सत्यमेव जयते

Government of India
Ministry of Water Resources

ANNUAL REPORT

2011-12

CENTRAL WATER COMMISSION

INDIA - LAND AND WATER RESOURCES : FACTS

•	Geographical Area & Location	328.7 M ha Latitude 8^0 4' & 37^0 6' North Longitude 68^0 7' & 97^0 25' East
•	Population 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 (2010)	3989.25 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 (2009-10)

•	Total Cultivable Land	182.2 M ha
•	Gross Sown Area	192.2 M ha
•	Net Sown Area	140.0 M ha
•	Gross Irrigated Area	86.4 M ha
•	Net Irrigated Area	63.3 M ha

HYDROPOWER

•	Ultimate Hydropower Potential (As per reassessment)	84044 MW at 60% L.F.
•	Potential Developed by 31st March, 2011	38990.40 MW

FROM CHAIRMAN'S DESK

It is our pleasure to bring out this Annual Report of the Central Water Commission (CWC) for the year 2011–12. 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 2011-12. 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 100 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 64 Major, 19 Medium and 8 ERM Projects of General/Vigorous along with 163 ongoing Projects under AIBP.
- Providing assistance in the coordination and monitoring of CAD Program in respect of 203 irrigation projects spread over 22 states and 2 union territories covering a CCA of more than 21 Mha.
- Examination of proposals for Major and Medium Irrigation Projects for release of ` 3703.438 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 5995 flood forecasts (with 98.43 % accuracy) during the monsoon period of 2011 to help effective flood management.

(R. C. JHA)
CHAIRMAN

HIGHLIGHTS OF THE YEAR 2011 -12

❖ DESIGNS

- Design units of CWC undertook detailed designs and drawings of various types of hydraulic structures for 100 water resources development projects.

❖ RIVER MANAGEMENT

- Carried out Hydrological Observations at 952 sites including snow and meteorological observation in different basins spread over the country.
- Operated 175 flood forecasting stations (including 28 inflow forecasting sites) spread over 9 major river basins. During the flood season 2011, 5995 flood forecasts were issued out of which 5907 (98.53 %) were within prescribed limits of accuracy. Daily flood bulletins and weekly flood news letters were issued during the flood season. 6 Red Bulletins (for Unprecedented Flood Situation) and 55 Orange Bulletins (for High Flood Situation) were issued.
- Completed installation of satellite based telemetry system at 205 stations upto March, 2012 and the work of remaining 17 stations is to be continues as spill over into the 12th plan period.
- Provided assistance to Royal Government of Bhutan for maintenance of 35 Hydro-meteorological sites in Bhutan.
- 7 Flood Management Schemes/Master Plans for Flood Control were examined/ appraised during the year 2011-12.
- Processed 130 flood management schemes for release of funds to Government of J&K, Goa, Punjab and Orissa during 2011-12 under "Flood Management Programme".

❖ WATER PLANNING

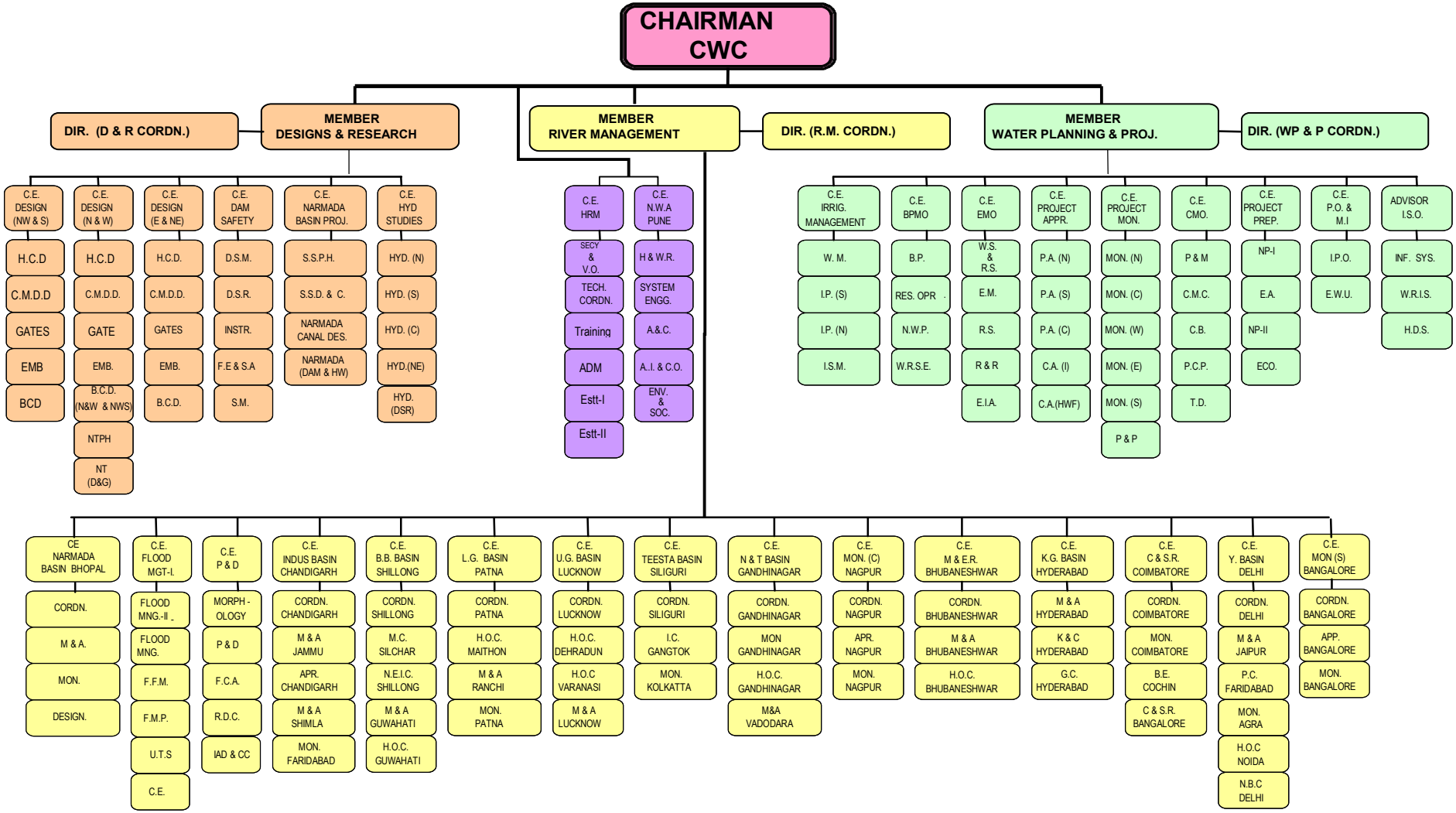
- During the year 2011-12, 30 major irrigation projects were under appraisal in CWC. 44 projects comprising 14 major, 3 medium irrigation projects, 25 flood control projects and 2 Coastal Protection projects were accepted by the Advisory Committee.
- Monitored 81 Major, Medium and Extension/Renovation/Modernization (ERM), Irrigation Projects. In addition 151 projects, receiving CLA under AIBP were also monitored.
- 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 ` 3703.438 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

- National Water Academy, CWC, Pune conducted 31 training programmes during 2011-12 including Workshop/Seminar for officers of Central / State Governments and Public sector undertakings with a total number of man weeks accomplished to the tune of 774.6.

C O N T E N T S

Organogram of Central Water Commission 2011 – 12



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 2011-12 were:

1.	**Chairman**, CWC	:	Shri A.K.Bajaj (02-03-2009 to 31-08-2011)
			Shri R. C Jha (01-09-2011 till date)
2.	**Member** (D&R)	:	Shri S.P. Kakran (31.01.2011 to 01-09-2011)
			Shri A.K. Ganju (02-09-2011 till date)
3.	**Member** (RM)	:	Shri R. C. Jha (12-02-2008 to 31-08-2011)
			Shri S.P. Kakran 02-09-2011 till date
4.	**Member** (WP&P)	:	Shri M. E. Haque (01-02-2011 to 31-12-2011)
			Shri C .M. Pandit (04-01-2012 to 31-03-2012)

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.
- To collect, maintain and publish statistical data relating to water resources and its utilization including quality of water throughout India.
- 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 Program (AIBP), and Command Area Development (CAD) program 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 151 ongoing projects under AIBP which are getting grant and are being monitored by CWC.

A grant of ` **3703.438** crore has been released to 70 Major & Medium Irrigation Projects under AIBP during 2011-12 till 31.03.2012. The cumulative total Central Loan Assistance / Grant provided to States is ` 44647 under AIBP since its inception of the programme till 31.03.2012 to 293 projects. As reported by the State Govts. 6.348 million

hectare of additional irrigation potential has been created under AIBP since the start of the scheme till March, 2012.

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 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. The Chief Engineer (FM), CWC is providing assistance to the Ministry of Water Resources for processing and coordination of cases for release of funds under "Flood Management Programme".

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. Four (04) more layers viz. Tourism, Litholog data, Inter basin transfer link and Drought have been added. The second version was launched on 22nd March'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 crops per drop of water etc., MoWR has decided to take up 2nd Phase of programme during remaining period of XI Five Year Plan i.e. year 2010-11 & 2011-12. The work of 2nd phase of FPARP has been awarded to 31 institutes for conducting 2,921 demonstrations for an estimated cost of ` 1, 431.00 lakhs.

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 the year 2011-12, only one meetings of High Powered Steering Committee was held on 22nd December, 2011. In the meeting, Saryu Nahar Pariyojna was recommended for inclusion in the Scheme of National Projects. Restoring capacity of Sharda Sahayak System was also discussed in the meeting and recommended for inclusion subject to amendment in the guidelines. During 2011-12, Central assistance of ` 97.2 cr was released to Teesta Barrage Project.

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 office Building of CWC Head Quater entrusted to CPWD. Works at 9th floor Sewa Bhawan have been completed and the work of 8th floor (North Wing) is in progress.

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) was introduced w.e.f 01.02.2011 in Central Water Commission.

Adequate numbers of machines were installed for marking the attendance by officers and members of staff. 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 libraries on the subject of Water Resources Engineering and other allied subjects. 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 2011-12. The Library is also engaged in the procurement of books/publications requisitioned by other directorates of CWC for their mini libraries.

Library stock has been re-arranged in a manner to make retrieval of desired publication fast and easy. 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 are 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. three Hindi workshops were organized at Central Water Commission headquarter, in which 109 officials participated and one workshop of computer training (Saransh Software) was organized to the benefit of CWC officials.
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, 2011. Various competitions like Hindi noting /drafting, easy writing, Technical easy writing, Dictation for MTS, Kavya Spardha Technical Presentation, Quiz on Water Resources aspects organized and winners were awarded cash prizes and certificates. Raj Bhasha hields for the year 2010-11

were also awarded to the field offices of the Central Water Commission situated at regions A, B, C Viz., Hydrological observation circle, Varanasi, Tapi Division, Gangtok, and Establishment-IX Section, Narmada Hydro Mechanical Design, Design Directorate within the Commission for doing their maximum work in Hindi during the year.

5. Apart from translation of documents falling under section 3(3) of the Official Language Act, the Annual Report of the Central Water Commission, 2009-10 and other urgent translation material received form MoWR were translated into Hindi.

6. Second Sub-Committee of Parliament on Official Languages inspected the field offices of CWC at Yamuna Basin, New Delhi on Dated 14 June, 2011. The committee suggestions are being implemented effectively.

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

8. Meetings organized by the Town Official language Implementation Committee of South Delhi were attended by the senior officers of CWC. Their suggestions are being implemented effectively.

1.10 Welfare Measures and Incentives

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

1.10.1 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.

1.10.2 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.

1.10.3 Sports and Cultural Activities

Shri Narottam Singh Rawat, Hindi Translator, CWC represented in various Delhi State /National/International Boxing Tournaments as Coach/Official.

CWC Hockey Team yet again won Team Championship in the Inter Ministry Hockey Tournaments 2011-12 consecutively sixth times in a row.

Smt. Mini Polson, UDC, CWC won the silver Medal in Women Long jump (Vet.) event in the Inter Ministry Athletic Meet 2011-12.

S/Sh. Ashwani Kumar, Asst., Esst V Section won the Bronze Medal in 100 mtr. Race Men (Vet) in the Inter Ministry Athletic Meet 2011-12.

CWC Athletic Team Stood Third in the March-Past of the Inter Ministry Athletic Meet 2011-12.

1.11 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.

1.12 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., out 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 cumulative figures of potential created in the successive plan periods are given in Figure 2.1 and 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 2.1.

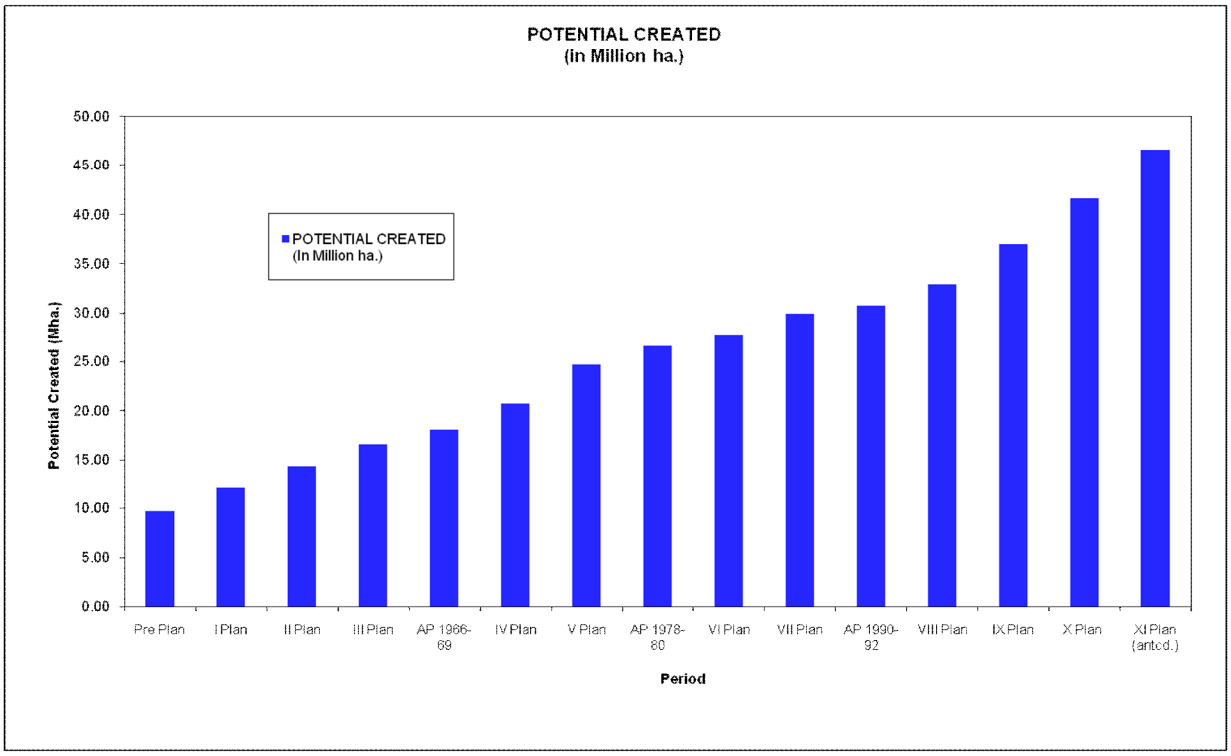


Table 2.1 - Growth of Irrigation Potential Created During Pre-Plan and Plan Period (Cumulative) (Major and Medium Irrigation Sector)

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 were 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. Further, as per the information furnished to the Working Group on Major Medium Irrigation & Command Area Development (MMI & CAD) for XII Plan formulation, 130 projects (31 major, 49 medium and 50 ERM) were reportedly taken up and 116 projects(35 major, 62 medium and 91 ERM) were completed during the XI Plan. Number of MMI Projects taken up and completed upto X Plan and During XI Plan are given in Table 2.2.

