water availability model for Tapi Basin is under progress. The preparation of drainage area map/drawings and working out of the various physical parameters in respect of drainage areas upto various G&D sites are under progress.

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

Design precipitation (PMP/SPS) estimates, are basic inputs in computing design flood magnitudes. Estimation of design storms has been found to be a major bottleneck in design flood studies by project proponents since necessary data and expertise is available with only a few organisations like IMD and CWC. To overcome this, it was decided to publish generalised PMP Atlases covering the whole country, to give a first hand estimate of design storm depths. The existing PMP Atlases prepared in the nineties are being widely used. Further work of preparation of new PMP Atlases and updation of existing PMP Atlases as listed under has been taken up in the XI plan scheme viz., "Dam Safety Studies and Planning":

(i) Preparation of New PMP Atlases for:
- Ganga River Basin
- Brahmaputra River Basin

(ii) Updation of six existing PMP Atlases for:
- Cauvery and other East Flowing Rivers
- Godavari and other East Flowing Rivers.
- Mahanadi and Adjoining River Basins.

- Chambal, Betwa, Sone and Mahi Basins.
- Narmada, Tapi, Sabarmati, Banas and Luni River Systems and Rivers of Saurashtra & Kutch Region.
- West Flowing Rivers of Western Ghats.

The work has been awarded to RMSI Pvt. Ltd. The contract agreement was signed on 21st October, 2010 and work has commenced w.e.f. 21-10-2010. The duration of the consultancy work is 36 months. The work is being monitored by HSO. The Inception report was accepted in February, 2011.

5.5 Dam Safety Aspects

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

- Instrumentation in Dams and Power House Caverns, besides other hydraulic structures.
- Special Analysis like Dam Break Modeling and foundation problems.
- Computer Aided Designs.
- Monitoring of dam safety related activities in India.
- Rehabilitation of aged and distressed dams.

5.5.1 Dam Rehabilitation and Improvement Project (DRIP)

The Dam Safety Assurance and Rehabilitation Project (DSARP) assisted by the World Bank was implemented in 4 States, namely Madhya Pradesh, Orissa, Rajasthan and Tamil Nadu, under overall guidance of Central Water Commission during the period 1991 to 1999.

After seeing the performance and benefits accrued from DSARP, the dam safety efforts are proposed to be carried further with the assistance of World Bank as a new project viz., 'Dam Rehabilitation and Improvement Project (DRIP)'. The proposed Dam Rehabilitation and Improvement Project (DRIP) would be a six-year project. 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 total cost of project is US $ 437.5 million (` 2100 Crore considering 1$ = ` 48/-). The World Bank would provide 80% cost of the project i.e. US$ 350 M (50% to be provided through IDA and 50% through IBRD). The balance 20% is to be provided by the respective states and central government for their own components.

Based on the interaction with different states, the World Bank indicated inclusion of five states namely, Chhattisgarh, Kerala, Orissa, Madhya Pradesh & Tamilnadu for DRIP implementation considering institutional readiness, government interest and commitment. These five states were requested to convey their government level willingness with concurrence of their Finance Department for participation in DRIP. However, willingness was indicated by only four states namely, Kerala, Orissa, Madhya Pradesh & Tamilnadu. Total 223 dams from the four participating States will be rehabilitated through this Project. Rehabilitation of additional dams in one or four of the participating states or the rehabilitation works of urgent nature or institutional needs in other States has also been envisaged during implementation of this project, provision for this has been kept in the estimated cost.

5.5.2 Dam Safety Legislation

Government of India constituted a Standing Committee in 1982, under the chairmanship of Chairman, Central Water Commission to review the existing practices and to evolve unified procedures of dam safety for all dams in India. The Standing Committee in its report of July, 1986 has recommended for unified dam safety procedures for all dams in India and the necessary Dam Safety Legislation. The states of Andhra Pradesh and West Bengal have adopted resolutions in their respective Assemblies for enactment of dam safety legislation for regulation in their states by an Act of Parliament. In pursuance of the request made by some states, the Union Government has decided to enact a Central Dam Safety Legislation. The proposed legislation on dam safety is intended to provide for proper surveillance, inspection, operation and maintenance of dams of certain parameters (called specified dams) to ensure their safe functioning and thereby protect persons and property against risks associated with dam failures.

The Union Cabinet on 23rd May, 2010 approved proposal of Ministry of Water Resources for enacting legislation on dams safety. Dam Safety Bill, 2010 was introduced in the Parliament on 30th August, 2010 and has been referred to the Parliamentary Standing Committee on the Water Resources for the examination of Bill. So far, three meetings of the Parliamentary Standing Committee have been held to discuss the Dam Safety Bill.

5.5.3 National Committee on Dam Safety (NCDS)

Government of India reconstituted the Standing Committee in 1987 as the National Committee on Dam Safety under the chairmanship of Chairman, CWC to:-

(a) Monitor the follow-up action on the report on Dam Safety Procedures both at the Centre and at the State level,

(b) Oversee dam safety activities in various states and suggest improvements to bring dam safety practices in line with latest state-of art consistent with Indian conditions and

(c) Act as a forum of exchange of views on techniques adopted for remedial measures to relieve distress.

The National Committee consisted of 18 members drawn from 10 states and various other organizations viz. MoWR, CWC, GSI, IMD, and BBMB. Thereafter, the committee was reconstituted in 1989, 1997 and 2002. At present there are 28 members drawn from 16 states and various other organizations. 30th meeting of NCDS was held on 27.08.2010.

5.5.4 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. Member (D&R), CWC is the Chairman of the Committee. 22nd meeting of NCSDP was held on 24.09.2010 at New Delhi. In this meeting seismic design parameters of 20 projects were discussed and were cleared.

5.6 Special Studies

- Dam break analysis is carried out to prepare the Emergency Action Plan (EAP) and inundation map in the unlikely event of dam failure. It estimates the maximum water level at the downstream locations of the dam along with their time estimates in the event of hypothetical failure of the dam. The dam break analysis is being carried out in CWC on consultancy basis. During the year 2010-11, dam break study of Neyyar Irrigation Project (Kerala) was examined.
- Glacial Lake Outburst Flood (GLOF) Studies are carried out to estimate the magnitude of the flood peak at the project site, resulting from release of sudden discharge of significance magnitude due to breaching of Moraine Dam on Glacial Lake, endangering the safety of the project being planned. The Glacier Lakes are formed by the accumulation of Glacier melt behind the Morian Dam formed by landslides or some other natural phenomenon. The study is required to account for the GLOF alongwith design flood for deciding the spillway capacity of the hydroelectric project at the design stage.
- During the current year, GLOF studies for Panan HE Project, Sikkim, Tawang HE Project –Stage I & II, Arunachal Pradesh and Jelam Tamak HE Project, Uttarakhand were examined.
- During the year, planning and preparation of instrumentation specification/ construction drawings have been carried out for the following projects:

    (a) Tapovan Vishnugarh H.E. Project (520 MW), Uttarakhand
    (b) Anandpur Barrage Project, Orissa

CHAPTER-VI

WATER MANAGEMENT RESERVOIR SEDIMENTATION AND POST PROJECT EVALUATION

6.1 Monitoring of Reservoir Storage

During the water year 2010-2011, Central Water Commission monitored Live Storages of 81 important reservoirs of the country having total live storage capacity at FRL of 151.77 BCM.

Table 1

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

Description			Water Year	
			2009-10	2010-11
Number of Reservoirs			81	81
Total Designed live storage Capacity at FRL (in BCM)			151.770	151.770
ACTUAL STORAGE	On June, 1st (Start of Water Year)	In BCM	17.424	21.241
		In % of Storage at FRL	11	14
		In % of 10 Years Avg. Storage	83	105
	On Sept, 30th (End of Monsoon Period)	In BCM	89.835	115.227
		In % of Storage at FRL	59	76
		In % of 10 Years Avg. Storage	88	115
	On Dec, 31st	In BCM	75.143	104.314
		In % of Storage at FRL	50	69
		In % of 10 Years Avg. Storage	100	140

A bulletin on the status of reservoir storages monitored by CWC 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 reservoirs.

6.2 Cauvery Water Bulletin

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

6.3 Assesment of the Revised Live Storage Capacity

The Basin wise / State wise data for 20 major river basins identified in Central Water Commission Publication "Storages in River Basins of India" excluding storages of less than 10 MCM is maintained by Central Water Commission. The data has been updated in the year 2011 and report sent to MoWR for views/concurrence.

6.4 Interaction with Ministry of Agriculture

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 in March 1979 by the ICAR 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 Organizations and others with a view to optimizing the yield per unit of water.

Director General, ICAR is the Chairman of the Panel in the first and third years while Chairman, Central Water Commission is the Chairman of the Panel in the Second year.

The last meeting of the re-constituted Panel was held on 21st April 2010 at New Delhi under the Chairmanship of Chairman, CWC. The next meeting is proposed in 2011.

6.5 Watershed Management and Reservoir Sedimentation

6.5.1 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, a total of 26 reservoirs were covered under the scheme. Out of which, survey of 23 reservoirs were completed in all respects and report finalization of 3 reservoirs was carried over to the first year of XI Plan.

During XI Plan, an SFC Memo for covering 20 more reservoir under Capacity Survey at an estimated cost of ` 410.00 lakhs was sanctioned by the Ministry of Water Resources on 20th February 2008. Out of these 20 reservoirs, work of carrying out capacity survey of 10 reservoirs was in progress during 2010-11 and likely to be completed by middle of 2011. The work of capacity survey for ten more reservoirs during 2011-12 has been initiated.

6.5.2 Status Report on Watershed Management and Water Harvesting

A report on Status of Watershed Management and Water Harvesting was published during 2000-05 based on the information received from state Government departments and field functionaries. The report was updated and published during 2010-11. The convergence of watershed development with National Rural Employment Guarantee scheme has also been included in the updated report.

6.6 Remote Sensing in Water Resources Development and Management

The Remote Sensing Directorate is implementing the following components in two

different plan schemes during 11th Five Year Plan Period:

- "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 2010-11 (upto March. 2011) is as under:

- Satellite Remote Sensing based Reservoir Sedimentation study (in-house) of 1 reservoir i.e. Salandi (in Orissa State) is under progress and spill-over studies (2009-10) of 3 reservoirs have been completed. The work of sedimentation assessment using Remote Sensing technique for 30 reservoirs is awarded to Maharashtra Engineering Research Institute (MERI), Nashik during May, 2010 with one year as the completion period. The draft reports of 20 reservoirs have been prepared and submitted by MERI, Nashik. Rest of the reservoirs (10 Nos.) are found non-feasible.

6.7 Performance Evaluation Studies (PES)

Central Water Commission is carrying out post project Performance Evaluation Studies (PES) of completed major/medium irrigation projects in the country. Studies include evaluation of system performance and agro-economic, socio-Economic and environmental impacts of project including economic analysis. Identifying deficiencies and recommending measures for improving the performance of project for achieving the envisaged objectives and targeted benefits is part of the studies.

A Technical Advisory Committee (TAC) under the Chairmanship of Member (WP&P), CWC and having members from Ministry of WR, Agriculture, Environment & Forest, Planning Commission amongst others has been constituted for guiding, supervising and approving the studies.

During the year 2010-11, the performance evaluation studies of following six irrigation projects have been completed:

i. Samrat Ashok Sagar Irrigation Project(Madhya Pradesh)

ii. Salki Irrigation Project (Orissa)
iii. Sukla Irrigation Project (Assam)
iv. Kodayar Irrigation Project (Tamilnadu)
v. Nanak Sagar Irrigation Project (Uttar Pradesh)
vi. Itiadoh Irrigation Project (Maharashtra)

The copy of reports have been forwarded to the concerned State Governments and Project authorities for taking necessary action on the recommendations given in the report for improving the performance of these projects.

In addition, final reports of following two projects have also been received, which would be considered by TAC in its next meeting:

i. Chandan Reservoir Irrigation Project (Bihar)
ii. Kanchi weir Irrigation Project (Jharkhand)

Draft Final Report of Loktak Lift Irrigation Scheme, Manipur after incorporation of observations of CWC has also been received and it would be considered by TAC in its next meeting.

6.8 Benchmarking of Irrigation Projects

Benchmarking in Water Resources Sector is in practice 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 has been set up for Benchmarking of Irrigation Systems in India.

Core Group is playing an active role as a coordinator 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 through State Government institutions in various states to facilitate concerned State Governments 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, ten regional workshops and five project level workshops have been organized in various parts of the country.

6.9 Study of Water Use Efficiency in Irrigation System

Irrigation sector is the biggest consumer of fresh water and its share in the overall demand of water is about 80%. However, water use efficiency in irrigation sector is relatively low. Central Water Commission is undertaking water use efficiency studies of completed major/medium irrigation projects in the country with the objective of having assessment of their water use efficiency. The studies cover the following aspects of irrigation projects:

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 utilized

A Technical Advisory Committee under the chairmanship of Member (WP&P), CWC has been constituted for guiding, supervising and approving the studies.