The cumulative irrigation potential created till the end of X Plan was 41.637 m ha. Working Group on MMI & CAD for XII Plan has anticipated a potential creation of

about 5 mha through MMI projects during the XI plan. It has also recommended target for additional potential creation of 7.79 mha during the XII Plan. The Plan-wise growth of irrigation potential created through major and medium irrigation sector and corresponding actual expenditure (anticipated expenditure in case of XI Plan) in various plan periods is given in Table. 2.3.

Table 2.1

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 2.2

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

Category	Projects Taken Up			Projects completed			Spill over into XII Plan			
	Preplan	Upto X Plan + During XI Plan	Total	Pre-plan	Upto X Plan + During XI Plan	Total	Noti-onal	On going	Liabi-lity in XII Plan	Not Repor-ted
Major	74	368+31	473	74	186+35	295	178	154	9	15
Medium	143	1087+49	1279	143	813+62	1018	261	139	28	93
ERM	-	215+50	265	-	120+19	139	126	34	1	91
Total	**217**	**1670+130**	**1800**	**217**	**1119+116**	**1452**	**565***	**327**	**37**	**199**

*** Out of these, 199 Projects (15 major, 93 minor, 91 ERM) have not been reported for XII Plan formulation by the States, effort is being made to obtain their Status.**

Source: Planning Commission

Table 2.3

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

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)	82195	184090	4.59	41.64	33.74
XI Plan (2007-12)*	174473	358563	5.00	46.64	--

* Anticipated figures

Source: Report of the Working Group on Water Resources for XII Five Year Plan (20012-17)

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.

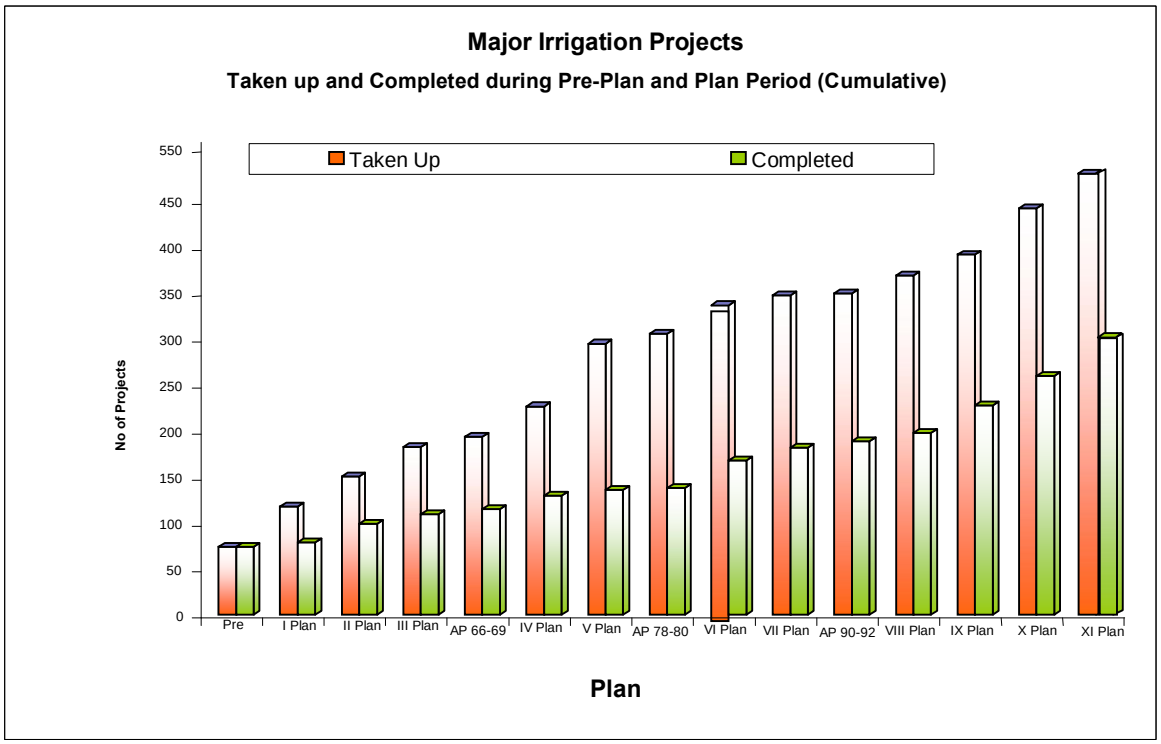


Fig 2.2 Major Irrigation projects taken up and completed during pre-plan and plan period (Cumulative)

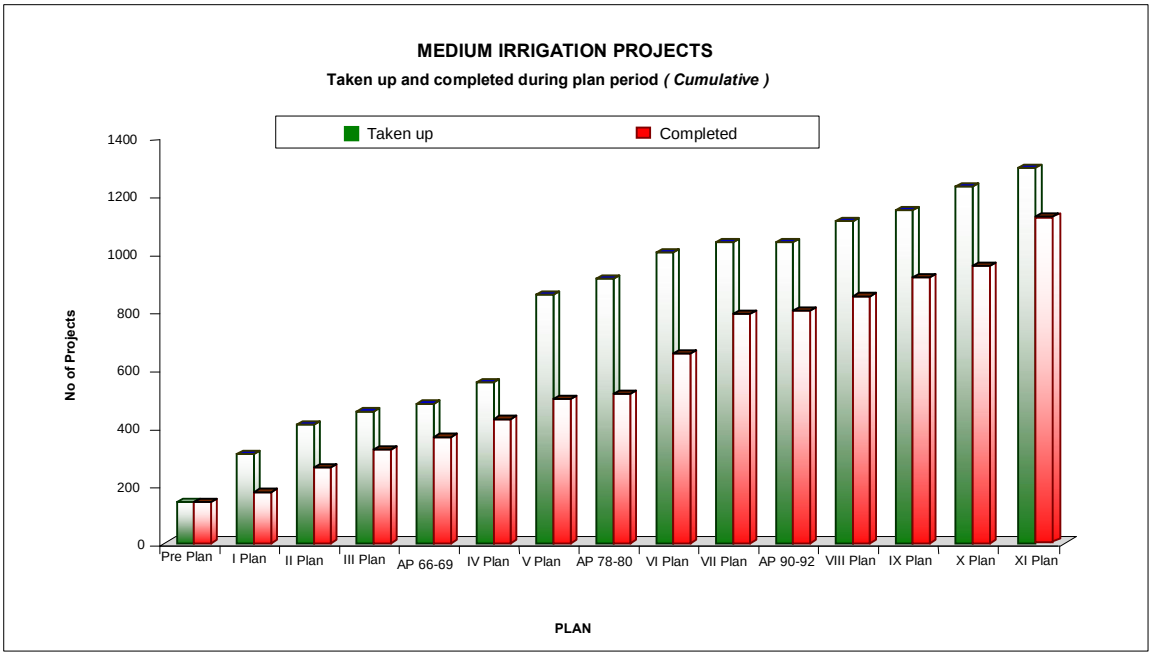


Fig 2.3 Medium Irrigation projects taken up and completed during pre-plan and plan period (Cumulative)

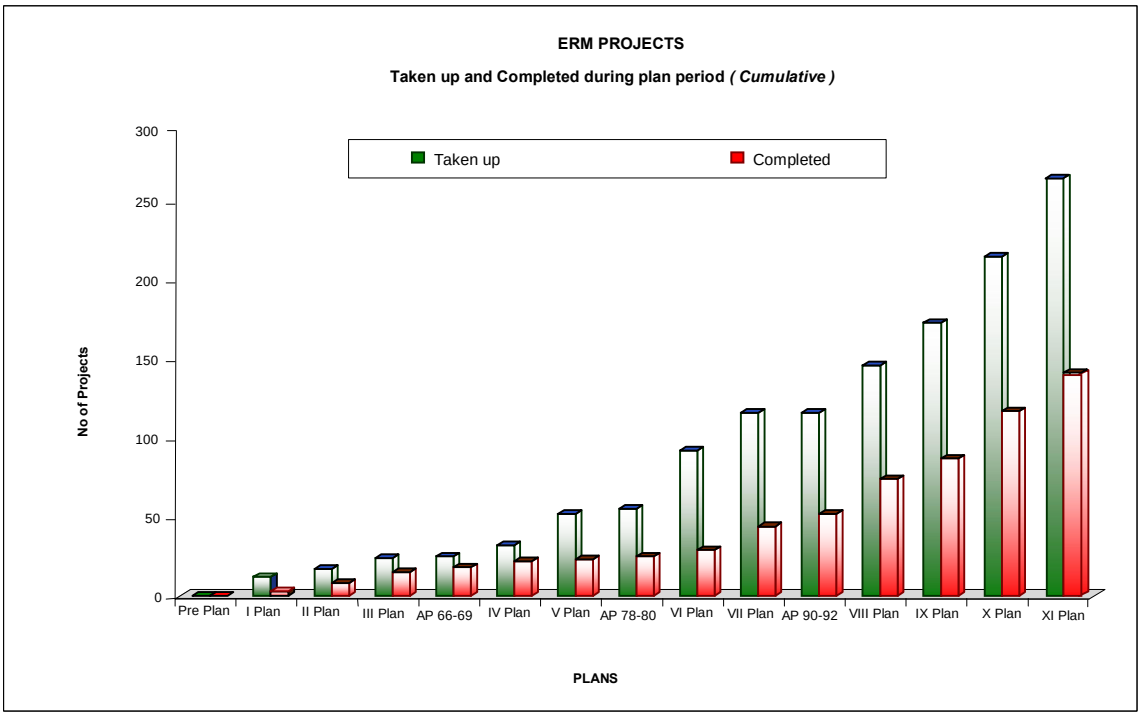


Fig 2.4 Modernisation of ERM Projects taken up and Completed during pre-plan and plan period (Cumulative)

2.3 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 Scheduled Tribes. The report on the status of irrigation projects benefiting TSP is updated from time to time.

CHAPTER-III

RIVER MANAGEMENT

3.1 Hydrological Observations

Central Water Commission is operating a network of 952 hydrological observation stations including snow and meteorological observation in different river basins of the country to collect (i) water level, (ii) discharge, (iii) water quality, (iv) silt and (v) selected meteorological parameters including snow observations at key stations. The data collected is put to various uses viz., planning and development of water resources projects, studies related to assessment of impacts due to climate change, water availability studies, design flood and sedimentation studies, flood forecasting, international & inter-state issues, river morphology studies, development of inland waterways, research related activities etc.

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.

Planning & Development Organisation at CWC headquarter at Delhi maintains hydrological data pertaining to all rivers of India. The data is provided to the bona fide 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 Centers were set up at Nagpur, Bhubaneswar, 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

Hydrology Project Phase-I was implemented by Government of India with an objective to establish a functional Hydrological Information System (HIS) and to improve institutional capacity of 9 States viz. Andhra Pradesh, Chhattisgarh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, and Tamil Nadu and 6 Central Agencies viz. Central Water Commission, Central Ground Water Board, Indian Meteorological Department, National Institute of Hydrology, Central Water and Power Research Station and Ministry of Water Resources. The project was implemented during September, 1995 to December, 2003. During HP-I, an Integrated HIS providing reliable, comprehensive and timely hydrological and meteorological data relating to 56 parameters was established.

The Hydrology Project, Phase-II (HP-II), which is a follow up on Hydrology Project-I has been launched with the objective to extend and promote the sustained and effective use of HIS by all potential users concerned with water resources planning and management. Four new states viz., Himachal Pradesh, Punjab, Goa, Pondicherry & two new Central agencies viz., Central Pollution Control Board, Bhakra Beas Management Board have been included in the phase-II of the project.

The components to be executed by Central Water Commission under HP-II are institutional strengthening and vertical extension. The estimated cost of the proposal is ` 2489.76 Lakh without contingencies and ` 2962.98 Lakh with contingencies.

I. Institutional Strengthening

Under this component, it is proposed to consolidate the gain made under HP-I by way of strengthening of capacities through training, up gradation/ replacement of hardware/ software acquired during HP-I, maintenance of website, data dissemination and knowledge sharing – workshops / seminars tours etc. Up gradation of the Data Storage Centre Software (WISDOM) is also envisaged to obviate the issues related to hardware, software and licence issues.

National Water Academy, Pune organizes various training courses for all the participating agencies under horizontal and vertical extension component of the project. Following works were carried out under this component of the project.

a. Construction of facilities: The work of Construction of 2 Lecture halls, one computer lab and extension of Krishna Hostel for an estimated cost of ` 409

Lakh was started on 30th March, 2011 by the Central Public Works Department and is in active progress. An expenditure of ` 2.44 Crore has been incurred by Central Public Works Department till March 2012.

b. Trainings: Total 39 training programmes have been conducted since starting of the Project, under which more than 800 officers have been trained. Twenty officers of Central Water Commission were deputed in five different International Training courses at UNESCO, IHE, Delft, the Netherlands in the field of water resources.

c. Video conferencing: Video-conferencing facility has been provided between Delhi, Pune, Gandhinagar, Hyderabad, Lucknow, Bhubaneswar & Coimbatore which is being utilized for delivering lectures to the trainees at National Water Academy.

d. Upgradation of National River Water Quality Laboratory at New Delhi: One Atomic Absorption Spectrophotometer has been installed for analysis of trace and toxic metals.

e. Modernization of Hydrological Observation Stations: Four Acoustic Doppler Current Profilers (ADCP) for discharge measurement on large rivers have been installed at Varanasi (on river Ganga), Billingundulu (on River Cauvery), Garudeshwar (on River Narmada) and Wadenpalli (on River Krishna). Eleven numbers of ADCPs have been procured and their installation is in progress.

II. Vertical Extension

a. Development of Hydrological Design Aids (HDA) including standardization of Methodologies/ protocols: The methods used for carrying out hydrological analysis for planning of various water resources projects by different state agencies are not uniform and even today some of these projects are being planned using empirical formulas which are no longer in use. The hydrologic analysis, usually, is carried out in a limited way without exploring various alternatives under different data scenario condition. Under HP-II, it is proposed to develop tools for making use of state of art technology for rational design and analysis and carry out integrated water resources analysis including study of hydrology of the complete water system. Following activities are proposed under the project:

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

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 38 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.

Final SAR, Inception Reports for HDA-1, HDA-2 & HAD-3 have been submitted. Draft Final Reports for HDA -1, HDA -2 & HDA -3 are in progress.

b. Purpose Driven Studies (PDS): 21 proposals related to surface water received from the States Andhra Pradesh, Chhattisgarh, Karnataka, Maharashtra, Orissa, Madhya Pradesh, Gujarat, Kerala, Tamil Nadu, Himachal Pradesh as well as from NIH and BBMB were examined by CWC and cleared by Hydrological Information System Management Group (HISMG-Tech.). Concurrence of World Bank on these proposals was received. The PDS have been started by the respective agencies and review of the progress of the PDS is being made by MOWR. There has been good progress in implementation of PDS by different agencies.

The total expenditure on CWC component of Hydrology Project-II till March, 2012 is ` 11.82 Crore.

3.1.2 Water Quality Monitoring

Central Water Commission is monitoring water quality at 399 key locations covering all the major river basins of India. It has a three-tier laboratory system for analysis of

the parameters. The level-I Laboratories are located at all field water quality monitoring stations on major rivers of India where six physical parameters viz., temperature, colour, odour, specific conductivity, total dissolved solids, pH and dissolved Oxygen are observed. There are 18 level-II Laboratories located at selected Divisional Headquarters to analyse 25 additional physico-chemical characteristics and bacteriological parameters of river water. Five Level-III/ II+ Laboratories are functioning at Varanasi, Delhi, Hyderabad, Guwahati and Coimbatore where 41 parameters including heavy elements/ toxic parameters and pesticides are analysed periodically. The data generated are computerized in the database system and disseminated in the form of Water Quality yearbooks, status reports and WQ bulletins.

3.2 Flood Forecasting & Warning Services

Flood forecasting and warning system is most important non-structural measure of flood management, which gives advance knowledge of incoming floods. This plays an important role in reducing flood damage by way of better planning of evacuation and rescue/ relief operations. Inflow Forecast also helps in optimum regulations of reservoirs with or without flood cushion.

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

On an average, over 6000 forecasts are being issued every year by Central Water Commission during flood season. Normally, these forecasts are issued 12 to 48 hours in advance, depending upon the river terrain, the locations of the flood forecasting sites and base stations. For the purpose of flood forecasting, hydrological and meteorological data is being observed at 708 sites and communicated through a network of 544 wireless stations. Synoptic weather situations, weather forecast/

heavy rainfall warnings etc. are also being collected from Flood Meteorological Offices (FMOs) of IMD.

3.2.1 Flood Forecasting Performance during 2011

During the flood season 2011 (w.e.f. May to October), all the 175 flood forecasting stations remained operational and 5995 flood forecasts (4852 level forecast and 1143 inflow forecasts) were issued out of which 5907 (98.53%) forecasts were found within accuracy limit of $\pm$ 0.15 m for level forecast and $\pm$ 20% for inflow forecast.

Out of 147 level forecasting sites, unprecedented flood situations (where the Highest Flood Level (HFL) attained during the flood season exceeded their respective previous HFL) were witnessed at two flood forecasting stations viz., Alipingal on river Devi a distributary of river Mahanadi and Anandpur on river Baitarni both in the State of Odisha. Also high flood situations (where peak level was attained within 0.5m of previous HFL) were experienced at 15 forecasting stations viz., road bridge on River Beki in Assam, River Ganga at Kannauj, Ankinghat, Kanpur and Dalmau, River Ramganga at Bareilly, River Ghaghra at Elgin Bridge and Ayodhya in Uttar Pradesh, River Ganga at Hathidah and Bhagalpur, River Ghaghra at Gangpur Siswan, River Bagmati at Benibad in Bihar, River Mahanadi at Naraj, River Kusabhadra at Nimapara and River Baitarni at Anandpur in Odisha .

3.2.2 Flood Bulletins

Central Water Commission (CWC) has been issuing daily flood bulletins and special flood bulletins during flood season every year based on the information collected from affected State Governments and its own field formations. During the year 2011, 154 daily bulletins (once daily), 55 Orange Bulletins for high flood situation (12 hourly) and 6 Red Bulletins for unprecedented flood situations (three hourly) were issued as per Standard Operating Procedure (SOP) issued by Ministry of Home Affairs (MHA). Central Flood Control Room (CFCR) of CWC also transmitted flood forecast bulletins through e-mails/ fax and SMS to the concerned user agencies.

3.2.3 Communication System of CWC used for Flood Forecasting Purposes

Central Water Commission is operating 544 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 CFCR at CWC (HQ), New Delhi. CFCR at New Delhi was operated on 24x7 basis during monsoon and data were passed on to various users daily primarily through email. Besides phone, fax and SMS were also used to disseminate the flood information.

3.2.4 Modernization of Flood Forecasting Services

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

The modernization of flood forecasting activities in CWC was started in 9th Plan on pilot basis in Chambal and Mahanadi basin for covering 55 stations by installing automatic sensor based data collection & satellite based telemetry communication system. This was expended further in 10th Plan in five river basins namely, the Godavari (63 nos.), the Krishna (41 nos.), the Brahmaputra (21 nos.), the Damodar (20 nos.), the Yamuna (15 nos.) and the Mahanadi (8 nos.) under the scheme "*Establishment & Modernization of Flood Forecasting Network in India including Inflow Forecast*". During 11th Plan, the work of modernization continued under the Plan scheme "*Flood Forecasting*" to set up another 222 stations in five more basins, namely, Narmada, Tapi, Indus, Cauvery, Ganga at the sanctioned outlay of ` 130 crore; out of which an expenditure of ` 103 crore has been incurred up to 31 March, 2012. The work on 205 stations has been completed by 31 March' 2012 and the work of remaining 17 stations is to be continued as spill over into the 12th Plan period.

Under modernization of flood forecasting activities, CWC has set up 21 Modelling Centres for the purpose of compilation of data received from automatic data acquisition sites through real time data transmission system. The compiled data is thereafter analyzed for generation of flood forecasts at these Modelling Centres, which are mostly located at Division offices of CWC and in the master control room at CWC (HQ). Twenty one Divisions are presently involved in formulation and dissemination of flood forecasts during floods. During 10th Plan eleven number of Modelling Centres were established at Dibrugarh and Guwahati in Assam, New Delhi in NCT Delhi, Agra in Uttar Pradesh, Hyderabad (LKD), Hyderabad (LGD), Kurnool in Andhra

Pradesh, Bhubaneswar in Odisha, Asansol in West Bengal, Maithon in Jharkhand where the hourly data is transferred from existing earth stations located at Jaipur (Rajasthan) and Burla (Odisha) through VSAT. In addition to above, 1 Earth Station at Delhi and 10 Modelling Centres at Patna in Bihar, Jalpaiguri in West Bengal, Lucknow and Varanasi in Uttar Pradesh, Dehradun in Uttarakhand, Gandhinagar and Surat in Gujarat, Bhusaval in Maharashtra, Shimla in Himachal Pradesh and FFM Directorate at CWC(HQrs) in NCT, Delhi have been installed during 11th Plan.

To improve the flood forecast modelling, windows based MIKE-11 software have been procured and supplied to Modeling Centres established under IX and X Plans. Basin specific models have been developed for Chambal and Mahanadi basins. These are being used for real–time flood forecasting. Models for other basins are being developed. Regular trainings for field staff are being organized.

3.2.5 Updating existing Manual on Flood Forecasting, CWC (1989)

For updating the existing CWC Manual on Flood Forecasting-1989 a core group under chairmanship of Chief Engineer (FM) has been set up in February 2012 to review/revise the Manual by 30th September 2012.

3.2.6 Flood Damage Statistics

The work on validation of tentative flood damage statistics for the years 2003 to 2011 for all the States and Union Territories have been undertaken. Most of the flood prone states have furnished the figures. Flood damage statistics is likely to be finalised & published shortly.

3.3 Flood Management Programme

The Government of India approved in principle in November, 2007 "Flood Management Programme (FMP)", a State Sector scheme under Central Plan, to provide Central assistance amounting to ` 8000 crore to States during 11th 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 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. The Chief Engineer (FM), CWC is providing assistance to the Ministry of Water Resources for processing and coordination of cases for release of funds under "Flood Management Programme".

Statement of Release of Central Assistance under FMP to "O*ther than the Ganga Basin States*" as on 31.03.2012

SN	State	Number of Schemes Approved	Estimated Cost as per scope of FMP	Approved EC for FMP-XI Plan	Central Share released (` in lakh)					
					2007-08	2008-09	2009-10	2010-11	2011-12	Total
1	*2*	*3*	*4*	*5*	*9*	*10*	*11*	*12*	*13*	*14*
A	States									
1	Chattisgarh	3	3247.00	3113.00	0.00	0.00	0.00	0.00	0.00	0.00
2	Goa	2	2273.00	2273.00	0.00	181.50	241.00	575.75	0.00	998.00
3	Gujarat	2	1979.31	1979.31	0.00	0.00	0.00	200.00	0.00	200.00
4	Haryana	1	17375.00	17375.00	0.00	0.00	4691.00	0.00	0.00	4691.00
5	Himachal Pradesh	2	19065.00	19065.00	0.00	0.00	2700.00	7425.00	4467.00	14592.00
6	Jammu & Kashmir	28	58079.42	40822.42	675.00	3002.00	4118.39	5809.11	9285.58	22890.08
7	Karnataka	3	9564.00	5946.00	0.00	0.00	0.00	0.00	2000.00	2000.00
8	Kerala	4	77105.30	31974.30	0.00	0.00	0.00	2242.50	4125.00	6367.50
9	Orissa	72	21995.86	21995.86	0.00	4590.00	2586.61	2297.85	90.00	9564.46
10	Punjab	5	15340.00	15340.00	0.00	2151.00	1308.00	0.00	584.05	4043.05
11	Tamil Nadu	5	63554.00	63554.00	0.00	0.00	111.00	5871.00	0.00	5982.00
12	Uttar Pradesh	2	5663.30	5663.30	0.00	0.00	1605.00	572.86	1448.83	3626.69
	Sub-total (States)	129	295241.19	229101.19	675.00	9924.50	17361.00	24994.07	22000.46	74954.78
B	Union Territories									
13	Puducherry	1	13967.00	13967.00	0.00	0.00	0.00	750.00	0.00	750.00
	Sub-total (UTs)	1	13967.00	13967.00	0.00	0.00	0.00	750.00	0.00	750.00
	Total (States + U.T.)	130	309208.19	243068.19	675.00	9924.50	17361.00	25744.07	22000.46	75704.78

3.4 Morphological Studies

The morphological studies for 17 rivers started during 11th Five Year Plan 2007-12 under the Plan Scheme "*R&D Programmed Water Sector*". The study has two components:-

1. Morphological study using river cross sectional surveys

The reconnaissance survey for identification of demarcated section at approximately 10 km intervals, establishment of permanent benchmarks and their connection with GTS benchmark, construction of pillars as permanent landmarks and their installation on both the banks, river cross sectional survey works, procurement of survey and other equipment has been carried out by CWC during 11th Plan period. The work would continue during 12th Five Year Plan (2012-17).

2. Morphological study using Remote Sensing Technique (RST)

The morphological study of rivers Ghagra and Sutlej is being carried out by *National Institute of Hydrology (NIH)*, Roorkee and the study for Gandak is being carried out by *CWPRS*, Pune.

3.5 Coastal Erosion

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 GoI constituted Beach Erosion Board in the year 1966 under the Chairmanship of Chairman, CWC. With the objective of development in the protected coastal zone, the Beach Erosion Board was reconstituted and renamed as *Coastal Protection and Development Advisory Committee (CPDAC)* by the Ministry of Water Resources, 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. An amount of ` 20 lakh was released to SAC, Ahmadabad for above work during FY 2011-12.

The 13th CPDAC meeting was held at Mangalore (Karnataka) during 9-10th February, 2012 and following decisions were taken:

(a) Emphasis to finalize and publish the Shoreline Change Atlas by SAC by 30th June, 2012.

(b) Sub-committee of CPDAC on Coastal Data Collection and Compilation was constituted.

(c) NHO has presented the provisional total length of coast line of India as 11,084.51 Km. Provisional State-wise length will be reviewed by Maritime States/ UTs.

(d) Review of Progress made in implementation of Ullal Coastal Erosion & Inlet Improvement Project in Karnataka and Mirya Bay Coastal Erosion and Protection Project in Maharashtra.

3.5.2 External Assistance for Coastal Protection

National Coastal Protection Project (NCPP) was initiated with a view to explore the possibility of funding coastal protection works through external assistance. After discussion between GoI and *Asian Development Bank* (ADB) for funding on coastal protection works, ADB approved grant for *Project Preparatory Technical Assistance (PPTA)*. The PPTA was used to prepare an investment programme for Sustainable Coastal Protection and Management Project in the States of Goa, Maharashtra and Karnataka. Under PPTA, an investment programme estimating to US $ 404.6 million including ADB loan of $250 million has been envisaged. Loan from ADB to states will be in the form of back-to-back loan. After loan negotiation, the multi-tranche facility (MFF) for project was approved by ADB on 29th September, 2010 for amount of $ 250 million to be implemented over a period of 8 years.