During 2010-11, the final reports of following four projects have been received:

(i) Kamla Irrigation Project (Bihar)
(ii) Durgawati Irrigation Project (Bihar)
(iii) Upper Morhar Irrigation Project (Bihar)
(iv) Eastern Sone Canal Project (Bihar)

In addition, Draft Final Reports of following five projects have also been received:

(i) Dekadong Project (Assam)
(ii) Kaldiya Project (Assam)
(iii) Singda Dam (Manipur)
(iv) Sekmai barrage (Manipur)
(v) Imphal Barrage (Manipur)

The above Draft Final Reports have been examined in Central Water Commission and are being finalized by consultant as per observations of CWC.

6.10 Water Audit and Water Conservation

Water audit is an important aspect for water management. In view of this, Central Water Commission and Central Ground Water Board have formulated "General Guidelines for Water Audit and Water Conservation" taking into consideration the views of various Central Government Ministries/ Organizations dealing with water resources development and management, State Governments, NGOs etc. to generate awareness among the people towards the importance of water conservation. These guidelines have been sent to all the State Governments, concerned Central Ministries and other Utilities for framing their own region specific, project specific and system specific guidelines. These guidelines have also been placed on the website of Central Water Commission.

6.11 Farmers' Participatory Action Research Programme (FPARP)

The Ministry of Water Resources, Government of India took up Farmers' Participatory Action Research Programme (FPARP) throughout the country with the help of Agricultural Universities, ICAR research institutes, ICRISAT, WALMIs, and NGOs with a view to demonstrate the available technologies to the farmers for increasing the yield and profitability of agriculture. The total cost of the programme was ` 24.4685 crores.

Technologies namely Micro irrigation system (drip & sprinkler irrigation), Water conservation (Jalkund, Storage tanks, percolation tanks, Check dams, recharging wells etc.), Crop Diversification and multiple use of water, System of Rice Intensification (SRI), In-situ soil moisture conservation, micro-nutrient management etc. were demonstrated to the farmers.

The programme was monitored by the Regional Offices of CGWB and CWC. In general, the demonstrations have shown the saving of water between 10 to 30% and yield improvement of between 10 to 40% depending upon crop, location, technology adopted etc.

The MoWR has also awarded the work for impact assessment of FPARP to an independent agency through open bid. The agency has to complete the work within six month from the date of award of the work.

Considering the overall benefit of the programme in terms of water saving, increase in yield leading to more crop per drop of water etc., MoWR has decided to take up 2nd Phase of programme wherein 5,000 demonstrations at a cost of ` 25 crore during the year 2010-11 & 2011-12 of XI Five Year Plan are contemplated. The work has already been awarded to 27 institutes during the year 2010-11 for conducting 2,620 demonstrations for an estimated cost of ` 1283.5 lakhs.

CHAPTER-VII

APPRAISAL OF PROJECTS

7.1 Project Appraisal

One of the important activities assigned to Central Water Commission is techno-economic appraisal of irrigation, flood control and multipurpose projects proposed by State Governments. This task is performed and coordinated by 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 projects for acceptance and thereafter recommends the same for investment clearance by the Planning Commission. Besides these, the Hydro-power projects proposed by State Power Corporations/ Electricity Boards /Public Utilities/ Private Sector Organisations for Techno-economic clearance by Central Electricity Authority (CEA) are also scrutinised in CWC from the view point of hydrology, civil design, inter-state issues and cost angles of civil structural components. Technical aspects of water supply schemes and cost aspects of Flood Control Schemes (except projects for Ganga Basin) are also appraised as and when referred by State Governments/ Ministry of Urban Development.

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

7.2 National Projects

Government of India has approved a scheme of National Projects for implementation during XI Plan with a view to expedite completion of identified National Projects for the benefit of the people. Such projects are provided financial assistance of 90% of the estimated cost by the Government of India in the form of Central grant for their completion in a time bound manner. Central Govt. has declared 14 water resources projects indicated in Annexure 7.1 as National Projects.

The criteria for selection of National Project are as under:

(a) International projects where usage of water in India is required by a treaty or where planning and early completion of the project is necessary in the interest of the country.

(b) Inter-State projects which are dragging on due to non-resolution of Inter-State issues relating to sharing of costs, rehabilitation, aspects of power production etc., including river interlinking projects.

(c) Intra-State projects with additional potential of more than 2,00,000 hectare (ha) and with no dispute regarding sharing of water and where hydrology is established

7.2.1 High Powered Steering Committee

The Union Cabinet in its meeting held on 7th Feb. 2008, constituted a "High Powered Steering Committee for Implementation of the Proposals of National Projects" with the Secretary (WR) as Chairman and Chief Engineer (PPO), CWC as Member-Secretary.

The terms of reference of the Committee are as under:

i. To recommend implementation strategies for National Projects
ii. To monitor implementation of National Projects
iii. To examine the proposal (if any) for inclusion of new projects as National Projects and make appropriate recommendation to the Government.

During the year 2010-11, two meetings of High Powered Steering Committee were held on 2nd June, 2010 and 9th Feb. 2011. During 2010-11, Central assistance of ` 1412.94 Cr. for Gosikhurd Project, ` 81.00 Cr. For Teesta Barrage Project and ` 15.236 Cr. for Shahpurkandi Project were released. A potential of 719.00 ha. was created upto November, 2010 from Gosikhurd Project during 2010-11.

7.3 Appraisal of Major Irrigation Projects

Major Irrigation Projects with Culturable Command Area (CCA) of more than 10,000 hectares are examined for various aspects in specialised Directorates in CWC and in the Ministries of Water Resources, Agriculture, Environment & Forests and Tribal Affairs. In case of multipurpose projects, examination in Central Electricity Authority

is also done for the power components. According to the existing procedure for scrutiny and examination of irrigation and multipurpose projects by Central Water Commission the concerned State Government in the initial stage submits preliminary report covering surveys and investigations, International/Inter-State aspects, hydrology, irrigation planning, brief environmental aspects, intended benefits etc. which are required to establish soundness of the project proposal. The project proposal is examined and if found acceptable, 'In Principle' consent of CWC for DPR preparation is accorded. Thereafter, DPR is prepared by the concerned State Governments with up-to-date cost and simultaneously the project authorities process and obtain necessary clearances of Ministry of Environment and Forests in respect of Environment Impact assessment and Forest area being diverted. If Scheduled Tribe population is affected, the clearance of R & R Plan is also obtained from the Ministry of Tribal Affairs. The DPR then prepared is examined in CWC. In State, where Central Design & Planning Organisations do not exist, the CWC checks the design also. Subsequent upon examination and finalization of the technical aspect, the CWC finalises the Cost, Benefit Cost Ratio, Internal Rate of Return etc. State Govt. obtains concurrence of the State Finance Department for the finalised cost. The project proposal thereafter is put up to the Advisory Committee of MoWR for consideration and acceptance. Once accepted by the Advisory Committee, the investment clearance of the Planning Commission would follow soon and the project is started. During the year 2010-11, 68 Major Irrigation Projects (44 New and 24 Revised) were under appraisal in Project Appraisal Organisation. Out of which 29 Projects (12 New and 17 Revised) have been accepted by the Advisory Committee of MoWR. Apart from the above, "In principle consent of CWC" for DPR preparation has been given in respect of 6 Major Irrigation Projects.

7.4 Appraisal of Medium Irrigation Projects

For Medium Irrigation Projects (CCA 2,000 to 10,000 hectare), State Governments are required to submit project proposal on proforma basis to the Appraisal and Monitoring Units of the CWC's field formations. During the year 2010-11, 51 Medium Irrigation Projects (45 New and 6 Revised) were under appraisal in various Regional Offices of CWC. Out of which 19 Projects (15 New and 4 Revised) have been accepted by the Advisory Committee of MoWR. Necessary assistance was provided by PAO, CWC for clearance and acceptance by the Advisory Committee of MoWR.

7.5 Interaction with State/Project Authorities

To expedite the appraisal process, Central Water Commission interacts frequently with State Govt. Engineers and interstate/review meetings are convened to resolve issues having a bearing on project clearance. Further, in order to simplify the process of appraisal, a Revised Guidelines for Submission, Appraisal and Clearance of Irrigation and Multipurpose Projects -2010 has been issued in Aug 2010 and the project proposals are being examined as per the revised guidelines.

7.6 Meeting of the Advisory Committee

During year 2010-11 the Advisory Committee of MoWR (reconstituted in 1987) accepted 75 projects comprising 29 Major & 19 Medium Irrigation and 27 Flood Control projects under the Chairmanship of Secretary (WR) in 6 meetings. The list of the projects accepted by the Advisory Committee is placed at **Annexure 7.2.**

Out of these 75 projects accepted by the Advisory Committee during 2010 -11, 48 are irrigation projects which will provide additional annual irrigation benefits of 38,21,406 hectare in the States of Andhra Pradesh, Bihar, Chhattisgarh, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajasthan & Uttar Pradesh. 27 Flood Control Scheme in the state of Arunachal Pradesh, Assam, Bihar, Jammu & Kashmir, Karnataka, Kerala, Orissa, Uttar Pradesh, and West Bengal will provide protection of an area of 9,83,346 hectare.

7.7 Appraisal of Power Projects

The civil components of Hydro-Electric Projects were also appraised in PAO, CWC. During 2010-11, 4 Hydro-Electric Projects having total installed capacity of 1310 MW have been cleared by CEA.

CHAPTER-VIII

MONITORING OF PROJECTS

8.1 MONITORING OF MAJOR AND MEDIUM IRRIGATION PROJECTS

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

As per the present arrangement in CWC, Inter-State, Externally Assisted and Centrally aided projects are being monitored by the monitoring units at Headquarters and other projects by respective field units. During 2010-11, a total of 82 projects under General/Vigorous monitoring were monitored by CWC. Out of 82 Major, Medium and ERM projects taken up for monitoring by CWC during 2010-2011, 14 projects (8 Major & 6 ERM) were being monitored from CWC Headquarter and remaining 68 projects (45 Major, 21Medium and 2 ERM) were monitored by its 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 offices of CWC to ensure their completion as stipulated. Out of these 30 projects, 18 projects were completed by the end of 2009-10 and remaining 12 projects were included in the list of 82 projects which were monitored during 2010-11.

All the projects identified for general 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, points needing attention of the State Govt. to expedite progress for early completion of the projects etc.

8.2 Accelerated Irrigation Benefits Programme

Central Govt., during 96-97, launched an 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 advanced stage of completion. Since its formulation, the terms of the programme have been widened and liberalised over time.

Priorities were also given to those projects which were benefiting Tribal and Drought Prone Areas. 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 distressed districts.

As per present pattern of assistance under AIBP, the Centre is providing grant to irrigation projects as an incentive to the States for creating irrigation infrastructure in the country. The projects included in the Prime Ministers relief package for agrarian distressed districts of Andhra Pradesh, Karnataka, Kerala and Maharashtra are also receiving financial assistance under the programme.

As on date, Major, Medium and Extension, Renovation and Modernisation (ERM) projects are eligible for Central Assistance (90% of the project cost as grant in the case of Special Category States and 25% of the project cost as grant in the case of Non-special category states) under AIBP. The surface water minor irrigation schemes of special category states as well as such schemes benefiting drought prone/ tribal area in non-special category are also eligible for Central Assistance (90% of the project cost as grant) under AIBP.

A grant of ` 4910.478 crore has been released to 77 Major & Medium Irrigation Projects under AIBP during 2010-11 till 31.03.2011. The cumulative total Central Loan Assistance/ Grant provided to States is ` 40944.992 crore under AIBP since its inception covering 287 projects. Out of 287 projects, 122 projects have been completed and 4 projects were deferred up to 31.03.2011. As reported by the State Govts. ` 6.325 million hectare of additional irrigation potential has been created under AIBP since the start of the scheme till March, 2011.

Under the AIBP, Central Water Commission has been assigned the responsibility to comprehensively monitor the projects receiving CLA/Grant. Presently, 165 ongoing projects under AIBP 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.

The list of projects under monitoring during 2010-11 under General/Vigorous/AIBP is given in **Annexure 8.1.**

State-wise distribution of ongoing Major, Medium and ERM projects being monitored by CWC Headquarter or Regional offices are given in **Table 8.1.**

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 Assessment of Irrigation Potential created under AIBP

To supplement the existing Monitoring mechanism by providing authentic and objective data base on existing irrigation infrastructure it was felt necessary to utilize the Remote Sensing Technique for the assessment of Irrigation Potential Creation in AIBP assisted projects. At the instance of Planning Commission, pilot studies of two projects i.e. Upper Krishna in Karnataka and Teesta Barrage in West Bengal were carried out successfully using Satellite Data by NRSA Hyderabad. The study results of the assessment were found 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. In first phase, the assessment of Irrigation potential Creation through mapping of irrigation infrastructures to monitor the progress was assigned to NRSA, Hyderabad in respect

of 53 Ongoing AIBP assisted projects covering area of 5447.743 Th. ha during 2007-08. The study has been completed during 2009-10. It not only provides the potential created but also gives critical gap areas for further effective monitoring.