Term of Reference (ToR) of PPTA also included preparation of DPR for one or two projects in each participating state for immediate implementation based on state's priority. Mirya Bay (Maharashtra), Coco and Colva Beach (Goa) and Ullal (Karnataka) projects were selected for implementation in first tranche and Feasibility Study and Design report for these projects were completed under PPTA.

Under *Sustainable Coastal Protection and Management Project*, Ullal Coastal Erosion & Inlet Improvement Project in Karnataka (estimated Cost ` 170.7 Crore at 2011 Price Level) and Mirya Bay Coastal Erosion and Protection Project in Maharashtra (estimated Cost ` 62.51 Crore at 2011 Price Level) have been accepted by the Advisory Committee On Irrigation, Flood Control and Multi-Purpose Projects in its 110th meeting held at CWC HQ, New Delhi on 20th July, 2011. Projects are to be implemented as Pilot projects under *National Coastal Protection Project* of Government of India with technical and financial assistance of *Asian Development Bank* and will be

reviewed in post-project scenario. Afterwards the GoI and ADB signed an agreement for the first tranche ($ 51.555 million loan) under the $ 250 million *Sustainable Coastal Protection and Management Investment Programme* on 17th August 2011. The first tranche loan will focus on heavily eroded coast in Karnataka (Ullal) and Maharashtra (Mirya Bay).

3.6 Morphological Studies

The morphological studies for 17 rivers started during 11th Five Year Plan 2007-12 under the Plan Scheme "*R&D Programmed Water Sector*". The study has two components:-

1. **Study using river cross sectional surveys**

The reconnaissance survey for identification of demarcated section at approximately 10 km intervals, establishment of permanent benchmarks and their connection with GTS benchmark, construction of pillars as permanent landmarks and their installation on both the banks, river cross sectional survey works, procurement of survey and other equipment has been carried out by CWC during 11th Plan period. The work would continue during 12th Five Year Plan (2012-17).

2. **Morphological study using Remote Sensing Technique (RST)**

The morphological study of rivers Ghagra and Sutlej is being carried out by *National Institute of Hydrology (NIH)*, Roorkee and the study for Gandak is being carried out by *CWPRS*, Pune.

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.

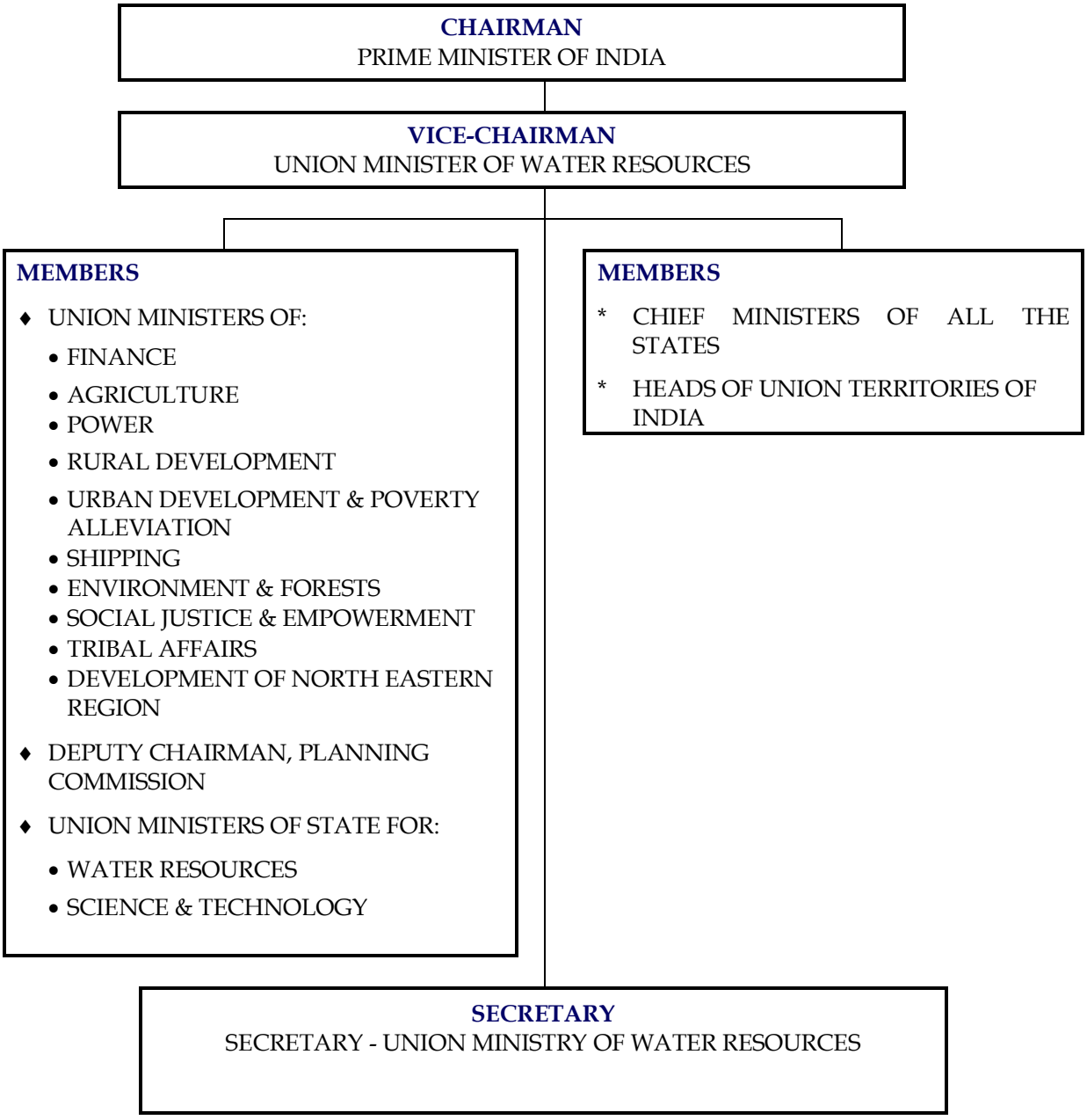


Fig. 4.1 - National Water Resources Council

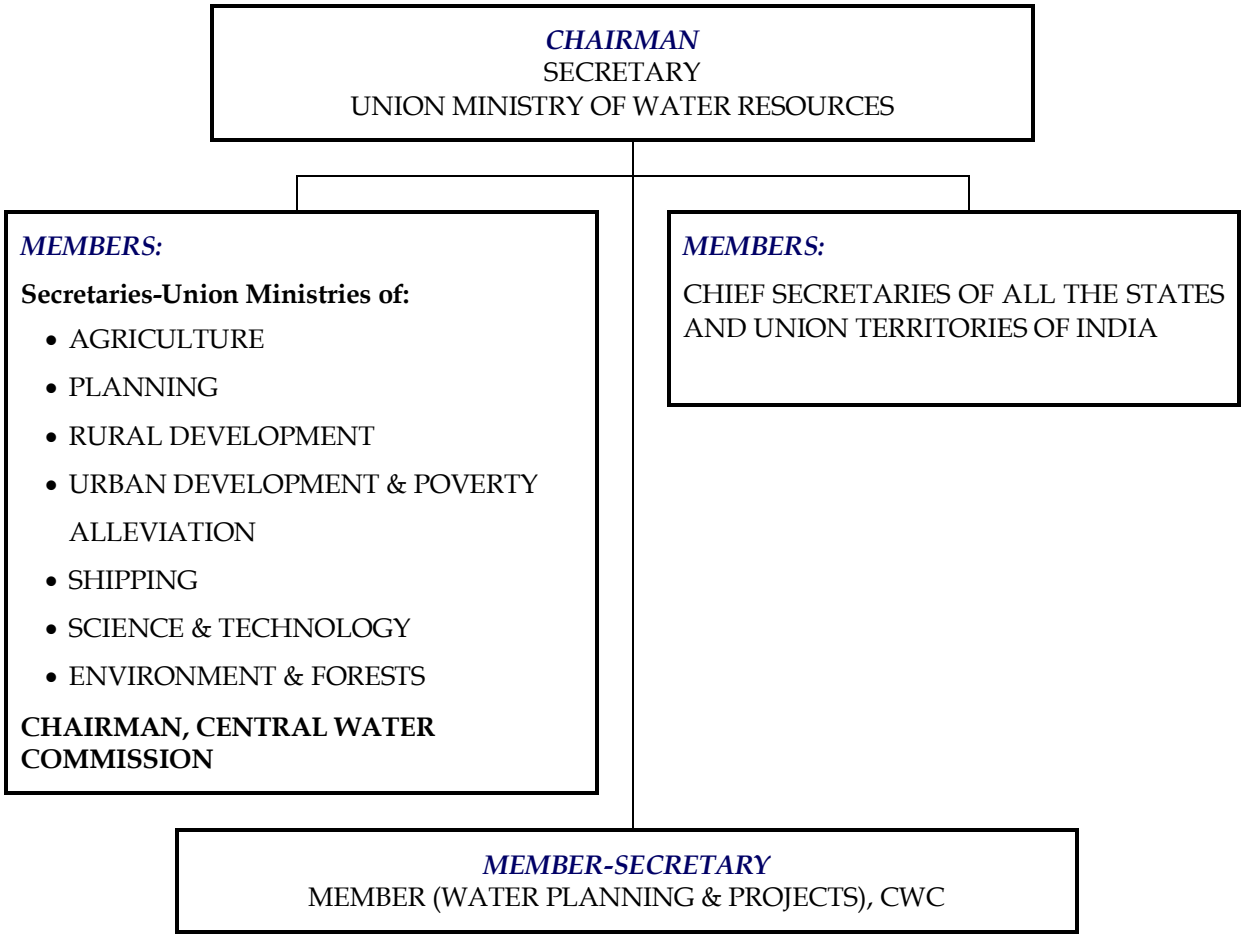


Fig. 4.2 - National Water Board

4.4 Review of National Water Policy

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. Various workshops were organized for consultation with Policy Makers, Academia, Experts and Professionals, NGOs and Panchyati Raj Institutions for review of National Water Policy. MoWR has constituted a Drafting Committee consisting of eminent experts in water resources sector for

drafting the National Water Policy. The draft National Water Policy has been formulated and placed in public domain for inviting suggestions/feedback.

4.5 Inter–Basin Transfer of Water & Interaction with NWDA

The National Water Development Agency is engaged in carrying out water balance studies, link canals studies for diversion of surplus waters to water deficit areas including inter-basin transfers. It has undertaken field surveys and investigations for preparation of feasibility reports of the link canals for water resources development with a national perspective. Now NWDA's mandate has been extended/amended to include preparation of DPR of links under National Perspective Plan as well as Intra-State links proposed by the States. Chairman, Member (WP&P) and Member (D&R), CWC are members of NWDA Society and Governing Body of NWDA.

4.5.1 Technical Advisory Committee (TAC) of NWDA

The Governing Body of NWDA Society has constituted a 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.

40th TAC meeting was held on 20th January, 2012 and following technical issues were discussed:

- Follow up action on Important decisions of the 39th Meeting of the TAC held on 24th Febuary,2011 at New Delhi
- Status of Studies pertaining to the Peninsular Rivers Development Component of National Perspective Plan (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 for 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 undertake 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 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 (D-P) link projects. Subsequently in November, 2009, MoWR 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.

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 (Strategy No. I.6) identified for implementation under the Comprehensive Mission Document of 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.

Central Water Commission, Ministry of Water Resources and National Remote Sensing Centre (NRSC), Indian Space Research Organization, Dept. of Space jointly executed demonstrative pilot studies in Godavari and Brahmani-Baitarani river basins wherein Space based geo-spatial inputs were used to estimate basin-level mean annual water resources. The highlights of the methodology include:

- Water balance approach;
- Precipitation as primary resource (spatial interpolation);
- New technology tools i.e. satellite derived spatial data (land use, land cover, elevation, soil), GIS;
- Semi-Distributed modeling approach;
- Concept of Hydrologic Response Unit (HRU) for water balance computation;
- Calibration and validation using CWC observed discharge observations.

During the year, following activities were undertaken in collaboration with NRSC:

a. Collection, compilation and processing the data in appropriate formats for model input.

b. Meetings were held to review the progress of the studies and to sort out the issues related to methodology, calibration and validation of the model

and on overall water balance of the basins for assessment of available water resources

c. Officers of CWC visited NRSC for facilitation of the compilation & processing of data, calibration & validation and review of progress of the study.

d. The report of the pilot studies "Assessment of Water Resources at Basin Scale using Space Inputs in the Godavari and Brahmani-Baitarani Basins" was prepared.

4.6.2 Integrated Water Resources Management

The need to adopt holistic approach towards development and management of water resources considering river basin as 'hydrological unit' has always been emphasized by Central Water Commission. 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 in CWC and submitted to Ministry of Water Resources. The draft guidelines have also been hosted on CWC website for comments / observations of State Govts, Field Offices of CWC and other Union Ministries.

4.6.3 Decision Support System (Planning)

Under World Bank funded Hydrology Project-II, the preparation of a Decision Support System Planning (DSS-P) is in 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, seven meetings of 'Review Committee' have been held. In the 7th meeting the Review Committee held at Bangalore on 02.02.2012, DSS-P Customization reports in respect of Madhya Pradesh, Karnataka and Orissa were presented by State Govt officers.

4.6.4 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.

4.7 Climate Change Issues and National Water Mission

Realizing the importance of climate change and to address the related issues, National Action Plan on Climate Change (NAPCC) has been prepared by the Government of India. The Action Plan has laid down principles and identified the approach to be adopted to meet the challenges of impact of climate change through eight Missions in climate sensitive sectors. National Water Mission (NWM) is one of them, for which Ministry of Water Resources (MoWR), Government of India is the nodal Ministry.

The "National Water Mission" has been formulated by Ministry of Water Resources with main objective of "conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within States through integrated water resources development and management". The document was approved by Hon'ble Prime Minister's Council on 30th August 2010 and by the Union Cabinet on 06th April 2011.

Mission Secretariat for operationalizing the National Water Mission for coordinated actions for addressing the impact of climate change on water resources has been established Ministry of Water Resources. Climate Change cell has also been set up in Central Water Commission for coordinating the work related to National Water Mission.

CWC has prepared "Inventory of Glacial Lakes/Water Bodies in the Himalayan Region of Indian River Basins" through National Remote Sensing Centre, Hyderabad (NRSC) and started monitoring of these glacial lake water bodies on monthly basis during monsoon season of 2011. This monitoring would continue during 12th Five Year Plan (2012-2017).

Another work of "Snowmelt runoff forecasting in Himalayan River Basin" has been taken up by CWC and the model development part has been entrusted to NRSC, Hyderabad by CWC. The forecast would start from April 2012.

MoWR has established six Chairs in Academic institutes - IIT Kanpur, IIT Kharagpur, IIT Guwahati, IIT Roorkee, NIT Patna and NIT Srinagar with the objective of carrying out studies and research on "Impact of climate change on Water Resources". Management Committees have been constituted under the Chairman, CWC for each of the Institute separately which has to meet once in a year. The last meeting (3rd) was held on 5th May 2011 in New Delhi jointly for all the Chair Professors.

With the technical assistance of Asian Development Bank, studies were undertaken under National Water Mission for the three distinct areas of concern from climate change point of view viz., (a) alterations of winter snow-pack dynamics from climate change [Satluj basin -Punjab State]; (b) basin/ sub-basin where groundwater is major water resource [Shipra sub-basin -Madhya Pradesh State]; and (c) low lying coastal areas where sea level rise will have impacts on surface and groundwater [Cauvery delta -Tamilnadu State]. The final report has been submitted in October 2011.

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.

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 comprise 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.

In addition, there are two units namely Hydrological Studies Organisation and Dam Safety Organisation dealing with various aspects of Hydrological Studies & analysis and Dam Safety issues respectively.

5.3 Planning and Design of Water Resources Projects

Design consultancy work in respect of 100 projects (including 15 projects with special problems) was carried out in the design units of D&R Wing during the year 2011-2012 as detailed below:

Sl. No.	Category	No. of Projects
1.	Projects at construction stage.	48
2.	Projects at DPR stage	37
3.	Projects with special problems	15
	Total	**100**

This includes 9 foreign projects, 1 in Afghanistan, 4 in Bhutan, 2 in Myanmar and 2 in Nepal (Indo-Nepal projects).

The list of National & International projects is at 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

Ujh Multi-Purpose Dam Project proposes a 119 m high concrete faced rock-fill dam (CFRD), 2.5 km long Head Race Tunnel (HRT), diversion Tunnel and a surface power house. As per the power potential studies, finalized by CEA, the installed capacity is 216 MW through 3 units of 72 MW each. Design discharge per unit is 58.45 cumec. Geological investigations are under progress.

CWC is rendering design consultancy services for preparation of DPR chapter & drawings of Ujh Multipurpose Project. The design of the structures and preparation of drawings are in progress. The DPR is under preparation by IBO, CWC, Chandigarh.

2. Koteshwar HE Project, Uttarakhand

Koteshwar HE Project is a part of integrated 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 the year, design & drawing for diversion tunnel plugging were issued. Consultancy on various grouting schemes as proposed by the grouting experts were examined and comments sent. All construction stage drawings of the project have been released. The project is in advance stage of completion. Unit-1 and Unit-2 have been commissioned in March, 2012 and Unit-3 in January, 2012.

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 issue 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, drawing and evaluation of quantities etc. in respect

of the project was offered by CWC. Design Consultancy for this project is being provided by CWC. The project is in advanced stage of construction.

4. Salma Dam Project (Afghanistan)

The 42 MW (3x14MW) surface power house on Hari rud River in Distt. Chiste- e - Sharief, 162 km from Herat city in Afghanistan is being executed by WAPCOS (I) Ltd on behalf of MEA, Govt. of India.

CWC is rendering consultancy to WAPCOS for construction stage design Engineering of Salma Dam and Spillway, various hydro civil components of the project i.e. power intakes, water conductor system, complete powerhouse structure etc.

Design & drawings of Power intake component and pressure shaft steel liner and tunnels and part of the power house civil structure have already been vetted /examined and released to WAPCOS. The power house is in advance stage of construction.

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 Brahmaputra Board, NEEPCO, State Govt. departments etc.

At present, there are 11 projects at construction stage for which design consultancy is being provided by the unit. In addition, there are 11 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	Jiadhal Multipurpose Project	DPR stage
2	Lohit HE Project	DPR stage
3	Nuranang Chu HE Project	DPR stage
4	Nyukcharong Chu HE Project	DPR stage

Assam		
5	Amjur Draninage Development Scheme	Construction
6	Bardhag Draninage Development Scheme-Sluice Regulator	Construction
7	Pagaladiya Dam Project	Construction
Manipur		
8	Dholaithabi Barrage Project	Construction
9	Khuga Multipurpose Project	Construction
10	Thoubal Multipurpose Project	Construction
Meghalaya		
11	Ganon HE Project	Construction
12	Jadukata HE Project Stage-I	DPR stage
13	Jadukata HE Project Stage-II	DPR stage
14	Killing Dam Project	DPR stage
15	Kulsi HE Project	DPR stage
16	Myntdu HE Project Stage-II	DPR stage
17	New Umtru HE Project	Construction
Mizoram		
18	Tuichang HE Project	DPR stage
Sikkim		
19	Santaley HE Project	DPR stage
Tripura		
20	Champaichera Dam Project	Construction
21	Howrah Dam Project	Construction
22	Kalasi Barrage	Construction

5.4 Hydrological Studies

The Hydrological Studies Organisation (HSO) carries out hydrological studies in respect of most of the projects in the country. During the year 2011-12 HSO has dealt with 157 projects from hydrological point of view which includes 20 projects for consultancy and 137 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

To compute the design flood in ungauged catchments, country has been divided into 7 zones and further into 26 hydro-meteorologically homogeneous sub-zones and flood estimation models have been developed for each subzone. So far flood estimation reports covering 24 sub-zones have been published. The periodic revisions/ updating of earlier reports are carried out whenever additional data is received.

(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 storm depths has been found to be a major bottleneck in design flood studies. Since necessary data and expertise is available with only a few organisations like IMD and CWC, it was decided to publish generalised PMP Atlases covering the whole country, to give a first hand estimate of design storm magnitude. 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 through consultant under the XI plan scheme "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.

During the year 2011-12, interim reports of Ganga and Godavari basins were submitted by the consultant. A one day workshop was also organised on 9th February, 2012.

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)

As part of continuous strengthening of the dam safety activities in India, Central Water Commission has prepared a proposal for rehabilitation and improvement of about 223 large dams in four states namely Madhya Pradesh, Orissa, Kerala and Tamil Nadu with World Bank funding. 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 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).

The project implementation agencies for DRIP would be the Water Resources Departments (WRD) of the four participating States and State Electricity Boards of Tamil Nadu and Kerala. The overall implementation of the project would be coordinated by Central Water Commission with the assistance of a management and engineering consulting firm.

The total estimated cost of DRIP is ` 2100.00 Crore (US$M437.50). Out of the total project cost, ` 1487.23 Crore (US$M 309.84) is for four States and ` 132.00 Crore (US$M 27.50) is for Central Water Commission (Central Component). Out of the total project cost, 80% (i.e. ` 1680.00 Crore) will be funded by the World Bank credit, while 20% (i.e. ` 420.00 Crore) will be borne by respective State governments and Central Water

Commission. The signing of agreement with the World Bank for DRIP was done on 21st December, 2011.

Under the Dam Rehabilitation and Improvement Project (DRIP), the design flood studies of all the Projects included in scheme are to be reviewed. In this regard, HSO of CWC have initiated studies in respect of some of the Dams and also vetted the studies carried out and submitted by the State Government. In all 69 project reports have been received, out of which, review of 36 projects have been completed.

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 enactment of necessary Dam Safety Legislation. Initial efforts for dam safety legislation were directed towards enactments of appropriate legislation by respective State Governments, and accordingly State of Bihar enacted the Dam Safety Act, 2006. However, some of the States favoured the idea of a uniform Central Dam Safety Act. 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 above, 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. In the first instance, the provision of the Bill shall apply to the States of Andhra Pradesh, West Bengal and the Union territories, and also to their public sector undertakings and to the public sector undertakings of the Central Government. It shall also apply to such owners of specified dams which are undertakings/ company/ institution or a body other than those owned by State Governments or Central Governments. However, provisions of this Legislation shall apply to other such States also if resolution to that effect is passed by all the houses of Legislatures of those States.

Dam Safety Bill, 2010 was introduced in the Parliament on 30th August 2010 and was referred to the Parliamentary Standing Committee on Water Resources for the examination of the Bill. The report of Standing Committee has been forwarded by the Parliament to the Government for further action. Compliance of the recommendations of the Parliamentary Standing Committee is under process in the Ministry of Water Resources and Ministry of Law & Justice.

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.

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. Guidelines for preparation and submission of site specific seismic study report of river valley projects have been finalized and uploaded on CWC official web site (cwc.nic.in).

5.5.5 Consultancy Services on Instrumentation in Hydraulic Structures

During the year, planning and preparation of instrumentation specification/ construction drawings have been carried out for the following projects:

(i) Instrumentation construction drawings:

a) Tapovan Vishnugud HE Project (520 MW), Uttarakhand - 3 nos.
b) Punatsangchhu–I HE Project (1095 MW), Bhutan - 2 nos.

(ii) Instrumentation specification drawings:

a) Arjun Sahayak Pariyojana, Kabrai Dam (UP) -2nos.
b) Saheed Bhima Nayak Sagar Pariyojana across river lower Goi (MP)-3nos.

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.

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 year, the GLOF study of Amochhu H E Project, Bhutan and Arun-III HEP, Nepal have been completed. Further, GLOF Study report in respect of Kalai- I, Kalai-II H E Projects, Hutong II H E Project, Attunli H E Project, Etalin HE Project and Tawang I &II of Arunachal Pradesh were also examined and cleared.

CHAPTER-VI

WATER MANAGEMENT

6.1 Monitoring of Reservoir Storage

During the water year 2011-2012, 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	
			2010-11	2011-12
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	21.241	36.235
		In % of Storage at FRL	14	24
		In % of 10 Years Avg. Storage	105	177
	On Sept, 30th (End of Monsoon Period)	In BCM	115.227	131.076
		In % of Storage at FRL	76	86
		In % of 10 Years Avg. Storage	115	128
	On Dec, 31st	In BCM	104.314	94.081
		In % of Storage at FRL	69	62
		In % of 10 Years Avg. Storage	140	119

One more reservoir namely Sardar Sarovar (Gujarat) with present live storage capacity 1.566 BCM has been added in the monitoring system of reservoir making total no. of 82 reservoirs with total designed capacity of 153.334 BCM w.e.f. January 2012.

A bulletin on the status of reservoir storages is being issued every week by CWC. 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 on weekly basis.

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. Special bulletins are also prepared at the time of meeting of Cauvery Monitoring Committee headed by the Secretary (WR).

6.3 Assessment of the Revised Live Storage Capacity

The Basin wise/State wise data of storage position, excluding storages of less than 10 MCM, for 20 major river basins is maintained by Central Water Commission and published as "Storages in River Basins of India". The data has been updated recently in the year 2011 and the details are:-

Live Storage capacity of Major & Medium projects (as updated in 2011)

S No	Details	Live Storage capacity of projects (in BCM)
1	Completed projects	245.131 (Dams having capacity > 10 MCM) 8.257 (Dams having Capacity < 10 MCM)
2	Under construction	50.3645 (Dams having capacity > 10 MCM) 0.594 (Dams having Capacity < 10 MCM)
3	Under consideration	109.673

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 19th December 2011 at New Delhi under the Chairmanship of Director General, ICAR and co- Chairmanship of Chairman, CWC. The necessary action on the deliberations held in the above meeting is being taken. The next meeting is proposed in 2012.

6.5 Reservoir Sedimentation-Capacity survey of Reservoirs

6.5.1 Hydrographic Survey

Capacity Survey of reservoirs has been undertaken as a plan scheme since VIII Plan. Upto the end of X plan, the hydrographic survey of 26 major reservoirs were completed in all respect and report finalization of 3 reservoirs was carried over to the first year of XI plan.

During XI plan, it was planned to undertake capacity suvey of 20 more reservoirs at an estimated cost of ` 410 lakhs. Out of these 20 reservoirs, capacity survey of 10 reservoirs was taken up in December, 2010. Out of these 10 reservoirs, the work of

capacity survey of 8 reservoirs has been completed in all respect and work of remaining two reservoirs is under progress.

6.5.2 Capacity Survey using Remote Sensing Technique

The estimation of Sedimentation in Reservoirs using Remote Sensing technique" was under taken under the sanctioned plan scheme "Research & Development Programme in Water Sector" during 11th Five Year Plan Period.

Satellite Remote Sensing based Reservoir Sedimentation In-house study of one reservoir i.e Salandi (in Orissa State) was completed during the year. Action for procurement of Satellite Data of one more reservoir viz. Khakhara reservoir was taken up for future study.

The work of sedimentation assessment for 30 new reservoirs was awarded to Maharashtra Engineering Research Institute (MERI), Nashik during May, 2010. Out of these 30 reservoirs, 10 nos of reservoirs were found non-feasible. The study in respect of remaining 20 reservoirs has been completed in all respect and final report of these 20 reservoirs prepared and circulated to all concerned.

6.6 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, & 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 2011-12, the performance evaluation studies of following three irrigation projects have been completed:

(i) Loktak Lift Irrigation Project (Assam)

(ii) Chandan Reservoir Project (Bihar)

(iii) Kanchi weir Irrigation Project (Jharkhand)

The study reports of these projects were 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.

The proposals for award of twelve fresh Post Project Performance Evaluation studies have been initiated during the year.

6.7 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.

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.

6.8 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. 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 2011-12, 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)

Reports are under examination in CWC for their finalisation.

6.9 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/Organisations dealing with water resources development and management, State Governments, NGOs etc. These guidelines have been circulated to all the State Governments, concerned Central Ministries and other Utilities. These guidelines have also been placed on the website of Central Water Commission.

6.10 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.

Under the programme, 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.

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 decided to take up 2nd Phase of programme during the year 2010-11 & 2011-12. The work of 2nd Phase of FPARP was awarded to 31 institutes for conducting 2,921 demonstrations for an estimated cost of ` 14.31 crore.

MoWR has also awarded the work of impact assessment of the 1st Phase and concurrent evaluation of 2nd phase of FPARP to a Consultant.

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 2011-12, only one meetings of High Powered Steering Committee was held on 22nd December, 2011. In the meeting, Saryu Nahar Pariyojna was recommended for inclusion in the Scheme of National Projects. Restoring capacity of Sharda Sahayak System was also discussed in the meeting and recommended for inclusion subject to amendment in the guidelines. During 2011-12, Central assistance of ` 97.2 cr was released to Teesta Barrage Project.