It has been decided to take up similar assessment in respect of another 50 projects in second phase covering an area of 851.428 Th ha.

8.5 Monitoring of Centrally Sponsored Command Area Development Programme

During XI five year plan, a state sector scheme titled "Command Area Development and Water Management" with the estimated cost of `1600 crores has been approved. CWC is providing assistance in the coordination and monitoring of CAD Programme in respect of 203 irrigation projects spread over 22 states and 2 union territories covering a CCA of more than 21 Mha. 32 Nos. of status reports were received during the year 2009-10 and 37 nos. of status report were received during the years 2010-11 from the field units and these reports were examined and comments/observations were made wherever necessary.

8.6 Monitoring of Repair, Renovation & Restoration of Water Bodies directly linked to Agriculture under MI Scheme

The coordination and other works related to "Repair, Renovation & 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. In the XI five year plan the Government of India has approved two Schemes viz.

1. Repair, Renovation & Restoration (RRR) of water Bodies with domestic support with a central Share of ` 1250 crores during XI five year Plan.
2. "Repair, Renovation & Restoration (RRR) of water Bodies with external assistance as a state sector scheme with Central share of ` 1500 crore during XI five year Plan.

The objective of the scheme is comprehensive improvement of selected tank systems including restoration of water bodies, improvement of catchment areas of tank commands, increase in storage capacity of water bodies, ground water recharge, and improvement in agriculture/horticulture productivity, development of tourism, cultural activities and increased availability of drinking water.

CHAPTER-IX

CONSTRUCTION EQUIPMENT PLANNING AND MANAGEMENT

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

9.1 Project Appraisal

During the year, 46 project reports of Irrigation, Power and Multipurpose projects of various states of the country were technically examined from plant planning angle. Out of these 22 projects reports were accepted with provisions worth ` 6048.03 Lakhs in respect of construction equipment. In respect of the remaining 24 project reports, the observations/ comments were conveyed to the project authorities for compliance and further review.

9.2 Consultancy

(i) A Memorandum of Understanding has been signed with National Water Development Agency (NWDA) to provide assistance in preparation of Detailed Project Report(DPR) in respect of following river inter-linking projects:-

a. Par-Tapi Narmada link Project

b. Damanganga-Pinjal Link Project

Equipment planning for the project involving selection of appropriate equipment and finalization of construction method and construction programme will be undertaken and a chapter on the same for inclusion in DPR will be provided.

9.3. Manpower Planning

A special study on "Employment Generation in major and medium Operation & Maintenance stage irrigation projects" has been launched in Central Water Commission. 66 Major and Medium irrigation projects were selected for the study, out of which the information received from 61 Major and Medium projects. The purpose of the study is to know the Employment potential, Employment norm on investment of per crore of rupees on O&M, actual cost of O&M per thousand hectare of CCA, Expenditure on Manpower, Expenditure O&M and other items in Operation and Maintenance stage irrigation projects during the five years period from 2000-01 to 2004-05. The information was received in respect of 61 projects. Out of which, information in respect of 55 major and medium irrigation projects found suitable for study was scrutinized and basic data statements were prepared.

A draft report on "Employment Generation in major and medium operation and maintenance stage irrigation projects" containing information in respect of 55 (21 major and 34 medium) irrigation project has been prepared.

9.4 Other Activities

(i). Director, CMC visited Phuentsholing, Bhutan to participate in the meeting of the committee constituted for selection of initial construction equipment for Punasangchu-II HE Project, Bhutan' during 25th - 28th August 2010.

(ii). Director, CMC visited Phuentsholing, Bhutan to participate in the meeting of Tender Evaluation Committee(TEC) for finalization of equipment, their prices and other terms and conditions for Punasangchu-II HE Project, Bhutan during 29th November to 3rd December 2010.

10 CHAPTER-X

INTER-STATE MATTERS

10.1 Inter-State River Water Disputes

CWC provides 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 Monitoring of the implementation of Interim Order of CWDT

For the implementation of the interim orders of the Cauvery Water Dispute Tribunal (CWDT), Cauvery River Authority (CRA) and a Monitoring Committee (CMC) under it were constituted in August 1998. The Cauvery River Authority is headed by the Prime Minister and Chief Ministers of the basin states are its members. Secretary, MOWR is the Member-Secretary. The Monitoring Committee of Cauvery River Authority is headed by the Secretary, MOWR and Chief Secretaries of the basin states along with one Chief Engineer from each basin state and Chairman, CWC are its members. Chief Engineer (IMO), CWC is the Member-Secretary of the Monitoring Committee. ISM Directorate is the Secretariat for CMC.

The Cauvery River Authority has so far held six meetings, last being on 10.2.2003. The Cauvery Monitoring Committee has so far held 25 meetings. The twenty fifth meeting was held during 2010-11 on 24th August, 2010.

Further a meeting was convened by the Secretary, MoWR with the Chief Secretaries of Govt. of Karnataka and Govt. of Tamilnadu on 28th January, 2011 to arrive at a mutually acceptable Distress Sharing Formula. As per the decision taken in the meeting, the Distress Sharing Formula has been suitably modified and sent to MoWR.

10.1.2 Krishna Water Disputes Tribunal -2

The Krishna Water Disputes Tribunal was constituted during April, 2004. Later on the effective date of constitution of the Tribunal was revised to 01.02.2006. Krishna Water Disputes Tribunal (KWDT-2), submitted its report and decision on 30.12.2010 to the

Central Government. The report and decision were studied and draft reference points for seeking explanation and guidance from the Tribunal on the same under section 5(3) of the Act were sent to MOWR during last week of March 2011.

10.1.3 Vamsadhara River Water Dispute

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

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.

Attempts were made by MOWR to arrive at an amicable settlement of the issue. Meanwhile Hon'ble Supreme court in it's order dated February 2009 has directed GOI to constitute a Water Dispute Tribunal within six months and refer the issue to the Tribunal. Further, the Hon'ble Supreme Court, on the request of GOI, in its order dated 24th November 2009 has given an extension of six months for implementing the order dated 6th February 2009. The Tribunal was notified on 24.02.2010.

10.1.4 Mahadayi/Mandovi River Water Dispute

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 rectify 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 (WR) on 16.01.2006. But no settlement of the issue could be reached. Subsequently, a meeting was taken by Hon'ble Union Minister (WR) with the Chief Ministers of the basin states on 4.4.2006. 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.

The Cabinet on 10th December, 2009 approved the constitution of the Tribunal.

Cabinet Committee of Accommodation (CCA) IN ITS MEETING DATED 6th October, 2010 approved location of Headquarter of Mahadayi Tribunal at New Delhi. The Tribunal has been notified on 16.11.2010

10.1.5 Palar Water Dispute

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. Supreme Court heard the suit on 7.1.2008 and observed that the Central Government can consider the representation of Tamil Nadu and try to arrive at a settlement of the issue. Accordingly, three inter-state meetings were held. The third inter-state meeting was held on 24.12.2010 under the Chairmanship of Chairman, CWC. No consensus however, could be reached in the meeting & MoWR was informed accordingly.

10.2 Control Boards for Inter-State Projects

10.2.1 Bansagar Control Board

In pursuance of an interstate 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 head quarter of the Board is located at Rewa (Madhya Pradesh).

The Union Minister of Water Resources is the Chairman of the Board and the Union Minister of Power, Union Minister of State for Water Resources, Chief Minister and Minister in charge of Irrigation and Finance of the 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. 72 meetings of Executive Committee have taken place so far.

Bansagar Dam on Sone River, a joint venture of the states of Madhya Pradesh, Uttar Pradesh and Bihar is being executed by Water Resources Dept., Madhya Pradesh under the directions of the Bansagar Control Board. Execution of the canal works in respective territorial 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 Madhya Pradesh, Uttar Pradesh and Bihar in the ratio of 2:1:1(MP : UP : Bihar). The latest estimated cost of project is ` 1582.94 crores at 2009 price level. The total expenditure for an amount of ` 1508.29 crore upto October, 2010 has been incurred on the project.

The project is envisaged to 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. 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.

Betwa River Board

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

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

As per Betwa River Board Act 1976, Chairman, CWC is the Chairman of Executive Committee of BRB subject to the general superintendence and control of the Board. The management affairs of the Board are vested in the EC, in accordance rules and the directions of the Board. The 84th meeting of Executive Committee was held on 5.8.2010. The Committee discussed/decided the financial, technical and administrative matters of the Board

The Rajghat Dam with appurtenant structures has been constructed across river Betwa to provide Irrigation facilities to ` 1.38 lakh ha. in Uttar Pradesh and ` 1.21 lakh ha. in Madhya Pradesh with power generation of 45 MW through Rajghat Hydro Electric Project at the toe of dam on left bank. The Rajghat Dam Project has been completed in June 2005. Now O&M stage of the project has been started. The Executive Committee desired that a model set up for the Joint River Board may be formulated on the lines of Tungabhadra Board. Accordingly a draft M O U was prepared and sent to party states for the comments/views. The comments/views are still awaited from the party states.

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.1). Out of these 85 selected projects, 17 are under close monitoring.

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, and Planning Commission & CWC are members of the committee. The Chief Engineer (EMO), CWC is the Vice Chairman and Director (EM), CWC is the Member Secretary. Environmental 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.

It encourages the constitution of State Environmental Monitoring Committee (SEMCs) and Project Environmental Management Committee (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 constituted for 68 out of 85 projects selected by NEMCRVP. In addition to this, 48 additional PEMCs have also been constituted for the 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.

Revised Guidelines for Environmental Monitoring of River Valley Projects were published during the year 2010-11.

11.2 Environmental Impact Assessment

Studies on Environmental (including social) impacts of completed Water Resources Projects have been taken up by EIA Directorate through consultants, under R&D scheme of the Ministry of Water Resources. Studies on three projects viz. Jayakwadi Stage-I (Maharashtra) and Barna (M.P) and Salandi Project (Orissa) have been completed and final reports submitted. Four more studies of a similar nature in respect of Mahanadi Delta Project (Orissa), Mahi Bajaj Sagar Project (Rajasthan), Singur Irrigation project (AP) and Ramganga Dam (UP) have been taken up during 2008-09 in XI Plan, for which agreement with consultant had already been signed and studies are in progress. Inception Report/Interim I and II have been submitted by the consultant for all the four projects. Draft final report of Singur Project has also been submitted and is under examination.

In addition to above, an Inter-Ministerial Group (IMG) was constituted under the chairmanship of Secretary (WR) 'to evolve a suitable frame work to guide and accelerate the development of Hydro Power in the North East'. One of the recommendations contained in the report of IMG is that the sub basin wise EIA studies may be taken up in major tributaries of Brahmaputra. CWC was entrusted with the responsibility to conduct the studies for Subansiri and Siang sub-basins in consultation with the CEA and MoEF. Accordingly, the EIA studies of Subansiri and Siang sub-basins have been taken up by CWC and work for finalization of Terms of Reference, short listing of Consultants, Request for Proposals etc. are in progress.

11.3 Rehabilitation & Resettlement

The 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 analyzed.

A Publication titled 'Status Report on Implementation of R&R Action Plan in respect of Major & Medium Water Resources Projects in India' has been brought out.