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 authority 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 2011-12, 14 Major Irrigation Projects (12 New and 2 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 7 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 2011-12, 3 Medium Irrigation Projects (1 New and 2 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. During the year 2011-12, 6 meetings were conveyed by the Chief Engineer in which issues related to 12 nos. of Projects were resolved.

7.6 Meeting of the Advisory Committee

During year 2011-12, the Advisory Committee of MoWR (reconstituted in 1987) under the chairmanship of Secretary (Water Resources) accepted 44 projects comprising 14 Major & 3 Medium Irrigation and 25 Flood Control and 2 Coastal Protection projects in 5 meetings. The list of the projects accepted by the Advisory Committee is placed at **Annexure 7.2.**

The irrigation projects accepted during 2011-12 envisages annual irrigation benefits to 20,80,342 hectare in the States of Haryana, Karnataka, Madhya Pradesh, Maharashtra, Himachal Pradesh, Gujarat, Bihar, Orissa and Rajasthan. The Flood Control Scheme accepted during 2011-12, envisages protection to the population of about 30 lakhs and area of 3,83,461 hectare in the state of Arunachal Pradesh, Assam, Karnataka, Jammu & Kashmir, Kerala, Maharashtra, Himachal Pradesh, Sikkim, Bihar, Punjab, West Bengal and Uttar Pradesh. The Coastal Protection Scheme envisages protection to fish processing industries in the state of Karnataka and Maharashtra.

7.7 Appraisal of Power Projects

The civil components of Hydro-Electric Projects were also appraised in PAO, CWC. During 2011-12, 8 Hydro-Electric Projects having total installed capacity of 4072 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 2011-12, a total of 81 projects under General/Vigorous monitoring were monitored by CWC. Out of 81 Major, Medium and ERM projects taken up for monitoring by CWC during 2011-2012, 15 projects (9 Major & 6 ERM) were monitored from CWC Headquarter and remaining 66 projects (45 Major, 19 Medium and 2 ERM) were monitored by its Regional Offices.

In addition, 163 ongoing projects under AIBP were also being monitored during the year 2011-12. The list of these projects General/Vigorous/AIBP is given in Table 8.1.

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 2010-11 and remaining 12 projects were included in the list of 81 projects which were monitored during 2011-12.

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.

Table showing the State-wise distribution of monitoring of ongoing Major, Medium and ERM projects by CWC Headquarter or Regional offices are at Annexure-8.1.

8.2 Accelerated Irrigation Benefits Programme

Central Govt., during 1996-97, 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. While selecting the projects, special emphasis was to be given to Pre-fifth and Fifth Plan projects. Priorities were also given to those projects which were benefiting Tribal and Drought Prone Areas. Under the revised AIBP Guidelines from the year 1999-2000 onwards Central Loan Assistance under AIBP can also be extended to minor surface irrigation projects of special category states (N.E. States & Hilly States of H. P., Sikkim, J&K, Uttaranchal and projects benefiting KBK districts of Orissa). However, later w.e.f. 1.4.2005, non-special category states could also include minor surface irrigation projects with potential more than 100 ha with preference to tribal areas and drought prone areas which fully benefit dalits and adivasis. Grant component was introduced under the programme during 2004-05 and Centre provided both loan portion and grant component of Central Assistance. However, as per the present policy, Centre is providing the grant component only from 2006-07 and States are authorised to raise loan component by market borrowing.

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

A grant of ` 3703.438 Crore has been released to 70 Major & Medium Irrigation Projects under AIBP during 2011-12 till 31.03.2012. The cumulative total Central Loan Assistance / Grant provided to States is ` 44647.57 under AIBP since its inception of the programme till 31.03.2012 to 293 projects.

The number of States benefited from the programme is 24 till 31.03.2012. Out of 293 projects, 137 projects have been completed and 5 projects were deferred up to 31.03.2012 as a result of AIBP. **Table 8.2** gives State wise list of Major & Medium projects completed under AIBP.

As reported by the State Governments 6.348 million hectare of additional irrigation potential has been created under AIBP since the start of the scheme till March, 2011.

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 151 ongoing projects under AIBP which are getting grant and are being monitored by CWC. The projects under AIBP are monitored twice a year by CWC officers and thereafter the status reports are prepared and issued to all concerned.

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. Till date final reports of 11 projects out of 50 projects have been submitted by NRSC, Hyderabad.

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.

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, assistance in procurement of equipment and spare parts, contract management and preparation of cost estimates.

9.1 Project Appraisal

During the year, **35 project reports** of Irrigation, Power and Multipurpose projects of various states of the country were technically examined from plant planning angle. Discussions were held with concerned Project Authorities regarding provision under sub-head 'Special Tools & Plants' of the cost estimates. 23 projects reports were accepted with provisions worth ` **7119.083 Lakhs** in respect of construction equipment. In respect of the remaining 12 project reports, the observations/ comments were conveyed to the project authorities for compliance and further review.

9.2 Consultancy

Reference has been received from National Water Development Agency (NWDA) regarding two River inter-linking Projects viz., "Daman Ganga-Pinjal River Link Project" and "Partapi-Narmada River Link Project" for preparation of a chapter on "Construction Equipment Planning & methods" including carrying out equipment planning, scheduling and preparation of construction programme. The work regarding the same is under process.

9.3. Manpower Planning

A draft report on "Employment Generation in Major & Medium Operation and Maintenance stage Irrigation Projects" containing information for 5 years period from 2000-01 to 2004-05 in respect of 55 (21 Major & 34 Medium) irrigation projects has been prepared.

A New Study On "Expenditure and Employment Statistics in Major & Medium Irrigation Projects (Under construction)" for the XI Five Year Plan (2007-2012) has been started by CWC. Data Collection from the State Water Resources Departments/Project authorities for 197 Major & Medium selected Irrigation projects under construction stage for 3 years from 2007-08 to 2009-10 in the specially designed proforma, is in progress. During the year, information of 8 major and 9 medium irrigation projects has been received /collected from the states of Karnataka, Chhattisgarh and West Bengal.

A Special study on "Employment Generation in Major & Medium Operation and Maintenance stage Irrigation projects" for the 5 years period has been Started by CWC. Data collection from the State Water Resources Departments/Project authorities for 106 Major & Medium completed projects selected for the study for the period from 2005-06 to 2009-10 as per format, is in progress. During the year, information of 4 major and 2 medium completed irrigation projects has been received from the states of Rajasthan, Madhya Pradesh and Tamil Nadu.

9.4 Other Activities

(i). Director, CMC visited Phuentsholing, Bhutan to attend 'Tender Evaluation Committee' meeting of Punasangchu-II, HE Project, Bhutan during 10th May 2011 to 16th May 2011 and 21st May 2011 to 25th May 2011.

(ii). Revision of "Guide Book on Use Rate, Hire charges and Transfer value of equipment and spare parts (Third Edition)-December, 1988 is under progress.

CHAPTER-X

INTER-STATE MATTERS

10.1 Inter-State River Water Disputes

CWC provides technical assistance to MoWR to settle water related 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 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.

The Cauvery River Authority has so far held six meetings, last being on 10.2.2003. The Cauvery Monitoring Committee has so far held 26 meetings. The twenty sixth meeting was held during 2011-12 on 12th August, 2011.

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. This formula was discussed during 26th meeting of CMC.

10.1.2 Krishna Water Disputes Tribunal -II

The Krishna Water Disputes Tribunal-II 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-II), under section 5(2) of Inter-State River Water

Disputes Act 1956 submitted its report and decision on 30.12.2010 to the Central Government.

The report and decision were studied in CWC 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. Further, references by the Party States on the KWDT-II decision before the Tribunal were examined and the material for replies were sent to MoWR. The tribunal is in process of examining the reference made by Centre/ State Govts.

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.

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 directed GOI to constitute a Water Dispute Tribunal and refer the issue to the Tribunal. The Tribunal was notified on 24.02.2010.

10.1.4 Mahadayi/Mandovi River Water Dispute

Mandovi is an inter-State river originating in Karnataka and after flowing in Goa drains in Arabian Sea. A small portion of the catchment area also lies in Maharashtra. 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.

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. 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 ordered 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 on Palar river issue was held on 24.12.2010 under the chairmanship of Chairman, CWC at New Delhi. However, no consensus could be reached in the meeting and MOWR was informed accordingly.

Subsequently, a meeting was held on 26.5.2011 under the Chairmanship of Secretary, MoWR for resolving the issue. However, no solution could be arrived as State of Tamil Nadu insisted that no new project in Palar River Basin in AP should be taken up. Secretary, MoWR concluded that in view of the rigid stand taken by the party States, there was no possibility of any negotiated solution and Hon'ble Supreme Court would be apprised of the same.

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 earst-while 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.

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 jurisdictions 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 project will provide annual irrigation to 2.49 lakh hectares in Madhya Pradesh. 1.5 lakh hectares in Uttar Pradesh & 0.94 lakh hectares in Bihar towards stabilizing its existing Sone canal system.

10.2.2 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 EC may exercise any power and do any act which may be

exercised by the Board. Chairman, EC has been delegated with emergency powers to take decision on urgent proposals, subject to ratification by the EC in its next meeting.

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 costs as well as benefits of the project are to be shared equally by both the States. Construction work of Dam and Power House is almost complete.

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 MoU was prepared and sent to party states for the comments/views.

So far 85 meetings of the Executive Committee of BRB have taken place. The 85th meeting of Executive Committee was held on 20.7.2011. The Committee discussed/decided the financial, technical and administrative matters of the Board.

10.2.3 Joint Operation Committee (JOC) of Rihand Reservoir

Along with Bansagar agreement (1973) on sharing of Sone water, the agreement on Rihand dam was signed between U.P. and Bihar. Ministry of Water Resources set up a Joint Operation Committee (JOC) for Rihand Reservoir. The TOR of the of the JOC is "Formulation of guidelines for operation of the Rihand Reservoir", after assessing the water availability, irrigation requirements in Bihar and Power to be generated with a view to meet the requirements of both the States". Member (WP&P), CWC is the Chairman of the JOC. Representatives from Bihar and UP are the members of the committee.

The 24th meeting of Joint Operation Committee of Rihand Reservoir was held in New Delhi on 29th September 2011 under the chairmanship of Member (WP&P) in which the actual releases made from Rihand reservoir during 2010-11 were discussed and the operation plan for 2011-12 was finalized.

CHAPTER-XI

ENVIRONMENTAL MANAGEMENT OF WATER RESOURCES PROJECTS

11.1 Environmental Management

The implementation of environmental safeguards for river valley projects are monitored through Multidisciplinary - Inter-Ministerial National Environmental Monitoring Committee for River Valley Projects (NEMCRVP).

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 (Fig.2).

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.

Fig-1: STATEWISE PROJECTS MONITORED BY NEMCRVP (TOTAL: 85 PROJECTS)

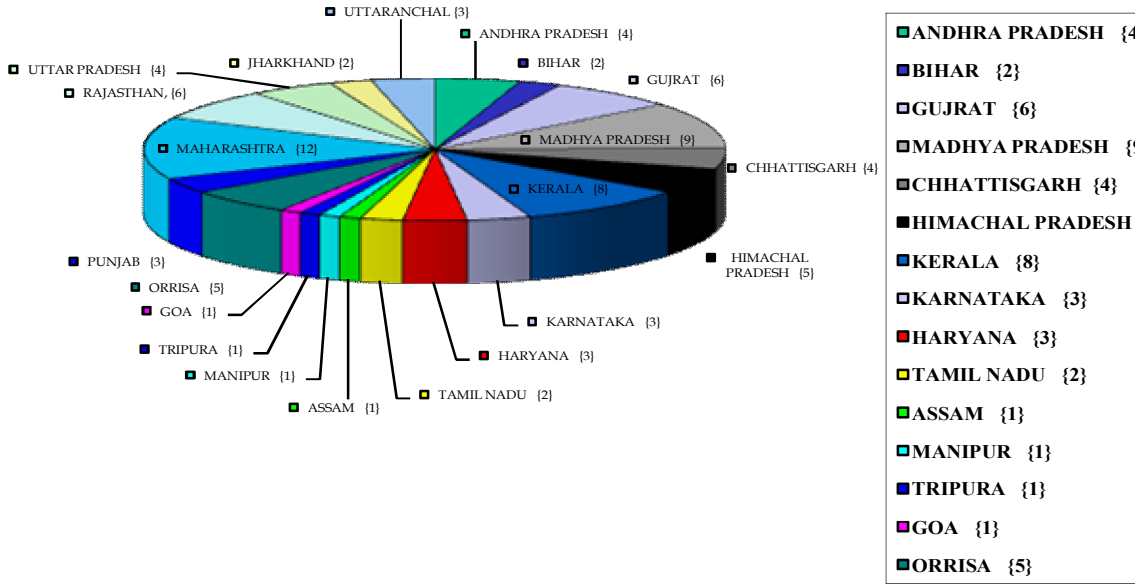
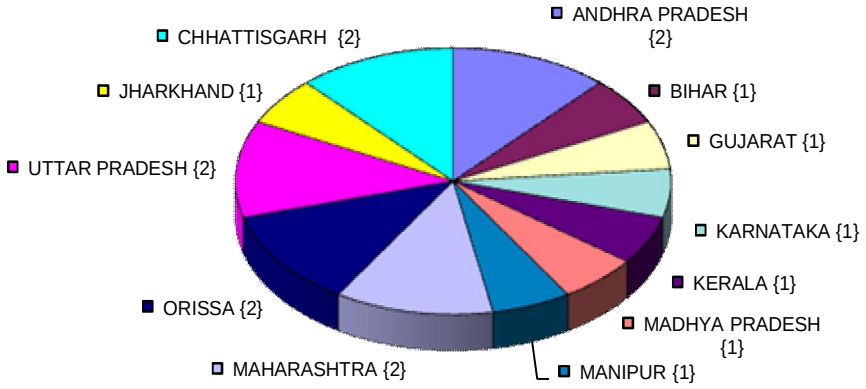


Fig-2: STATEWISE PROJECTS UNDER CLOSE MONITORING BY NEMCRVP (TOTAL :17)



11.1.2 Functions of the Committee

The NEMCRVP visits the projects and holds meetings with the State Governments and Project Authorities for implementation of environmental safeguards as stipulated in Environmental and Forest clearances. The Committee has visited 58 projects which include all the closely monitored projects and held 61 meetings since 1990.

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.

The progress achieved by the NEMCRVP is being brought out annually in Annual Report giving details of visits and meetings. The directions given to concerned state and project authorities for implementing the environmental safeguards are highlighted in the Annual Report.

11.2 Pollution and Conservation of Rivers- Empowered Steering Committee of NGRBA

The Ministry of Environment & Forests in exercise of powers conferred by Environment (Protection) Act. 1986, has constituted the National Ganga River Basin Authority (NGRBA) on 20.2.2009 as an empowered planning, financing, monitoring and coordinating authority for abatement of pollution and conservation of the river Ganga.

An Empowered Steering Committee (ESC) of the NGRBA has been constituted under the Chairmanship of Secretary, MoEF. Secretaries of Department of Expenditure (Ministry of Finance), Ministry of Urban Development, Ministry of Water Resources, Ministry of Power, Department of Science and Technology, Planning Commission and Chief Secretaries of the states of Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, West Bengal and Chairmen of Central Pollution Control Board & Central Water Commission and Additional Secretary & Financial Advisor (MoEF) are Members of the committee. Mission Director (NGRBA) is the Member Secretary of the Committee.

Following functions have been assigned to the Empowered Steering Committee of NGRBA:

(i) To consider, appraise and sanction project proposals related to activities of NGRBA.
(ii) To consider release of funds for the projects approved.
(iii) To monitor progress of work.
(iv) To facilitate coordination between the Centre and States and between NGRBA and various Central Ministries.
(v) To report to the NGRBA and its Standing Committee from time to time.

During the year 2011-12, a Presentation on Ganga Strategic Basin Assessment was made by World Bank and round table discussion with the officers of MoWR/CWC and World Bank was held in the month of August. Views of CWC on Five draft reports prepared by the consortium of seven IITs on Ganga River Basin Management Plan were furnished to MoWR.

11.3 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. Four such studies have been taken up during 2008-09 in respect of Mahanadi Delta Project (Orissa), Mahi Bajaj Sagar Project (Rajasthan), Singur Project (Andhra Pradesh) and Ram Ganga Dam (U.P). Studies on two projects viz., Singur Project (Andhra Pradesh) and Ram Ganga Dam (U.P) have been completed and Final Reports submitted during this year. The findings and conclusion of the studies have been communicated to the concerned State Governments for mitigating adverse impact of the projects. The Studies on other two projects viz., Mahi Bajaj Sagar (Raj) and Mahanadi Delta Project (Orissa) are in progress and the draft final reports and final reports are due for submission.

The work for conducting Environmental Impact Assessment studies of Subansiri and Siang Sub Basins were assigned to Central Water Commission by the Ministry of Water Resources based on the recommendation of an Inter- Ministerial Group that was constituted under the Chairmanship of Secretary (WR) to evolve a suitable framework to guide and accelerate the development of Hydro power in the North East especially to assess the downstream impacts on Assam during 2009-10. Terms of Reference of the above studies have been provided by the MoEF. Memorandum of Understanding with the selected consultants has been executed by the CWC during

December 2011 after getting the approval of MoWR and the works are in progress during this year.

Feasibility reports/ DPRs of 4 projects namely Kishenganga HEP, Chandan Reservoir Project, Kanchi Weir Irrigation project, Loktak lift irrigation project have been examined from an environmental angle and comments offered. Two EIA reports viz., Kalez Khala and Suntley projects, Sikkim were examined from environmental angle and comments offered.

11.4 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.

The Ministry of Rural Development (Deptt. of Land Resources), Govt. of India has prepared the "National Policy on Resettlement and Rehabilitation for Project Affected Families – 2003", which was further reviewed in the year 2007. Some of the State Governments have formulated their own R&R policies / Guidelines / Acts for project affected persons. Recently Land Acquisition and Rehabilitation and Resettlement Bill 2011 has been introduced in Parliament. The bill is having provision of Land Acquisition as well as Rehabilitation and Resettlement of Project affected people.

A compilation consisting of Rehabilitation & Resettlement Data of Major / Medium, existing / on-going water resources projects was prepared in year 2010 which has been updated in March 2012. This compilation includes the information received from State Governments related to 385 Major and Medium W.R Projects.

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

One major project proposed for World Bank funding, one major project proposed for JBIC assistance and two major project proposed 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

Table 12.2

Project proposed for JBIC Assistance

S No.	Name of Project	Estimated cost (` crore)
1	**AP Irrigation and Livelihood Improvement Project**	1137.74

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, Tranche-II	`471.48
2.	Integrated Water Resources Management and Sustainable Water Services Delivery in Karnataka	$85.00

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 Five such projects are being taken up with the assistance of the World Bank in the state of Rajasthan, Madhya Pradesh, Uttar Pradesh and Maharashtra and Andhra Pradesh.

The main objectives of WSRP are:-

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

12.2.2 Closed Credit/Loan Agreements

Out of 43 World Bank aided projects, 38 projects have been closed and the assistance utilized is as shown in Table 12.4

Table 12.4

Details of Closed Agreements

Sl. No.	State	No. of Projects	Assistance in million US Dollar	
			As per SAR	Utilised
1.	Andhra pradesh	6	995.30	802.62
2.	Bihar	2	142.00	158.61
3.	Gujarat	7	921.50	805.82
4.	Haryana	3	519.00	505.98
5.	Karnataka	2	451.00	291.96
6.	Kerala	1	80.00	79.08
7.	Madhya Pradesh	2	360.00	318.18
8.	Maharashtra	4	453.00	480.75
9.	Orissa	5	544.90	457.55
10.	Punjab	2	294.00	290.06
11.	Tamil Nadu	3	340.90	268.36
12.	Uttar Pradesh	1	125.00	125.76
	Total	38	5226.60	4584.73

12.2.3 On-going Credits / Loans Agreements

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

Table 12.5

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 02/12
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	215.54 M, USD
2 A	Rajasthan Water Sector Restructuring Project	Cr.3603-IN	IDA	03-2002	03-2013	8305.07	8305.07	93.45 M, XDR	76.39 M, XDR
2 B	Addional Financing for Rajasthan Water Sector Restructuring	Cr.4709-IN	IDA	05.2010	03.2013	2080	2080	12.40 M, XDR	1.39 M, XDR
3.	Uttar Pradesh Water Sector Restructuring Project	Cr.3602-IN	IDA	03-2002	10-2011	8351.00	8351.00	87.23 M, XDR	85.67 M, XDR
4.	Madhya Pradesh Water Sector Restructuring Project	Ln.4750-IN	IBRD	01-2005	03-2012	20402.23	20402.23	387.04 M, USD	187.23 M, USD
5.	Andhra Pradesh Water Sector Improvement Project	LR.7897-IN	IBRD	14-08-10	31-7-2016	44444	44444	450.00 M, USD	55.78 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 02/12 (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
						6273.57	6273.57	On-going
	Rengali Irrigation Project	ID-P-210	03/10	11/15	19583.4	3052.0	2203.03	On-going
	Rengali Irrigation Project –(III)*	ID-P-210A	03/10	11/15	-----	20.00	0.00	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	3302.95	On-going
3	AP Irrigation and Livelihood Improvement Project	IDP 181	3/07	07/16	11377	23974	2638.55	On-going
	Total					**61901.57**	**39297.52**	

* Separate Loan agreement signed for additional financing to ID-P-210

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 neighboring 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.

To discuss various issues related to water resources between India and Nepal, including implementation of existing agreements and understanding, a three tier mechanism comprising of (i) *Joint Ministerial Level Commission on Water Resources (JMCWR)* headed by Ministers of Water Resources of India and Nepal, (ii) *Joint Committee on Water Resources (JCWR)* headed by Secretaries of Water Resources and (iii) *Joint Standing Technical Committee (JSTC)* headed by the Chairman, Ganga Flood Control Commission, Patna from Indian side, exists.

Joint Committee on Water Resources (JCWR)

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. Important committees are as under:-

i. Joint Standing Technical Committee (JSTC)
ii. Joint Committee on Inundation and Flood Management (JCIFM)
iii. Joint Team of Experts (JTE)

Joint Committee on Inundation and Flood Management (JCIFM)

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 Ministry of External Affairs 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 to the decision taken during the 4th meeting of the India-Nepal JCWR held on 12-13 March, 2009, a 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).

JCIFM implements the decisions of JSTC in inundation and flood management issues and addresses the issues related to flood management and inundation and can form task group(s), if required. The JCIFM monitors the progress of works and provides guidance to task group(s) and report to JSTC. During the 6th meeting of JCIFM, held at Kathmandu on January 16-21, 2012, decisions regarding various on-going works of construction of embankment/ anti-erosion works were taken. Prior to the meeting, the Joint Committee also visited various on-going works. Apart from this, the Detailed Project Reports (DPRs) of proposed projects and issues related with its examination in GFCC were discussed. The Committee also finalised the Draft Report on flood forecasting activities on rivers common to India and Nepal.

Joint Ministerial Level Commission on Water Resources (JMCWR)

In pursuance of the decisions taken during the 3rd meeting of JCWR held on 29th September- 1st October, 2008 at Kathmandu (Nepal) and 4th meeting of the India-Nepal Joint Committee on Water Resources (JCWR) held on 12-13 March, 2009 at New Delhi, India-Nepal Joint Ministerial Commission on Water Resources (JMCWR) has

been constituted to discus and decide plans for maximizing the benefits from water resources development through bilateral cooperation. Minister (WR), Govt. of India is co-chairman from India side. In the 6th meeting of JCWR held on 24-25 November 2011 at New Delhi, it was agreed that the first meeting of Joint Ministerial Commission on Water Resources (JMCWR) may be held in early 2012 to plan for maximizing the benefits from water resources development through bilateral cooperation.

Accordingly, the 1st meeting of India-Nepal Joint Ministerial Commission on Water Resources (JMCWR), headed by Hon'ble Minister (Water Resources), Govt. of India, was held on 15th February, 2012 at New Delhi. Later on in a Joint Press Statement, it was agreed to expedite the work of Pancheshwar Development Authority (PDA) & completion of DPR of Sapta Kosi High Dam Multipurpose Project and Sun Kosi Storage cum Diversion scheme within the time frame. Other issues related to cooperation in the field of Water Resources were elaborately discussed.

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 power houses along the canal system. CWC has finalised the investigation stage layout for power house related components of Sapta Kosi Dam Project and has also provided alternative barrage alignment at Sisaulighat.

Sun Kosi Storage-cum-Diversion Scheme envisages diversion of water from the Sun Kosi River to a tributary of Kamla via Diversion dam at Sun Kosi River, 16.6 km

diversion tunnel and a dam at Kamla River to store the water in the reservoir for subsequent release for the irrigation of command area. To utilize effective water head from the Sun Kosi River to end of the diversion tunnel and Kamla Dam, two hydro power stations were proposed with a total installed capacity of 93.4 MW.

In the 10th meeting of the India-Nepal Joint Team of Experts on Sapta Kosi high dam Multipurpose Project and Sun Kosi storage-cum-diversion scheme held on 22-23 August, 2011 at New Delhi, it was decided to expedite the remaining field investigation and studies in a time bound manner.

During the 6th meeting of India Nepal JCWR headed by Secretary (WR) held during 24th – 25th November 2011 at New Delhi followed by the 1st meeting of the India Nepal Joint Ministerial Commission on Water Resources (JMCWR) held on 15.2.2012, the field works related to investigations of Saptakosi High Dam Project including Sun Kosi diversion Scheme were reviewed. JPO-SKSKI was directed to expedite all the balance works so that Detailed Project Report could be completed by February' 2013. The works are in progress. However the field works viz., geotechnical investigations at Sapta Kosi Dam, spillway, power house area and re-regulating barrage at Sisaulighat site could not progress due to political instability, local law and order problems. The same are being sorted by the Nepalese side.

The 11th meeting of the India-Nepal Joint Team of Experts on Sapta Kosi high dam Multipurpose Project and Sun Kosi storage-cum-diversion scheme was held on 2-4 February, 2012 at Kathmandu, Nepal. The progress of work was discussed in the meeting and action plan for completion of residual all field related works viz. additional topographical survey, EIA study, drilling work, geological work etc. and preparation of DPR was broadly chalked out. The Project Managers were advised to complete the remaining field work and studies in a time bound manner.

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.

Detailed Project Report (DPR) 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 at Poornagiri/ Rupaligad to primarily meet irrigation requirements downstream in Uttar Pradesh, have been prepared by Indian side in the year 2002 based on detailed surveys & investigation. However, the Govt. of Nepal has suggested some change in the location of re-regulating structure at Rupaligad, which is yet to be surveyed and investigated. The DPR is yet to be accepted by Govt. of Nepal.

In the 3rd meeting of India-Nepal Joint Standing Technical Committee (JSTC) held on 13-14 September 2011 at New Delhi, it was decided that all types of help would be provided from the Nepalese side for conducting discharge observations at Pancheshwar dam site and drilling work of Rupaligad site. Accordingly, the action has been initiated to take permission for the following :-

(i) Permission for movement of 3 Indian personnel to Nepal side for operation of Winch machine installed on Nepal side at Pancheswar site on daily basis for carrying out discharge observation during the period from 07.00 hrs to 12.00 hrs.

(ii) Permission for movement of 5 Indian personnel to Nepal side for drilling and installation of Winch machine at Rupaligad site for about 45 days.

(iii) Govt. of Nepal is to be requested to depute a team of officers for a week for updating cost estimate of Pancheshwar project.

JCWR during its 6th meeting held on 24-25 November 2011 at New Delhi, decided that the remaining work of Pancheshwar Multipurpose Project may be completed early to finalize the technical parameters of the re-regulating dam and its power plant complex. It was informed that the Government of Nepal has approved the ToR of Pancheshwar Development Authority (PDA) and the same is under process of approval from the Indian side.

In the 1st meeting of India-Nepal Joint Ministerial Commission on Water Resources (JMCWR), headed by Hon'ble Minister (Water Resources), Govt. of India, held on 15th February, 2012 at New Delhi, it was agreed to expedite the setting up of Pancheshwar Development Authority (PDA) at the earliest for implementation of the Pancheshwar Multipurpose Project.

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 five times. The last meeting was held at Beijing on 19-22 April, 2011.

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 New Delhi on March 17-20, 2010 wherein various matters pertaining to cooperation in water resources sector, including Tipaimukh Dam Project, interlinking of rivers, sharing aspects of waters of common rivers, bank protection works, flood forecasting etc. were discussed.