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) and 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 2010-11. 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

S No.	Name of Project	Estimated cost (` crore)
1	Andhra Pradesh Water Sector Improvement Project	4444.41
2	Orissa Water Sector Improvement Project	3493.10

Table 12.2

Project proposed for JBIC Assistance

AP Irrigation and Livelihood Improvement Project					
S.No.	**(Sub –Projects)**		**River/Basin**	**District**	**Estimated Cost (` crore)**
1	Wyra	Medium	Wyra / Krishna	Khammam	46.00
2	Taliperu	Medium	Taliperu /Godavari	Khammam	13.20
3	Sathnala	Medium	Sathnala/Godavari	Adilabad	48.39
4.	Swarna	Medium	Swarna /Godavari	Adilabad	14.50
5.	Lankasagar	Medium	Kattaleru/ Krishna	Khammam	12.00
6	Malluruvagu	Medium	Malluruvagu / Godavari	Warangal	12.00
7	Dindi	Medium	Dindi / Krishna	Nalgonda,	15.00
8.	Gajulladinne	Medium	Hundri / Krishna	Kurnool	55.00
9.	Pakhal lake	Medium	Muneru / Krishna	Warangal	45.60
10	Lower Sagileru	Medium	Sagileru (Pennar)	Kadapa	19.00
11	Swarnamukhi Anicut	Medium	Swarna mukhi	Chittoor	27.55
12.	Gandipalem	Medium	Pillaperu	Nellore	29.30
13.	Paleru Bitragunda anicut	Medium	Paleru	Prakasam	19.00
14.	Cumbum tank	Medium	Gundlakamma	Prakasam	16.00
15.	Rallapadu project	Medium	Manneru	Prakasam	34.60

Table 12.3

Major projects proposed for Asian Development Bank Assistance

Sl No	Name of project	Estimated cost (` crore)
1.	Orissa 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 Restructuring Projects

Water Sector Restructuring Project is the latest concept in water resources development and management. Water Sector restructuring projects are planned with the objective to take care of water sector reforms, 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 On-going Credits / Loans Agreements

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

Table 12.4

External Assistance to Projects (World Bank)

Sl. No	Name of Project	Credit No/Loan No.	Agency	Time Slice		Est. Cost (` Million)		Assistance	
				Starting Month	Closing Month	Total (As per SAR)	Latest	Total	Utilized ending 02/11
1	2	3	4	5	6	7	8	9	10
1.	Maharashtra Water Sector Improvement Project*	Ln4796-IN	IBRD	09-2005	3-2012	18595.58	18595.58	325.00 M, USD	187.87 M, USD
2.	Rajasthan Water Sector Restructuring Project	Cr.3603-IN	IDA	03-2002	03-2013	8305.07	8305.07	93.45 M, XDR	74.71 M, XDR
3.	Uttar Pradesh Water Sector Restructuring Project	Cr.3602-IN	IDA	03-2002	10-2011	8351.00	8351.00	90.47 M, XDR	75.73 M, XDR
4.	Madhya Pradesh Water Sector Restructuring Project	Ln.4750-IN	IBRD	01-2005	03-2011	20402.23	20402.23	387.04 M, USD	184.27 M, USD
5.	Andhra Pradesh Water Sector Improvement Project	LR.7897-IN	IBRD	14-08-10	31-07-2016	44444	44444	450.00 M, USD	41.13 M, USD

12.3 Japan Bank of International Cooperation Assistance

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

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

12.3.1 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)

S. No	Name of Project	Loan Agrement No.	Loan period		Estimated cost	Total Assistance (M Yen)	Assistance utilized ending 02/11 (M yen)	Remarks
			Starting date	Closing date	As per agreement (` Million)			
1	Rengali Irrigation Project Left Bank Canal-II Phase-I, Orissa	ID-P-135 & ID-P154	03/04	05/11	6580	7760	6844.23	Closed
						6342	6207.95	On-going
2	K. C. Canal Modernisation Project, Andhra Pradesh	ID-P-113 & ID-P155	3/04	06/12	11070	16049	15728.65	Closed
						4773	3219.64	On-going
3	AP Irrigation and Livelihood Improvement Project	IDP 181	3/07	07/16	11377	23974	2638.55	On-going
	Total					**58898**	**34639.02**	

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 co-operation on matters relating to these rivers by way of discussions with neighbouring countries concerning river waters, water resources development projects and operation of related international treaties.

13.2 Cooperation with 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 catchments.

With a view to discuss important issues pertaining to cooperation in the field of Water Resources, including implementation of existing agreements and understanding, a India-Nepal Joint Committee on Water Resources (JCWR) headed by Water Resource Secretaries of both countries has been functioning with the mandate to act as an umbrella Committee for all committees and groups.

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

In pursuance of the decision taken during the 4th meeting of the India-Nepal Joint Committee on Water Resources (JCWR) held on 12-13 March, 2009 Joint Committee on Inundation and Flood Management (JCIFM) with Member (C), GFCC, Patna as Team Leader from India side was constituted replacing erstwhile bilateral committees namely Standing Committee on Inundation Problem (SCIP), Standing Committee on Flood Forecasting (SCFF), High Level Technical Committee (HLTC), Sub Committee on Embankment Construction (SCEC), Joint Committee on Flood Management (JCFM). During the 2nd meeting of JCIFM, held at Kathmandu during 7th-12th January 2010, the Director General, Department of Hydrology & Meteorology, Government of Nepal handed over Draft Flood Forecasting Master Plan 2010-14. The consolidated observations/comments of the Indian side on the Draft Flood Forecasting Master Plan 2010-14 have been sent to the Government of Nepal.

The 2nd meeting of India-Nepal Joint Standing Technical Committee (JSTC) was held on 30-31 March 2010 at Kathmandu, Nepal in which it was informed that the security for investigation works of Sapta Kosi project area has been provided for further continuation of JPO-SKSKI. It was informed that the closure of the Kosi Breach was completed in time with close cooperation between the Government of Nepal and India.

India-Nepal Joint Ministerial Commission on Water Resources (JMCWR) has been constituted in pursuance of the decision taken during the 3rd meeting of JCWR held on 29 September-1st October, 2008 at Kathmandu (Nepal) and 4th meeting of JCWR held on 12-13 March, 2009 at New Delhi to discuss and decide plans for maximizing the benefits from water resources development through bilateral cooperation. Minister (WR), Government of India is co-chairman from India side.

The status of projects being implemented jointly by India and Nepal is as follows:

I. Sapta Kosi High Dam Multipurpose Project & Sun Kosi Storage-cum-Diversion Scheme, Indo-Nepal

Field investigation studies and preparation of DPR for Sapta Kosi High Dam Multipurpose Project and Sun Kosi Storage-cum-Diversion Scheme have been taken

up jointly by Govt. of India and HMG Nepal. A Joint Project Office (JPO) has already been set up in Nepal for investigation of the projects. DPR stage design engineering for these projects is to be carried out by Central Water Commission.

Preliminary studies of Sapta Kosi High Dam Multipurpose Project 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.

Based on the preliminary studies carried out so far, four alternatives proposals for present study by JPO/SKSKI have been selected for Sun Kosi Storage-cum-Diversion Scheme. An optimal option amongst the four alternatives is required to be investigated in detail. CWC has furnished the investigation stage layout for power house related components and has also provided alternative barrage alignment.

II. Pancheshwar Multipurpose Project

A Treaty on Integrated Development of Mahakali (Sharda) River including Sharda Barrage, Tanakpur Barrage and Pancheshwar Multipurpose Project was signed between Government of India and Government of Nepal in February 1996, which came into force in June, 1997 (Mahakali Treaty). The Treaty is valid for a period of 75 years.

Pancheshwar Multipurpose Project is the Central 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 irrigation requirements downstream in Uttar Pradesh, have been completed. The Detailed Project Report (DPR) is to be finalized after mutually resolving the pending issues.

During the 5th meeting of JCWR held on 20-22 November, 2009 at Pokhara, Nepal, the Committee finalized the TOR of Pancheshwar Development Authority (PDA) and discussed several issues pertaining to PDA. The Indian side again reiterated its request to the Nepalese side to provide sufficient security arrangements at all sites, so that the investigations may be resumed immediately. As per the finalized TOR of PDA, it was

agreed that Chief Executive Officer (CEO) will be appointed from India or Nepal and the Headquarter of PDA would be located at Mahendranagar (Nepal).

13.3 Cooperation with China

The Government of India had entered into an MOU with China in the year 2002 for sharing of hydrological information on Yaluzangbu/ Brahmaputra river. 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 the Central Water Commission. On expiry of the above MOU in 2007, the revised MOU was signed on 05-06-2008.

During the visit of the Chinese Premier to India in April, 2005, an MOU was signed for supply of hydrological information by China to India in respect of Langquin Zangbo/ Sutlej river in flood season. Accordingly, the Chinese side provided hydrological information to India beginning from monsoon 2006. The Implementation Plan in this regard was signed in April 2008. Recently, on expiry of the above MOU in 2010, the revised MOU was signed on 16th December, 2010.

Joint Expert Level Mechanism (JELM) – In accordance with India-China Joint Declaration of November, 2006, both sides have set up an Expert Level Mechanism to discuss interaction and cooperation on the provision of flood season hydrological data, emergency management and other issues regarding trans-border rivers. The Indian side of Joint Expert Level Mechanism (JELM) is headed by Commissioner (B&B), MoWR and Chief Engineer (FM), CWC is member of JELM. The JELM has so far met three times.

13.4 Cooperation with Bangladesh

In order to ensure the most effective joint effort in maximizing the benefits from common river systems an Indo-Bangladesh Joint Rivers Commission (JRC) is functioning since 1972, which is headed by Water Resource Ministers of both the countries.

So far, 37 meetings of JRC have been held and its last meeting was held in March, 2010.

As per the provision of the Treaty, signed by the Prime Ministers of India and Bangladesh on 12th December 1996 for the sharing of Ganga/Ganges waters, a Joint Committee has been set up for implementing, joint inspection and monitoring of the sharing arrangements at Farakka in India and at Hardinge Bridge in Bangladesh for the dry season (Jan to May) every year.

Under bilateral arrangements, India provides the flood data of Farakka for Ganga and flood data of Pandu, Goalpara and Dhubri for Brhamaputra and Silchar for Barak during monsoon period to Bangladesh for use by their flood forecasting and warning arrangements besides data of river Teesta, Manu, Gumti, Jaldhaka and Torsa etc. The transmission of flood forecasting information from India during the monsoon which is being supplied free of cost, has enabled the civil and military authorities in Bangladesh to take precautionary measures and shift the population affected by flood to safer places. In addition to above, India has agreed to provide flood data of above sites to Bangladesh on continuous basis for use of data in development of flood forecasting models by Bangladesh.

13.5 Cooperation with Bhutan

A 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 33 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 26th meeting of the Joint Expert Team (JET) between Government of India (GOI) AND Royal Government of Bhutan (RGoB) to oversee and review the comprehensive scheme for establishment of Hydro-Meteorological and Flood Forecasting Network on rivers common to India and Bhutan was held at Guwahati, India from 5-6 March, 2011.

The matter relating to problem of floods created by the rivers originating from Bhutan and coming to India was taken up with the Royal Government of Bhutan. 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 appropriate and mutually acceptable remedial measures to both Governments.

The India side of JGE is headed by Commissioner (B&B), MOWR. The 3rd meeting of JGE was held at Thimphu (Bhutan) on 7-9 February, 2011 wherein the report of reconstituted Joint Technical Team (JTT) (13-16 September, 2010) was discussed. It was agreed that both sides should complete Integration of the map of common rivers to the scale of 1:50,000 in their respective territories within 6 months and the two sides will exchange the maps through the JTT team leaders, for finalization in the next meeting of the JTT.

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.

13.6 Cooperation with 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 fulfillment of the requirements of Indus Water Treaty, the daily data of 280 hydrological sites in six basins, viz., Indus, Jhelum, Chenab, Ravi, Beas and Sutlej of Indus system was sent to Pakistan every month.

Flood flow data for agreed sites on the rivers Ravi, Sutlej, Tawi and Chenab was also communicated by India to Pakistan for their benefit through telephone during the period from 1st July to 10th October to undertake advance flood relief measures.

13.7 Joint Working Group of India and Australia

In pursuance to the Memorandum of Understanding (MoU) signed between Government of India and Government of Australia on 10.11.2009, a Joint Working

Group (JWG) comprising of members from Indian and Australian sides was constituted by MoWR.

A delegation comprising of the members of Australian side of JWG visited India from 15.11.2010 to 19.11.2010 for the first meeting of the JWG. The Indian side of the JWG was led by Sh Shankar Mahto, Chief Engineer (BPMO), CWC while the Australian side was led by Dr. James Horne, Deputy Secretary, Department of Sustainability, the Environment, Water, Population and Communities. Director (Basin Planning) participated as representative of CWC.

After detailed deliberations between the members of the Indian and Australian side of the JWG, an Action Plan to Enhance Cooperation in the field of water resources development and management through the sharing of policy and technical experience of water management was signed by both sides.

14

CHAPTER-XIV

WATER RESOURCES DATA MANAGEMENT

14.1 Water Resources Data

14.1.1 Water Resources Information System (WRIS)

Under the Plan scheme "Development of Water Resources Information System" being implemented in the XI Plan, CWC has to establish inter alia an online data collection and information exchange system covering a wide range of areas relating to water resources development and management thereof subsequently. For this purposes, the requisite IT facilities are to be provided to state agencies as well as to all field offices of CWC to enable them to maintain their own data basis and transmit data to CWC through internet periodically. The online information so obtained would be stored in the centralized data bank to be developed for further dissemination and analysis.

For the purpose of creation of watershed maps and geographic information system under the scheme, CWC & ISRO has jointly undertaken this work. The First full version of website of INDIA WARIS has been launched on 07 December 2010 by Hon'ble Minister Water Recourses. The URL of the website is www.india-wris.nrsc.gov.in/webgis.php# can be seen for more details. Further, the development of Information System is under progress.

An MOU has been signed between the two parties in Dec' 2008 with 4 years time as the completion period. Further development of Information System is under progress and is to be completed by end of year 2012.

14.1.2 Hydrological Data

Hydrological Data for non-classified basins collected from the observation sites of CWC are compiled and brought out in the publication entitled "Integrated Hydrological Data Book". The publication contains the following information:

1. Description of Different River Basins,
2. Gauge & Discharge details of Water at different locations of River Basins,
3. Sedimentation Statistics,
4. Water Quality Statistics
5. Land Use Statistics

The publication for the year 2009 containing data up to 2006-07 has already been up-loaded on the website of CWC and the hard copy of the publication has also been distributed among the various Offices/Departments/Libraries/users. The preparation of the next issue of the publication is under progress.

14.1.3 Water and Related Statistics

Water and related Statistics collected from different sources are compiled in the publication entitled "Water & Related Statistics". The publication for the year 2010 has been released and is available on CWC website.

The following publications for official use have also been finalised.

i. Hand Book on Water & Related Information, May 2010
ii. Water Resources Sector At a Glance – 2010.

14.1.4 Financial Aspects

The water rates for domestic & industrial use and lift & flow irrigation up to 2006-07 prevailing across the country was compiled for the publication "Water Rates in Public System in India" and the same has been uploaded on website of CWC and printed. The publication contains the following information.

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 publication on "Financial Aspects of Irrigation Projects in India" is brought out to provide data on various financial parameters, in particular those 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 following information at State/UT level.

1. Financial Aspects of Major & Medium Irrigation Projects – Commercial and Non-Commercial
2. Financial Aspects of Minor Irrigation Schemes
3. Financial Aspects of Command Area Development Programmes

The Publication containing the information up to the year 2006-07 has been printed and placed on the website of CWC. The compilation of the publication containing the information up to 2008-09 is under progress.

14.2 Information Support to Management

The Information Systems organisation brings out publications for catering the needs of water resource planners, managers, administrators, researcher and public at large.

CHAPTER-XV
15 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. These programmes are held both within and outside the country, and officers of CWC are also deputed to various National and International seminars, conferences, workshops etc. Some training programmes are also conducted by Training Directorate at Head Quarter and field offices for in-service officers of CWC and other Central/State Govt. Departments and their Organisations. Further it 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 and the programmes in which CWC officers were nominated in abroad are given in Annexure 15.1 & 15.2 respectively.

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 phase of 24th ITP was conducted at NWA, Pune from 24th of Aug' 2010 to 12th of Nov' 2010 and second phase of this ITP was conducted at Head Quarter of CWC at New Delhi during 3rd of January 2011 to 25th January 2011, in which 9 officers participated.

15.3 National Water Academy

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.

NWA has also been mandated to take up training programmes for Panchayats, Farmers, NGOs, Media Personnel and other stakeholders etc. including foreign nationals particularly from developing countries. With effect from October 2010, all regular training programmes for NWA are made open to any citizen of India, viz. Central/State Government employees, Central/State PSUs employees, private companies, academicians, NGOs, and individuals. Some select programmes are also open to foreign nationals.

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 2010-11, in all 39 numbers of training programmes including Workshop/Seminar have been conducted. In these programmes, 883 numbers of officers from various states/central Govt. organizations, PSUs were trained by NWA with a total number of manweeks accomplished to the tune of 1116.

Out of 39 training programmes conducted by NWA, following programmes/ Workshops were introduced for the first time.

- Technical Preparedness under Dam Safety Awareness – 10th – 12th November 2010.
- Workshop on Scenario on Water Resources of India (3rd December 2010).
- Rural Drinking Water Supply – 6th – 10th December 2010.
- Flood Forecasting Techniques – 21st – 26th February 2011.
- Workshop for Training coordinators of Hydrology Project-II.
- World Bank Procurement Procedures (26th – 30th July 2010).

During the year 2010-11, an International training programme was conducted for African nationals on "Preparation of Detailed Project Report" in the month of February 2011 for the first time. A special 3 days training programme on Water Resources Management was conducted during 23-25 June 2010 for the benefit of college students from NIITE, Karnataka.

Various training courses, workshops and seminars organized by NWA at Pune during 2010-11 are given at **Annexure -15.3.**

Following off-campus training programmes were also conducted during the year 2010-11.

a) Workshop on E-Governance – 19th May 2010 at New Delhi.

b) Construction Management – 20-21 May 2010 at New Delhi

c) Refresher course on HYMOS – 8-10 Nov. 2010 at Karnataka

d) Environmental Aspects of Water Resources Project for W.R. Engineers of Shillong – 24-26 November 2010.

e) Training Programme for WAPCOS officers – 6-10 December 2010 at Gurgaon.

During 2010-11, faculty of NWA contributed following publications.

1. A rejoinder on "What Monsoon Means" written by Shri Chetan M Pandit, Chief Engineer, NWA was published in Current Science during February 2011.
2. Shri D S Chaskar, Director published and presented a paper titled "Information Systems for G2G Initiatives" in the National Conference on "Emerging Technologies and Practices in E-governance" during 9-10 December 2010 at Dr C V Raman University, Bilaspur (CG).
3. During the Regional Workshop held at CWC, Bangalore during 23-24 March, 2011, following papers by Dr R N Sankhua, Director, NWA were published.
   a) Modern Irrigation Canal Regulation and Canal Control Algorithms.
   b) Modelling of Non point Pollution Source in Upper Krishna Watershed using GIS: An overview.
   c) An appraisal for developing ANN based spatio-temporal morphological model of the river Brahmaputra.
4. A publication titled "Application Guide for HYMOS Users" written by Shri A K Srivastava, Director, NWA was released on 30.03.2011 by Hon'ble Union Minister of Water Resources and Minority Affairs, Shri Salman Khurshid.

Infrastructure development of NWA

The work of infrastructure development of NWA was continued during the year 2010-11. The construction work of two classrooms and a computer lab in office complex of NWA at a total cost of 409 lakhs was awarded through the Central Public Works Department (CPWD) and the construction work has been started. The work of construction of Swimming pool was also awarded through CPWD and the construction has been started.

The upgradation work of Godavari guest house of NWA was initiated during the year and all 32 rooms were upgraded by providing fridge, TV, ACs in each room. The balance upgradation work will be taken up during 2011-12.

The foundation stone laying ceremony for "Annexe Building of Office Complex of NWA" was held on 30th March 2011 at the hands of Hon'ble Union Minister of Water Resources and Minority Affairs, Shri Salman Khurshid, and the foundation stone for Extension of Krishna Hostel of NWA was laid by Shri Vincent Pala, Hon'ble Union Minister of State for Water Resources and Minority Affairs on 30th March 2011.

CHAPTER-XVI

16 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 2010-11, 11 complaints were received and taken up for investigation. Final decision was taken in respect of 8 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	19	11	11	01
b)	No. of cases added during the year	07	04	1	3
c)	No. of cases disposed of during the year	04	01	03	-
d)	No. of cases pending at the end of the year (a+b+c)	22	14	9	4

Vigilance Awareness Week was observed at CWC headquarters from 25th October to 1st November, 2010.

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

Sl. No	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
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, New Delhi.	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

Sl. No	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
34.	Indo-Nepal Joint Committee on Water Resources	Chairman, CWC	Member
35.	Farakka Barrage Control Board	Chairman, CWC	Member
36.	Sardar Sarovar Construction Advisory Committee	Chairman, CWC Member (WP&P)	Member Invitee
37.	Society of National Water Development Agency	Chairman, CWC Member (D&R) Member (WP&P)	Member Member Member
38.	Governing body of National Water Development Agency	Chairman, CWC Member (D&R) Member (WP&P)	Member Member Member
39.	National Water Board (NWB) of the National Water Resources Council	Chairman, CWC Member (WP&P)	Member Member-Secretary
40.	High Powered Committee (HPC) on Maintenance of Minimum Flow of River Yamuna	Chairman, CWC	Member
41.	Cauvery Monitoring Committee (CMC)	Chairman, CWC	Member
42.	Standing Committee on Water Resources (SC-W) of Planning committee of National Natural Resources Management System (PC-NNRMS) of Planning Commission	Chairman, CWC	Member
43.	Advisory Committee for consideration of Techno Economic viability of Major & Medium Irrigation, Flood Control and Multipurpose project proposals	Chairman, CWC Member (WP&P) Member (RM) Member (D&R)	Member Special Invitee Special Invitee Special Invitee
44.	Ganga Flood Control Board	Chairman, CWC	Invitee
45.	Narmada Control Authority	Chairman, CWC	Invitee
46.	Review Committee of Narmada Control Authority	Chairman, CWC	Invitee
47.	Upper Yamuna River Board	Member (WP&P)	Chairman
48.	National Environmental Monitoring Committee	Member (WP&P)	Chairman
49.	Joint Operation Committee for Rihand Dam	Member (WP&P)	Chairman
50.	Contracts Works Sub-Committee of Betwa River Board	Member (WP&P)	Chairman
51.	Sub-Committee for processing tenders and proposals for purchase of stores & equipments of Bansagar Control Board	Member (WP&P)	Chairman
52.	Sub-Committee of officers to consider the claims of M/s HSCL in Earth Dam- Lot of Rajghat Dam Project	Member (WP&P)	Chairman
53.	Committee for settlement of claims of M/s N.P.C.C. Ltd of Betwa River Board	Member (WP&P)	Chairman
54.	Sub-Committee to examine and process claim cases of contractors of Bansagar Control Board	Member (WP&P)	Chairman
55.	Technical Advisory Committee on Socio-Economic, Agro-economic and Environmental Impact studies	Member (WP&P)	Chairman
56.	Screening Committee for selection of arbitrators on Arbitration Boards.	Member (WP&P)	Chairman

Sl. No	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
57.	Joint regulation Committee of Chandil Dam and Galudih Barrage	Member (WP&P)	Chairman
58.	Joint Regulation Committee of Kharkai Dam	Member (WP&P)	Chairman
59.	Sub-Committee on Irrigation, Performance Assessment History, Education, Training, Research & Development	Member (WP&P)	Chairman
60.	Standing Project Appraisal Committee of Central Water Commission	Member (WP&P)	Chairman
61.	Water Resources Planning Management and evaluation Sectional Committee-WRD-06 (BIS)	Member (WP&P)	Chairman
62.	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
63.	Task Force for Flood Management in the country (North Western Region)	Member (WP&P)	Chairman
64.	Committee for Cost Sharing of Hathnikund Barrage	Member (WP&P)	Chairman
65.	Sub-Group-1 for Research topics under invited reserved Category	Member (WP&P)	Chairman
66.	Sub-Group-II Rain Water Harvesting	Member (WP&P)	Chairman
67.	Committee for the Re-organised UP/Uttaranchal States	Member (WP&P)	Chairman
68.	Committee for Re-organised Bihar/ Jharkhand States	Member (WP&P)	Chairman
69.	Upper Yamuna Review committee	Member (WP&P)	Member-Secretary
70.	Working Group of INCID on capacity building	Member (WP&P)	Member
71.	Working Team on Socio-Economic Impacts & Policy Issues (ICID)	Member (WP&P)	Member
72.	Standing Committee for overall National Perspective Water Planning and Coordination in relation to diverse use of water	Member (WP&P)	Member
73.	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
74.	Committee for Eastern River Waters of Indus System of River	Member (WP&P)	Member
75.	National Watershed Committee	Member (WP&P)	Member
76.	Central Loan Assistance under Accelerated Irrigation Benefits Programme	Member (WP&P)	Member
77.	Steering Committee of Indian National Committee on Hydrology (INCOH)	Member (WP&P)	Permanent Invitee
78.	High Powered Committee-Yamuna Action Plan of Ministry of Environment and Forests	Member (WP&P)	Invitee
79.	Technical Advisory Committee for Flood Control, Drainage and Anti-Sea Erosion Schemes (Goa)	Member (RM)	Chairman

Sl. No	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
80.	Subernarekha Embankment Committee (Orissa, West Bengal & Bihar)	Member (RM)	Chairman
81.	Working Group to advise WQAA on the minimum flow in the rivers	Member (RM)	Chairman
82.	Setting up of HISMG (Data and Data dissemination) for Implementation of the World Bank assisted Hydrology Project Phase –II.	Member (RM)	Member
83.	Setting up of HISMG (Technical) for Implementation of the World Bank assisted Hydrology Project Phase –II.	Member (RM)	Chairman
84.	Steering Committee for the Preparation of Status Report on Water Resources requirements and its availability for Urban Areas	Member (RM)	Chairman
85.	Coastal Protection and Development Advisory Committee (CPDAC)	Member (RM)	Chairman
86.	National Coastal Zone Management Authority (NCZMA)	Member (RM)	Chairman
87.	Ghaggar Standing Committee	Member (RM)	Chairman
88.	Yamuna Standing Committee	Member (RM)	Chairman
89.	Sahibi Standing Committee	Member (RM)	Chairman
90.	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
91.	Flood Control Board set up by the Irrigation and Flood Control Department of Govt. of NCT of Delhi	Member (RM)	Chairman
92.	Committee for Flood Control Works in Brahmaputra Valley	Member (RM)	Chairman
93.	Standing Committee to Brahmaputra Board	Member (RM)	Chairman
94.	West Bengal State Committee of Engineers	Member (RM)	Chairman
95.	Kosi High Level Committee	Member (RM)	Chairman
96.	Damodar Valley Reservoir Regulation Committee	Member (RM)	Chairman
97.	WRD 01 Sectional Committee of BIS for Fluid Flow Measurements	Member (RM)	Chairman
98.	WRD-22 River and Diversion Works Sectional Committee	Member (RM)	Chairman
99.	Sub-Committee-III (Flood Management, Drainage and Environment Impacts) of INCID	Member (RM)	Chairman
100.	Joint Group of Experts on Pancheshwar Multi-purpose project	Member (RM)	Special Invitee
101.	Joint Team of Experts (JTE) on Sapta Kosi Project	Member (RM)	Team Leader
102.	Committee for examination of technical issues regarding Baglihar Hydro-Electric projects on the Chenab Main in J&K	Member (RM)	Chairman
103.	TAC to Assam State Brahmaputra Valley Flood Control Board	Member (RM)	Chairman
104.	TAC to Cachar Flood Control Board (Assam)	Member (RM)	Chairman

Sl. No	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
105.	High Level Committee to Study the Regulation of Releases from various Hydro-Electric Projects Constructed Along Teesta	Member (RM)	Chairman
106.	Committee to study Erosion Problem of Bhutani Diara (West Bengal) and Majauli Island (Assam)	Member (RM)	Chairman
107.	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
108.	Standing Technical Advisory Committee (STAC) to the Governing Council for CSMRS, New Delhi.	Member (D&R)	Chairman
109.	Technical Committee for procurement of Instruments and working models for Instrumentation Centre (IDC)	Member (D&R)	Chairman
110.	Governing Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
111.	General Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
112.	Research Advisory Committee (RAC) of National Council for Cement and Building Materials.	Member (D&R)	Member
113.	Indian National Committee on Hydraulic Research (INCH)	Member (D&R)	Chairman
114.	R&D Implementation and Monitoring Committee(RIMC)	Member (D&R)	Chairman
115.	National Committee on Seismic Design Parameters of River Valley Projects (NCSDP)	Member (D&R)	Chairman
116.	Standing Advisory Committee (SAC) for R&D Programme	Member (D&R)	Chairman
117.	National Level Steering Committee (NLSC) for Dam Rehabilitation and Improvement Project (DRIP)	Member (D&R)	Member
118.	Technical Committee (TC) for Dam Rehabilitation and Improvement Project (DRIP)	Member(D&R)	Chairman
119.	Technical Advisory and Review Committee (TARC) for preparation of PMP Atlas	Member (D&R)	Chairman
120.	Steering Committee of INCOH	Member (D&R)	Chairman
121.	World Meteorological Organization	Member (D&R)	Principal Representative
122.	Board of Directors of Tehri Hydro Development Corporation	Member (D&R)	Part Time Director
123.	Group of Implementation of Hydro-Electric Projects in J&K State	Member (D&R)	Member
124.	Section Committee of Bureau of Indian standards, WRD-15	Member (D&R)	Chairman
125.	Committee to access Quantum on Excess River Water Flowing Across International Boarder and suggest its diversion	Member (D&R)	Chairman
126.	Technical Advisory Committee of the Farakka Barrage Project.	Member (D&R)	Chairman

Sl. No	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
127.	Committee of CEA to accord of techno-economic appraisal of Power Schemes.	Member (D&R)	Permanent Special Invitee
128.	NHPC Performance Review Committee	Member (D&R)	Member
129.	Tender Committee of Farakka Barrage Project	Member (D&R)	Chairman
130.	Programme Advisory Committee (PAC) for Fly Ash Unit constituted by Department of Science and Technology	Member (D&R)	Member
131.	Committee to finalize the Action Plan on full utilization of Eastern River flowing across international Boarder	Member (D&R)	Chairman
132.	Committee for monitoring progress of Farakka Barrage Project	Member (D&R)	Chairman
133.	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 Indian National Committee on Hydraulic Research (INCH)

The Indian National Committee on Hydraulic Research (INCH) was constituted in the year 1990, the apex body in Hydraulics with the responsibility of coordinating various research activities in the field of management of floods, hydraulic structures, river and estuarine hydraulics, river morphology, ground water hydraulics, instrumentation for seismic and geophysical measurements, open channel flow, pipe flow, hydraulic machinery, city water supply and ports and harbours. The secretariat of INCH, earlier located at CWC, New Delhi has now been shifted to CWPRS, Pune with effect from September, 2008. As on January 2011, 17 research schemes are under implementation and 1 has been completed successfully during 2010-11.

17.2.2 Indian National Committee on Hydrology (INCOH)

The Indian National Committee on Hydrology (INCOH) constituted in the year 1982, the apex body in Hydrology, with the responsibility of coordinating various research activities in the field of meteorology, surface water hydrology, evaporation control, instrumentation, real time systems, application of GIS and remote sensing. The secretariat of INCOH is located at National Institute of Hydrology, Roorkee.

In pursuance of its objectives, the Committee has brought out 29 state-of-art Reports in hydrology in the country. The Committee has also provided financial support for organising seminars, conferences etc. for dissemination of knowledge and promoting education and training in hydrology.

The Committee is participating in the activities of International Hydrological Programme (IHP) of United Nation's Educational, Scientific and Cultural Organisation (UNESCO) by organizing regional courses and workshops.

As on January 2011, 17 research schemes are under implementation. The 3 research schemes have been completed during 2010-11.

17.2.3 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. Recently INCID has been reconstituted and there 14 members who represent CWC, CGWB, IMD, WALMIs, IIT, Water Resources Dept. of various State Government etc. Senior officers of the Central and State Governments are representing INCID in 21 Work Bodies of INCID, thereby facilitating exchange of Technology and know how in the related fields among the member countries. INCID Secretariat is located at New Delhi. INCID pursues the mission and activities of International Commission on Irrigation and Drainage (ICID) in India. It also looks into the R&D activities in irrigation and drainage sectors.

The activities of INCID during the year 2010 are given below:

(i) The Ministry of Water Resources through INCID is funding 40 research projects of various research institutes in the field of agriculture and irrigation during financial year 2010-11. Appraisal and monitoring of the schemes has been carried out.

(ii) Chairman INCID attended the 61st International Executive Council (IEC) Meeting and 6th Asian Regional Conference (ARC) of ICID at Yogyakarta, Indonesia during October 2010.

(iii) 9th R&D Session of INCID was held at New Delhi in December 2010.

(iv) 27th Meeting of INCID was held in March 2011 at New Delhi.

17.2.4 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. 61st brainstorming session of the New Delhi Centre of WWC held on 12th March 2009 under the chairmanship of Mr. M. Gopalkrishnan.

17.2.5 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.

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

18

CHAPTER-XVIII

PUBLICITY AND PUBLICATION

18.1 Printing and Publication

The offset press in the Publication Division of Technical Documentation Dte. carried out various printing jobs for CWC & MOWR. About 9544 number composed pages and 92260 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. Printing and Binding jobs completed during the period from 1.4.2010 to 31.03.2011.

Sl. No.	Name of the Job	Nodal Agency	No. of composed pages	No. of copies
(1)	(2)	(3)	(4)	(5)
1.	Hand book for Computing the Water Use Efficiency (WUE) Studies	IPO Dte.	156	100
2.	CWC Annual Report 2008-2009 (English)	TC Dte.	148	450
3.	Flood Estimation Report for Lower Narmada and Tapi Sub-zone 3(b) Revised	Hydrology Dte.	116	200
4.	Guidelines for Submission, Appraisal and Clearance of Irrigation & Multipurpose Project 2010	PA (North) Dte.	36	1000
5.	Guidelines for Environment Monitoring of Water Resources Day	Environmental Mgt .Dte.	46	400
6.	Guidelines for Preparation of Detailed Project Report of Irrigation and Multi-purpose Projects.	NP-I Dte.	436	2000
7.	Report on Status of Watershed Management and Water Harvesting	W&RS Dte	145	200
8-14.	Bhagirath English – 7 Nos. issues: Jan-March, 2008, April-June 2008, July-Sept.2008, Oct-Dec.2008 April-June2009, April-June 2010, July-Sept..2010	Editor, Bhagirath (English) Publicity Section	330	7100
15-23.	Bhagirath Hindi – 9 Nos. issues: Oct-Dec.2008, Jan-March2009, April-June 2009, July-Sept 2009, Oct-Dec 2009, Jan-March 2010, April-June 2010, July-Sept..2010, Oct-Dec 2010	Editor, Bhagirath (Hindi) Section	440	9900

24-33	CWC Administrative News Bulletin (Hind/English) – 10 Issues	Editor, (English) & Publicity Section	68	7200

In addition following items of regular nature were also published:

- APAR form of officers and staff of CWC
- Other printed stationary required for administration and official purpose

18.2 Microfilming

In view of converting the microfilm drawing into digital media, modernization work of microfilming unit is under progress..

18.3 Journals

CWC publishes 'Bhagirath' a quarterly semi-technical journal, both in English and in Hindi, which contain articles/information/news concerned with Water Resources development and related subjects. During the year all the issues were published as per schedule. In addition, 'Administrative News Bulletin' on monthly basis was also published during the year 2010-2011 bilingually. From October 2010 onward 'Administrative News Bulletin' is published on the website of CWC for public view.

18.4 Azo Prints

Nearly 4487 number 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. Directorate.

18.5 Engineering Museum

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

18.6 Information, Education & Communication (IEC) activities

T.D. Directorate is co-ordinating the works of Information, Education & Communication (IEC) activities of MoWR. In this regard, the following IEC activities are undertaken:

i. Printing and distribution of printed material like posters, banners, pamphlets, booklets, electronic sign-boards etc.
ii. Advertising through Mass Media, transport vehicle, Bus back panel hoardings, Metro Stations, Airports etc.
iii. Celebration of special Days viz., World Water Day, Water Resources Day etc. to generate awareness on water issues
iv. Organizing exhibitions in prominent places viz. Parliament Annex, Rail Museum, Pragati Maidan, Nehru Planetarium and similar other places in other states.
v. Holding seminars, workshops etc. with irrigation Ministries/Principal Secretaries of water related Ministries
vi. Arranging visits of school/college students to museum at Kalindi Bhavan/WR Projects, etc.

18.7 Media Plan 2010-2011 of MoWR

As per Media Plan 2010-11 of Ministry of Water Resources, CWC participated in the following fair/exhibitions along with other departments of MoWR:

- Thrissur Pooram Exhibition 2010 at Thrissur, Kerala from 3rd April, to 24th May, 2010
- Science & Technology Expo-2010 at Nainital, Uttrakhand from 4th to 6th June, 2010
- 4th National Exhibition on theme "Starving towards glorious India" at Kolkata West Bengal from 3rd to 7th Sept., 2010
- Exhibition at Kurukstertra, Haryana in Oct., 2010
- India International Trade Fair (IITF)-2010 at Pragati Maidan, New Delhi from 14th to 27th November, 2010
- Lucknow Mahotsav at Lucknow, Uttar Pradesh from 26th Nov.,2010 to 5th Dec., 2010
- PHD Chamber of Commerce & Industry – expo at Amritsar(Punjab) from 8th to 12th December, 2010
- 4th International Trade Festival at Guwahati, Assam from 29th December to 10th January, 2011
- Water India-2011 at Pragati Maidan, New Delhi from 10th to 12th February, 2011.

Annexure-1

Plan Schemes & Annual Budget

Plan Schemes

Details of the Plan Schemes during the year 2010-11 are given below:

(` in Crore)

S. No	Name of Schemes	Objective / Scope of Works	XI Plan outlay	FY 2010-11 (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	4.00	2.870	2.797
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 - `631.83 crore, CWC component `29.60 crores	6.82	4.77	4.059
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	66.00	40.90	31.486
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 `290.00 crore, CWC component `40.00 crore	15.57	11.00	9.704
5.	Dam Safety Studies & Planning	Setting up of Instrumentation Demonstration Centre (spill over works of Xth Plan Scheme). •Environmental & Social	10.00	1.773	1.5	1.163

		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).				
6.	Flood Forecas-ting	●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	45.326	36	24.254
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 `601.00 crore, CWC outlay `118.95 crore)	26.15	13.207	7.777

8.	Infrastru-cture Develop-ment	●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 ` 115.00 crore			
			CWC component			
			(i)Land & Building ` 57.00 crore	11.721	15	9.733
			(ii) Up-gradation and moderni-sation of comput-erisation and infor-mation system of CWC `6.00 crore.	1.43	1.69	1.748

1.7.2 Non-Plan Budget

The non-plan budget outlays and expenditure for the year 2010-11 are given below:

Table 1.3

CWC (NON-PLAN) SCHEMES - OUTLAY AND EXPENDITURE

2701- MAJOR & MEDIUM IRRIGATION

(` in crores)

S NO.	NAME OF THE SCHEMES	BE. 2010-11	EXP. 2010-11
1	Direction & Administration	20.90	22.70
2	Data Collection	65.13	84.16
3	Research	1.84	2.37
4	Training	0.32	0.32
5	Survey & Investigation	8.12	8.68
6	Consultancy	20.74	24.29
7	Exhibition & Trade Fair	0.01	0.013
8	Cell for Mon. externally aided Project	0.65	0.98
9	Mod. Of Equip. CWC Offset Press	0.24	0.36
10	Water Planning Wing	1.07	1.89
11	Hydrological Obs. In Chenab Basin	1.70	1.90
12	Seminars and Conferences	0.004	0
13	Contribution to International Bodies	0.01	0
	Total:	**120.734**	**147.663**

2711- FLOOD CONTROL & DRAINAGE

(` **in crores**)

S. NO.	NAME OF THE SCHEMES	BE. 2009-10	EXP. 2009-10
1	Flood Control	53.77	66.51
2	Payment to Government of Bhutan for Maintenance of Flood Forecasting & Warning Centres	1.02	0.053
3	Strengthening & Modernisation of FF and Hyd. Obs. Network in Brahmaputra and Barak Basin	1.95	2.37
	Total:	**56.74**	**68.9333**

Annexure – 5.1

List of Active Consultancy Projects in D&R Wing during the Year 2010-11

S. No.	State/ name of projects	S. No.	State/ name of projects
	Andaman & Nicobar Islands	24	Indira Sagar Main Canal (Const.)
1	Indira Nalla Water Supply Scheme (Const.)	25	Dudhi Project (DPR)
2	Chouldhary Nallah Project (Const.)	26	Jobat Project (Const.)
	Andhra Pradesh	27	Lower Goi Project (Const.)
3	Indira Sagar (Polavaram) Project (Const.)	28	Raghavpur Small HE Project (DPR)
	Arunachal Pradesh	29	Omkareshwar Project Unit-II Canal (Const.)
4	Kameng H.E. Project (Const.)	30	Indira Sagal Project (Const.)
	Bihar	31	Upper Budhner Project (DPR)
5	Durgawati Reservoir Project (Const.)	32	Ganjal Project (DPR)
	Chattisgarh	33	Machchrewa Project (DPR)
6	Kelo Irrigation Project (Const.)	34	Rosara Small HE Project (DPR)
	Goa	35	Basania Small HE Project (DPR)
7	Opa Barrage Project (Const.)	36	Yashwant Sagar Water Supply Project (Const.)
	Gujarat	37	Chinki HE Project (DPR)
8	Sardar Sarovar Project (Const.)		**Rajasthan**
9	Garudeshwar Weir Project (DPR)	38	Kalisindh Project (Const.)
	Himachal Pradesh	39	Khetri Iron Ore Tailings Dam (Const.)
10	Rampur H.E. Project (Const.)	40	Lhasi Medium Irrigation Project (Const.)
	Jammu & Kashmir		**Sikkim**
11	Ujh M.P. Project (DPR)	41	Kalez Khola HE Project (DPR)
	Jharkhand		**Uttar Pradesh**
12	Amanat Barrage Project (Const.)	42	Arjun Sahayak Pariyojna (Const.)
13	Gumani Barrage (Const.)		**Uttarakhand**
14	Balpahari MP Project (DPR)	43	Tehri Dam Project (Const.)
	Madhya Pradesh	44	Tapovan Vishnugad Project - NTPC (Const.)
15	Kushalpura Project (Const.)	45	Koteshwar H.E. Project (Const.)
16	Sher Project (DPR)	46	Pala Maneri Project (Const.)
17	Halon Irrigation Project (DPR)		**Gujarat & Maharashtra**
18	Pench Diversion Project (DPR)	47	Damanganga - Parinjal Link Project (DPR)
19	Pench Valley Water Supply Scheme (Const.)	48	Par -Tapi - Narmada Link Project (DPR)
20	Ataria Project (DPR)		**Orissa**
21	Bargi Diversion Project (Const.)	49	Anandpur Barrage Project (Const.)
22	Morand Project (DPR)	50	Control Structures on Indravati & Jouranalla River (Const.)
23	Harsi High Level Canal Project (DPR)		**Meghalaya**
24	Ataria Project (DPR)	51	Myntdu H.E. Project (Const.)

52	New Umtru H.E. Project (Const.)		**West Bengal**
	Manipur	18	Farakka Barrage Project
53	Thoubal M.P. Project (Const.)		
54	Dholaithabi Barrage Project (Const.)		
55	Khuga M.P. Project (Const.)		
	Foreign Projects		
	Afghanistan		
56	Salma Dam Project (Const.)		
	Bhutan		
57	Punatsangchu Stage-I HE Project (Const.)		
58	Punatsangchu Stage-II H.E. Project (Const.)		
	Indo-Nepal		
59	Naumure MP Project(DPR)		
60	Sapta Kosi High Dam MP Project (DPR)		
	Sun Kosi Storage cum Diversion Scheme (DPR)		
61	Kamla MP Project (DPR)		
	Myanmar		
62	Tamanthi Hydro Power & MP Project (DPR)		
63	Shwezaye Hydro Power & MP Project (DPR)		
	Sp. Problem Projects		
	Andhra Pradesh		
1	Nagarjuna Sagar Project		
2	Srisailam Dam		
3	Srisailam Left Bank HE Scheme		
4	Srisailam Right Bank HE Scheme		
	Bhutan		
5	Chukha HE Project		
	Haryana		
6	Hathnikund Barrage		
	Himachal Pradesh		
7	Chattru Project		
	Jammu & Kashmir		
8	Nimboo Bazgo HE Project		
9	Bursar Storage Project		
10	Kishan Ganga HE Project		
11	Upper Sindh HE Project Stage-II		
	Karnataka		
12	Devarabelakera Pick up Dam Project		
13	Ankamanhal Minor Irrigation Dam		
	Meghalaya		
14	Barapani Project		
	Tamil Nadu		
15	Mulla Periyar Dam		
	Uttar Pradesh		
16	Hardoi Branch Canal System		
17	Rihand Dam Rehabilitation Project		

Annexure- 7.1

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	9.23 lakh ha 1000 MW Barrage	West Bengal
2.	Shahpur Kandi	3,80 lakh ha 300 MW 0.016 MAF	Punjab
3.	Bursar	1 lakh ha (indirect) 1230 MW 1 MAF	Jammu & Kashmir
4.	2nd Ravi Vyas Link	Harness water flowing across border of about 3 MAF	Punjab
5.	Ujh Multipurpose Project	0.32 lakh ha 280 MW 0.66 MAF	Jammu & Kashmir
6.	Gyspa Project	0.50 lakh ha 240 MW 0.6 MAF	Himachal Pradesh
7.	Lakhvar Vyasi	0.49 lakh ha 420 MW 0.325 MAF	Uttranchal
8.	Kishau	0.97 lakh ha 600 MW 1.04 MAF	Himachal Pradesh /Uttranchal
9.	Renuka	drinking water 40 MW 0.44 MAF	Himachal Pradesh
10.	Noa-Dehang Dam Project	8000 ha 75 MW 0.26 MAF	Arunachal Pradesh
11.	Kulsi Dam Project	23900 ha. 29 MW 0.28 MAF	Assam
12.	Upper Siang	Indirect 9500 MW 17.50 MAF & Flood moderation	Arunachal Pradesh
13.	Gosikhurd	2.50 lakh ha 3 MW 0.93 MAF	Maharashtra
14.	Ken Betwa	6.46 lakh ha 72 MW 2.25 MAF	Madhya Pradesh

Annexure 7.2

List of Projects Accepted By Advisory Committee of MoWR during 2010-11

Sl. No.	Project Name	Name of the State	Major/ Medium	Estimated Cost (`Cr.)	Price Level	Benefits in Ha. /MW	Date of Approval by Planning Commission
104th Meeting held on 12.05.2010							
1	Karra Nalla Irrigation Project	Chhattisgarh	Medium	99.19		4,100	22.06.2010
2	Ghumariya Nalla Irrigation Project	Chhattisgarh	Medium	47.79	2009	3,200	09.07.2010
3	Sutiapat Irrigation Project (Revised)	Chhattisgarh	Medium	98.62	2009	6,960	09.07.2010
4	Improving Irrigation Intensity of Hardoi Branch System (Revised - ERM)	Uttar Pradesh	Major	105.30		3,06,055 (Restoration 95,961 ha)	
5	Rajiv Sagar (Bawanthadi) (Revised)	Madhya Pradesh & Maharashtra	Major	1407.19	2009	57,120	15.09.2010
6	Purna Barrage-II Project	Maharashtra	Medium	179.28 (PL 2008-09)	2008-09	7,302	17.07.2010
7	Upper Manar Irrigation Project (Revised)	Maharashtra	Medium	424.5	2008-09	12,420	16.07.2010
8	Modernization of Zaingir Canal Irrigation Project (ERM)	Jammu & Kashmir	Medium	73.51		7,100	
9	Modernization of Lar Canal Project (ERM)	Jammu & Kashmir	Medium	47.72		2,231 (Addn. 617Ha)	
10	Modernization of Grimtoo canal (ERM)	Jammu & Kashmir	Medium	99.09		4,734	
11	Restoration & Modernization of main Ravi canal and its distribution system (ERM)	Jammu & Kashmir	Major	62.27		50749 (Restoration 15,016)	
12	Raising and strengthening of Left and Right Embankment along None River	Bihar	Flood Control	26.71	--	A.P 2,72,000	02.08.2010
13	Flood Threat of River Jhelum	Jammu & Kashmir	Flood Control	97.46	--	--	

Sl. No.	Project Name	Name of the State	Major/ Medium	Estimated Cost (`Cr.)	Price Level	Benefits in Ha. /MW	Date of Approval by Planning Commission
14	Regulation of Flood water in Kayal Area, 4 Padasekhrams and Mitigation of Floods in Group-9, 5 Padasekharams in Kuttanad Region of Kerala	Kerala	Flood Control	118.91	--	3,266	
15	Flood protection works of river Yamuna, Saharanpur district	Uttar Pradesh	Flood Control	28.113	--	20villa-ges	
16	Flood Protection works along Left and Right Bank of River Rapti	Uttar Pradesh	Flood Control	68.82	--	365.48 sq.km	
17	Flood protection works along left and right bank of river Yamuna	Uttar Pradesh	Flood Control	43.80	--	18,633	
18	Construction of embankment along left bank of river Ganga in district J P Nagar and Bijnor	Uttar Pradesh	Flood Control	33.23	--	4,000	
19	Anti-erosion works to protect sensitive cluster of villages along right bank of river Ghaghra in district Lakhimpur Kheri	Uttar Pradesh	Flood Control	30.40	--	195	
20	Anti-erosion works to protect sensitive cluster of villages along left and right bank of river Sarda in district Lakhimpur Kheri and Sitapur	Uttar Pradesh	Flood Control	25.04	--	140	
105th Meeting held on 25.06.2010							
21	Restoration Works of Eastern Gandak Canal system (Revised)	Bihar	Major	684.78		6,62,000 (Restoration 4,36,000 ha.)	04.11.2010
22	Khrung Tank Project-ERM	Chhattisgarh	Major	101.04		56,300 (Additnl.Irri. 15,300)	25.08.2101
23	Halon Irrigation Project	Madhya Pradesh	Major	414.21		16,782	
24	Man Irrigation Project	Madhya Pradesh	Major	246.03	2009	17,700	31.12.2010
25	Upper Narmada Irrigation Project	Madhya Pradesh	Major	683.93	2009	26,622	05.12.2010

Sl. No.	Project Name	Name of the State	Major/ Medium	Estimated Cost (`Cr.)	Price Level	Benefits in Ha. /MW	Date of Approval by Planning Commission
26	Shelgaon Barrage project	Maharashtra	Medium	446.49		11,318	05.12.2010
27	Rengali Irrigation Sub-Project–LBC-II (Revised)	Orissa	Major	1958.34	2009	1,77,651	
28	Kachnoda Dam Project (Revised)	Uttar Pradesh	Major	423.45	2009	10,850	02.08.2010
29	Flood Protection Works to Brahmani-Kelua-Birupa Doab of Brahmani system of Orissa State	Orissa	Flood Control	62.32	2009	17,100	19.08.2010
30	Revised Project Estimate for constructon of right Marginal bund on river ganga from Bhogpur to Balawali	Uttarakhand	Flood Control	20.69	--	9,000	
31	Scheme for Desilting of river Ichamati along the common border portion for better drainage and flood management.	West Bengal	Flood Control	38.23	--	225 sq.km	
106th Meeting held on 16.09.2010							
32	J. Chokka Rao Godavari Lift Irrigation Scheme (Revised)	Andhra Pradesh	Major	9427.73	2009-10	285,724	
33	Durgawati Reservoir Project (Revised)	Bihar	Major	983.10	2009-10	39,610	
34	Maniyari Tank Project - ERM	Chhattisgarh	Major	159.95	2008-09	64,771	06.12.2010
35	Balh Valley (Left Bank) Irrigation project (Revised)	Himachal Pradesh	Medium	103.78	2010	4,354	
36	Gumani Barrage Project (Revised)	Jharkhand	Major	185.76	2008-09	16,194	10.02.2011
37	Kandi Canal extension from Hoshiarpur to Balachur, Stage-II (Revised)	Punjab	Major	540.24	2009	23,326	27.01.2011
38	Modernisation of Gang Canal system (Revised)	Rajasthan	Major	621.42	2008-09	281,050(Adtinl Irr.96,510)	31.12.2010
39	Badaun Irrigation Project	Uttar Pradesh	Major	332.12	2008-09	37,453	18.11.2010
40	Bansagar Canal Project (Revised)	Uttar Pradesh	Major	3148.91	2008-09	150,132	05.12.2010
41	Kanhar Irrigation Project	Uttar Pradesh	Major	652.58	2008-09	27,898	05.12.2010

Sl. No.	Project Name	Name of the State	Major/ Medium	Estimated Cost (`Cr.)	Price Level	Benefits in Ha. /MW	Date of Approval by Planning Commission
42	Restoring capacity of Western Gandak Canal system – ERM	Uttar Pradesh	Major	217.12	2009-10	332,000 (Rstrn 178,000)	06.12.2010
43	Raising & Strengthening to tributary dyke of Kopilli river from Charaihagi to Tuklaitup, Basundhari to Killing Kopilli junction (L/B) and Chapormukh to Ahotguri Amsoi PWD road including anti erosion measures at different reaches.	Assam	Flood Control	110.72	2009-10	26,000	
44	Assam integrated Flood & River Bank erosion Risk Management project – Dibrugarh Sub Project.	Assam	Flood Control	61.33	2009-10	32,614	
45	Assam integrated Flood & River Bank erosion Risk Management project – Palasbari Sub Project.	Assam	Flood Control	129.49	2009-10	65,152	
107th Meeting held on 27.10.2010							
46	Raisa Reservoir Scheme	Jharkhand	Medium	77.68	2009-10	3145	10.02.2011
47	Tajna Reservoir Scheme	Jharkhand	Medium	87.76	2009-11	5670	10.02.2011
48	Kachhal Irrigation Project	Madhya Pradesh	Medium	62.48 DoR-03/09	2009	3470	09.03.2011
49	Upper Kaketo Irrigation Project	Madhya Pradesh	Medium	196.27	2009	3423	
50	Flood Protection works along banks of river Tunga at Shimoga town from Ch:11.754km to Ch:14.410 km and Mattur village from Ch: 6.006 km to Ch:7.036km in Shimoga District	Karnataka	Flood Control	55.18	2010-11	11	
51	Flood Protection works for Hemavathi river (Ch:km 29.50 -km 31.50) at Holenarasipur in Hassan District	Karnataka	Flood Control	25.48	2010-12	7	

Sl. No.	Project Name	Name of the State	Major/ Medium	Estimated Cost (`Cr.)	Price Level	Benefits in Ha. /MW	Date of Approval by Planning Commission
52	Flood Protection works along left and right bank of River Rapti in District Siddharthnagar, Sant Kabir Nagar, Gorakhpur and Deoria- U.P.	Uttar Pradesh	Flood Control	52.29	--	422.33 sq.km	
108th Meeting held on 04.01.2011							
53	Siddhata Irrigation Project (Revised)	Himachal Pradesh	Medium	95.29	2010	5348	
54	Mitigation of Flood in Kuttanad of Kerala in respect of Phase – I (Group 2 to 5,7,8 &10to 19)	Kerala	Flood Control	379.05	2010	9311	
55	Indira Sagar (Polavaram) Project (Revised)	Andhra Pradesh	Major	16010.45 (Irri. 9307.54)	2010-11	436827	
56	Lower Wardha Project (Revised)	Maharashtra	Mojor	2232.41	2008-09	63333	18.03.2011
57	Relining of Indira Gandhi main Canal, Stage-I (ERM)	Rajasthan	Major	401.63	Mar.2010	71892	
58	Indira Gandhi Nahar Project, Stage-II (Revised)	Rajasthan	Major	6921.32	2010	901000	
109th Meeting held on 14.03.2011							
59	Phina Singh Irrigation Project	Himachal Pradesh	Medium	204.51	Feb-11	8472	
60	Subernarekha Multipurpose Project (Revised)	Jharkhand	Major	6613.74	2010	236846	
61	Kushalpura Irrigation Project	Madhya Pradesh	Medium	83.975	2009	7540	
62	Bagharru Irrigation Project	Madhya Pradesh	Medium	50.57	2009	3350	
63	Rehti Irrigation Project	Madhya Pradesh	Medium	48.77	2009	2905	
64	Waghur River Project (Revised)	Maharashtra	Major	1183.55	2009	30358	
65	Urmodi Irrigation Project	Maharashtra	Major	1417.75	2009-10	43870	
66	Tembhu Lift Irrigation Project	Maharashtra	Major	3450.35	2009-10	80472	
67	Bodwad Parisar Sinchan Yojna	Maharashtra	Major	2178.67	2009-10	53449	
68	Anti erosion & flood protection work in Dikrong Basin in	Arunachal Pradesh	Flood Control	23.68	2010	1690	

Sl. No.	Project Name	Name of the State	Major/ Medium	Estimated Cost (`Cr.)	Price Level	Benefits in Ha. /MW	Date of Approval by Planning Commission
	Papumpare District						
69	Anti erosion & flood protection work in Bhareli sub basin in East Kameng District	Arunachal Pradesh	Flood Control	16.81	2010	1000	
70	Anti erosion & flood protection work in Siyom Basin in West Siang District	Arunachal Pradesh	Flood Control	29.64	2010	2782	
71	Anti Erosion works along River Ganga (i) Near village Kasimchak in Danapur diara on left bank, (ii) Downstream of Mokama bridge on the left bank, (iii) Downstream of Vikramshila bridge on the left bank, (iv) Town protection work near Patna City and Ramnagar Diara on the right bank and (v) Near village Mathurpur Ami on the left bank	Bihar	Flood Control	63.54	--	48280	
72	Anti erosion works at Koerpatti between 27 mile to 32 mile of Champaran embankement on the left bank of river Gandak in the District West Champaran of Bihar	Bihar	Flood Control	19.8	--	2500	
73	Scheme for breach closure of Saran embankment, anti erosion works and raising and strengthening of Pathara Chharki embankment on river Gandak in Bihar	Bihar	Flood Control	57.15	--	460 sq.km	
74	Scheme for flood protection works of Pipra-Piprasi embankment on	Bihar	Flood Control	21.73	2010	323.84 sq.km	

Sl. No.	Project Name	Name of the State	Major/ Medium	Estimated Cost (`Cr.)	Price Level	Benefits in Ha. /MW	Date of Approval by Planning Commission
	right bank river Gandak						
75	Bagmati Flood Management Project - Phase II	Bihar	Flood Control	596.51	--	290000	

Annexure 15.1

Courses organized by Central Water Commission during the year 2010-11

Sl. No	Training Programme	Duration of the Course	Venue	No. of Participants
1.	Computer Training under E-Governance activities in CWC	03rd – 18th & 22nd March – 5th April, 2010	New Delhi	28
2.	Training on "Awareness on various aspects of E-Governance" at CWC Hqrs	19th May, 2010	New Delhi	40
3.	Training on "Contract Management and financial Procedures".	20th -21st May, 2010	New Delhi	37
4.	Workshop on Installation of Satellite Based telemetry station and Modeling Center	18th-19th June, 2010	New Delhi	38
5.	Training on "MS Office Bilingual"	18th July, 2010	New Delhi	18
6.	Hindi Work shop	22nd September, 2010	Bhubaneswar	11
7.	Training on "Use of MIKE-11 for Flood Forecasting"	4th – 8th October, 2010	Bhubaneswar	10
8.	Training on "Preparation & Appraisal of DPR of Flood Management Programme."	20th – 22nd October, 2010	Bangalore	20
9.	Training on "Refresher Course on HYMOS".	1st – 3rd November, 2010	Bangalore	20
10.	Workshop on "Hydrological Aspects in Project Planning and Preparation of DPR."	8th – 12th November, 2010	New Delhi	30
11.	Training on "Refresher Course on SWDES"	8th -12th November, 2010	Hyderabad	10
12.	Training on "Refresher Course on SWDES"	22nd – 26th November, 2010	Hyderabad	10
13.	Training on "Surface Water Data Collection, Data Entry in SWDES & Data Processing using HYMOS"	6th – 10th December, 2010	NTBO, CWC, Gandhinagar	21

14.	"Refresher Course on HYMOS"	27th – 31st December, 2010	KGBO, CWC, Hyderabad	10
15.	24th Induction Training Programme for Newly recruited Assistant Directors.	3rd to 25th January, 2011	New Delhi	11
16.	Training on MIKE-11	7th – 11th February, 2011	Agra	9
17.	Training on MIKE-11	21st – 25th February, 2011	Hyderabad	12
18.	Brain Storming Session on "Increasing Water Use Efficiency by 20%"	4th February, 2011	New Delhi	150
19.	Training Programme on "Training for Freshers on SWDES"	23rd – 27th May, 2011.	KGBO, CWC, Hyderabad	10
20.	Workshop on "Process of Project Appraisal and Monitoring in CWC" organised for State Irrigation Department"	19th – 20th May, 2011	Shillong	50

Annexure 15.2

List of officers deputed abroad for various Training/Seminor/Symposia/Confrence etc. During the year 2010-11

Sl. No	Training Programme	Duration of the Course	Venue	No. of Participants
1.	Participating in River Basin Study visit at Madrid, Spain	26th – 27th May, 2010	Madrid, Spain	1
2.	Meeting of participants countries: ILO/IPEC (International Programme on Elimination of Child Labour) Surveys to estimate Commercial Sexual Exploitation of Children (CSES)	24th – 25th June, 2010	Cebu City (Phillipines)	1
3.	Group Training Course in "Integrated Water Resources Management under the technical cooperation Programme of the Government of Japan.	25th July – 7th August, 2010	Japan	1
4.	Participating in 2 back to back Technical Events organised by ILO's IPEC	25th – 28th September, 2010	Istanbul	1
5.	Group Meeting of ISO/TC113 and its Committee	17th – 22nd October, 2010	Portland Oregon (USA)	1

Annexure – 15.3

CENTRAL WATER COMMISSION
NATIONAL WATER ACADEMY

TRAINING CALENDAR FOR THE YEAR 2010-11

Sr. No.	Training Programme	Duration of Courcse	No. of participants	Manweeks
1.	Water Quality Management for lakes and reservoirs	19-23 April 2010	24	24
2.	Workshop on E-Governance	19th May 2010	40	8
3.	Construction Management	20-21 May 2010	37	14.8
4.	Leadership Communication Skills	24-28 May 2010	19	19
5.	Application of RS-GIS	7-18 May 2010	19	45.6
6.	Introductory Program – WRM for Karnataka Govt.	23-24 June 2010	38	15.2
7.	SWDES Using HYMOS	28.06.10 to 02.07.10	21	21
8.	Environmental Aspects	12-16 July 2010	31	31
9.	World Bank Procurement Procedures	26-30 July 2010	30	30
10.	Design Flood Estimation	16-20 Aug. 2010	17	17
11.	Coastal Engineering	23-27 Aug. 2010	26	26
12.	24th ITP	24.08.10 to 12.11.2010	9	108
13.	Hydrology	30.08.10 to 03.09.10	15	15
14.	Hydrometry	6-11 Sept. 2010	14	16.8
15.	Workshop on Train the Trainers (T3)	27.09.10 to 01.10.10	19	19
16.	Application of IT.in Water Resources.	4-8 Oct. 2010	16	16
17.	Economic, Social and Environmental Aspects.	11-15 Oct. 2010	2	2
18.	Strategic Issues in Water Resources Development and management	18-21 Oct. 2010	2	2
19.	Hydrological Review of Existing Projects	25-29 Oct. 2010	29	29
20.	Refresher course on HYMIOS	8-10 Nov. 2010	33	19.8

	(off campus – at Karnataka)			
21.	Technical Preparedness under Dam Safety Aspects.	10-12 Nov. 2010	24	14.4
22.	Application of RS-GIS in Water Sector	22.11.10 to 03.12.10	25	60
23.	Workshop on FMR	23-24 Nov. 2010	25	10
24.	Off campus training programme on "Environmental Aspects of WRP for the W.R. Engineers of Shillong	24-26 Nov. 2010	40	24
25.	Scenario of W.R.S. in India	03.12.2010	37	7.4
26.	Rural Drinking Water Supply	6-10 Dec. 2010	16	16
27.	Off campus training program for WAPCOS at Gurgaon	6-10 Dec. 2010	37	37
28.	Application of Finite Element Analysis in W.R.	6-16 Dec. 2010	19	45.6
29.	Dam Safety Concern	13-15 Dec. 2010	25	15
30.	Management Development Program for Non Engineering Officers of organizations under MoWR.	3-7 January 2011	13	13
31.	Mid Career Program for the Directors / Deputy Directors of CWC	3- 7 January 2011	8	8
32.	Preparation of Detailed Project Report	17-28 January 2011	11	26.4
33.	Analysis and Design of Dams	31st January to 11th Feb. 2011	28	67.2
34.	Preparation of Detailed Project Report for African nationals.	14 - 25 Feb. 2011	12	28.8
35.	Preparation of Detailed Project Report for WRD, Bhopal	-- do --	20	48
36.	Flood Forecasting Techniques	21-26 Feb. 2011	23	27.6
37.	Workshop for Training Coordinators of HP-II	28th Feb. 2011	17	3.4
38.	Water Quality Management (Surface Water)	7-16 March 2011	28	56
39.	Orientation Program for newly promoted AD-II of CWC	21st March to 8th April 2011	34	129.2
		Total	**883**	**1116.2**