A Treaty was signed by the Prime Ministers of India and Bangladesh on 12th December 1996 for the sharing of Ganga/ Ganges waters for a period of thirty years to be renewable by mutual consent. As per the provision of the Treaty, 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 Brahamaputra and 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. 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 RGoB.

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.

The 2nd meeting of the reconstituted Joint Technical Team (JTT) between the Govt. of India (GoI) and Royal Govt. of Bhutan (RGoB) was held on 21-24 December, 2011 at Siliguri, India. In this the compilation and Integration of maps showing river systems common to India and Bhutan in the scale of 1:50,000 has been exchanged. Other items viz. assessment of the sediment load and its impact on the rivers, review of remedial measures taken for stability assessment for Kharbandi check post, Rinchending Goenpa and Jharna slides and action to be taken on short and long term basis for flood prevention and erosion control were discussed.

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. Presently, consultancy work for replacement of originally installed rope drum hoist with hydraulic system for radial gates and integration of remote automatic operation of gates of Chhukha Hydropower Plant, Bhutan has been awarded to BID, CWC.

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 side and Australian side has been constituted. Director (Basin Planning), CWC is one of the members of JWG from Indian side.

During the first meeting of the JWG held in November, 2010, 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. The Action Plan inter-alia envisages to collaboratively develop a project plan and funding proposal for integrated water resources management and planning, drawing together key policy, scientific and information inputs, in a case study of a river basin. The requisite inputs for preparation of project plan as envisage under Action Plan were provided to the Ministry of Water Resources. Two members of the Indian side Working Group were deputed to participate in Water Information Research and Development Alliance's Science Symposium from 1st to 5th August, 2011 at Melbourne, Australia. During the year, meetings of the Indian side of the Working Group were held to review the progress and prepare a Project Plan for Brahmani-Baitarni river basin in India in consultation with the States.

CHAPTER-XIV

WATER RESOURCES DATA MANAGEMENT

14.1 Water Resources Information System (WRIS)

The project 'Generation of Database and Implementation of Web-enabled Water Resources Information System' in the country named as **India-WRIS** has been jointly formulated by ISRO and CWC to generate nationally consistent water resources database. The estimated cost of the project is ` 78.3164 crores & MoU has been signed between the two parties in Dec' 2008.

India-WRIS is envisaged as a '**single–window'** data source in a standardized national Geographical Information System (GIS) framework for management and planning of water resources of the country. This database would be accessible by all the Departments / Agencies authorized by CWC, on a thin client scalable web enabled information system where data will be residing in a centralized database and application server environment. It allows users to Search, Access, Visualize, Understand and Analyze water resources data for planning, development and finally IWRM.

The currently available data with CWC and ISRO are organized in the first version and new data generation is being developed and is to be completed in next two years. Beta version of India-WRIS was launched by Hon'ble by Hon'ble Minister for Water Resources Shri Pawan Kumar Bansal on 7th December 2010. The website URL is www.india-wris.nrsc.gov.in. The information system contains several GIS layers on water resources projects, thematic layers like major water-bodies, land use/land cover, wastelands, land degradation etc., environmental layers as well as infrastructure and other administrative layers. The information system has all the basic map viewing and navigation capabilities like zoom, overview, bookmark, table of contents, etc. Apart from these, it makes use of the latest web technologies to present the data using Identify, Search and Query facilities, Comprehensive charting tools, Measurement tools, Geo Tagging, Clip & Ship, Map personalization & Printing facilities and Contextual data analysis tools.

Further development of Information System is under progress. The updated version i.e second version has been launched on 22nd March 2012.

14.2 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 containing data up to 2009-10 has been published in March 2012 and up-loaded on the website of CWC.

14.3 Water and Related Statistics

A publication titled 'Water and Related Statistics' is brought out by CWC which inter-alia provides the following information.

- Rainfall in different meteorological sub-divisions of the country.
- Water resources potential in the river basins of India, basin-wise, storages in India.
- Month wise storage position of important reservoirs.
- State-wise ultimate irrigation potential, basin-wise hydrological observation Stations of Central Water commission.
- Land use Statistics and flood Damage i.e Area Affected
- Resources Utilization including Plan-wise/ State-wise Potential created, Potential Utilised, Achievements of Irrigation Potential of Major &Medium Irrigation Projects.(surface Water).
- Production Related performances & Economic Efficiency.
- State- wise and Plan-wise Financial Expenditure on Major & Medium irrigation as well as Minor irrigation.

The Publication for the year 2010 has been published and is available on CWC website. Yearly publication entitled "Water Resources Sector at a Glance – 2012" is brought out every year by CWC. The publication for the year 2012 has been published.

14.4 Financial Aspects

The water rates for domestic & industrial use and lift & flow irrigation as prevailing up to 2007-08 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.

14.5 STANDARDS ON FLUID FLOW MEASUREMENTS BUREAU OF INDIAN STADARDS/ ISO STANDARDS

Chief Engineer (P&D) is Chairman of two sub-committees viz., (i) ISO/ TC-113/ SC-1 (Velocity Area Method), and (ii) ISO/ TC-113/SC-5 (Instrumentation) at National Level and the works related with these committees are dealt in P&D Directorate. Preparation/ examination of following draft Bureau of India Standards / ISO standards were carried out on behalf of Bureau of India Standards (Secretariat for ISO works).

1. ISO/FDIS 772: Hydrometry – Vocabulary & Symbols,
2. ISO/DIS 6421: Hydrometry – Methods for assessment of reservoir sedimentation,
3. ISO/DIS 4377: Hydrometric determination – Flow measurement in open channels using structures flat V-weirs,
4. ISO/TR 9212:2006 Hydrometry – Measurement of liquid flow in open channel – Methods of measurement of bed load discharge, and
5. ISO/DIS 1100-1: Hydrometry- Measurement of liquid flow in open channels-Guideline for selection, establishment and operation of gauging station etc.

CHAPTER-XV

TRAINING

15.1 Training

In order to develop knowledge, technical and managerial skills of CWC personnel, Training Directorate arranges and co-ordinates training programmes/seminars/ workshops in water related fields. 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 (ITP)

Induction training to Assistant Directors recruited through UPSC and for newly promoted Asst Directors of CWC is also conducted by Training Directorate and National Water Academy at Pune. ITP for newly promoted Asst Directors of CWC has been conducted during 5-23 September 2011 in the year 2011-12.

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 2011-12, in all 31 numbers of training programmes including Workshop/Seminar have been conducted. During the year 711 number of officers from various states/central Govt. organizations, PSUs were trained by NWA with a total number of manweeks accomplished to the tune of 774.6.

Out of 31 training programmes conducted by NWA, following programmes/ Workshops were introduced for the first time.

- Workshop on EHP-At India Meteorological Department, Pune.
- Workshop on " Leadership Skills, managerial Effectiveness and Influencing changes" (Off campus program at Gandhinagar)
- Orientation Program for Chief Engineers and Senior Directors of CWC.
- Consultation Meeting with Panchayti Raj Institutions (Representatives from Madhya Pradesh, Gujarat, Goa and Maharashtra States attended the meeting).
- Training Program on Construction and contract Management.
- Training Program on "Preparation of Detailed Project Report" for African Nationals.
- Webinar on "Understating Environment Flows".

During the year 2011-12, a training programme on "Preparation of Detailed Project Report" for African Nationals was conducted during 28th November to 9th December 2011. A team comprising 16 delegates from various African countries attended this training program.

Following off campus training programmes were conducted during the year 2011-12.

a) Workshop on Extended Hydrology Project at IMD, Pune-13-15 April 2011-12.
b) Workshop on "Leadership Skills, Managerial Effectiveness and Influencing changes" 1-2 June 2011 at Gandhinagar.
c) Orientation Program for WAPCOS officers-31st October to 7th November 2011 at Gurgaon.

Various training courses, workshops and seminars organized by NWA at Pune during 2011-12 are given at **Annexure -15.3.**

National Water Academy, CWC, Pune

Consultation Meeting with Panchayti Raj Institutions was held at NWA on 02-11-2011 under the chairmanship of Shri Pawan Kumar Bansal, Hn'ble Union Minister of Water Resources. Shri Vincent Pala, Hon'ble State Minister for Water Resources was also present on the occasion. Representatives from Panchayatis of Madhya Pradesh, Gujarat and Goa attended the meeting.

During 2011-12, faculty of NWA contributed following publications.

1. Paper on "Capacity building in Water Resources Sector-changing paradigm and approaches" submitted by Shri D. S. Chaskar, Director, NWA in India Water Week-2012.
2. Paper on "Advance in flood forecasting techniques" submitted by hri A K Srivastava, Director and Dr. R. N. Sankhua, Director, NWA in India Water Week-2012 is approved by the organisers.
3. Paper on "A case study of dynamic wave routing and unsteady flood modelling of part of Karha basin with "HEC-RAS" submitted jointly by Dr. R. N. Sankhua, Director, NWA and Shri A.K. Srivastava, Director, NWA in India Water Week-2012.

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 going on in full swing.

The corner Stone for construction of swimming pool at National Water Academy, CWC, Pune was laid at the hands of Shri A.K. Bajaj, Chairman, CWC on 28th July 2011.

As a part of faculty development, following faculty of National Water Academy, CWC Pune, participated in various foreign training programmes tour as follows.

1. Shri Chetan Pandit, Chief Engineer, NWA attended an Expert Meeting on "Extended Hydrological Prediction (EHP) at Melbourne, Australia from 7th to 9th July 2011 organised by the WMO in association with the Australian Bureau of Meteorology to review the status of EHP in different regions in the world. The meeting at Melbourne was attended by 16 participants from 10 countries.
2. Shri Sushil Kumar, Director, NWA attended a short term training program on "Environment Monitoring and Modelling" at UNESCO-IHE, Delft, the Netherlands during 28th March to 15th April 2011.

3. Shri D. S. Chaskar, Director and Shri A K Srivastava, Director, NWA, CWC, Pune participated in a Training of Trainers Workshop at Boulder, USA during 28th November to 9th December 2011.

Various training courses, workshop and seminars organised by NWA at Pune during 2011-12 are given at Annexure-15.1.

CHAPTER-XVI

VIGILANCE

16.1 Disciplinary Cases

The Vigilance/Disciplinary cases and complaints received against officers & staffs of CWC were given proper and prompt attention. During the year 2011-12, 14 complaints were received and taken up for investigation. Final decision was taken in respect of 13 cases. In respect of 6 cases out of 13, the officials found guilty were awarded major/minor penalties. The break-up of vigilance/disciplinary cases in respect of different category of officers and staff is as follows:

S. No.	Particulars	Category of officers/staff			
		Gr. A	Gr. B	Gr. C	Gr. D
a)	No. of cases pending at the beginning of the year	22	14	09	04
b)	No. of cases added during the year	04	02	04	04
c)	No. of cases disposed of during the year	06	01	03	03
d)	No. of cases pending at the end of the year (a + b - c)	20	15	10	5

Vigilance Awareness Week was observed at CWC headquarters from 31st October to 5th November, 2011.

CHAPTER-XVII

REPRESENTATION OF CENTRAL WATER COMMISSION IN VARIOUS COMMITTEES

17.1 Committees Represented by CWC Officers

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

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

Sl. No	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
		Member (WP&P)	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
34.	Indo-Nepal Joint Committee on Water Resources	Chairman, CWC	Member
35.	Farakka Barrage Control Board	Chairman, CWC	Member

Sl. No	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
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.	Bureau of Indian standards (BIS) , WRD-1, wrd-2, WRD-10 and WRD-21	Chairman, CWC	Chairman
48.	Upper Yamuna River Board	Member (WP&P)	Chairman
49.	National Environmental Monitoring Committee	Member (WP&P)	Chairman
50.	Joint Operation Committee for Rihand Dam	Member (WP&P)	Chairman
51.	Contracts Works Sub-Committee of Betwa River Board	Member (WP&P)	Chairman
52.	Sub-Committee for processing tenders and proposals for purchase of stores & equipments of Bansagar Control Board	Member (WP&P)	Chairman
53.	Sub-Committee of officers to consider the claims of M/s HSCL in Earth Dam- Lot of Rajghat Dam Project	Member (WP&P)	Chairman
54.	Committee for settlement of claims of M/s N.P.C.C. Ltd of Betwa River Board	Member (WP&P)	Chairman
55.	Sub-Committee to examine and process claim cases of contractors of Bansagar Control Board	Member (WP&P)	Chairman
56.	Technical Advisory Committee on Socio-Economic, Agro-economic and Environmental Impact studies	Member (WP&P)	Chairman
57.	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
58.	Joint regulation Committee of Chandil Dam and Galudih Barrage	Member (WP&P)	Chairman
59.	Joint Regulation Committee of Kharkai Dam	Member (WP&P)	Chairman
60.	Sub-Committee on Irrigation, Performance Assessment History, Education, Training, Research & Development	Member (WP&P)	Chairman
61.	Standing Project Appraisal Committee of Central Water Commission	Member (WP&P)	Chairman
62.	Water Resources Planning Management and evaluation Sectional Committee-WRD-06 (BIS)	Member (WP&P)	Chairman
63.	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
64.	Task Force for Flood Management in the country (North Western Region)	Member (WP&P)	Chairman
65.	Committee for Cost Sharing of Hathnikund Barrage	Member (WP&P)	Chairman
66.	Sub-Group-1 for Research topics under invited reserved Category	Member (WP&P)	Chairman
67.	Sub-Group-II Rain Water Harvesting	Member (WP&P)	Chairman
68.	Committee for the Re-organised UP/Uttaranchal States	Member (WP&P)	Chairman
69.	Committee for Re-organised Bihar/ Jharkhand States	Member (WP&P)	Chairman
70.	Upper Yamuna Review committee	Member (WP&P)	Member-Secretary
71.	Working Group of INCID on capacity building	Member (WP&P)	Member
72.	Working Team on Socio-Economic Impacts & Policy Issues (ICID)	Member (WP&P)	Member
73.	Standing Committee for overall National Perspective Water Planning and Coordination in relation to diverse use of water	Member (WP&P)	Member
74.	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
75.	Committee for Eastern River Waters of Indus System of River	Member (WP&P)	Member
76.	National Watershed Committee	Member (WP&P)	Member
77.	Central Loan Assistance under Accelerated Irrigation Benefits Programme	Member (WP&P)	Member
78.	Steering Committee of Indian National Committee on Hydrology (INCOH)	Member (WP&P)	Permanent Invitee
79.	High Powered Committee-Yamuna Action Plan of Ministry of Environment and Forests	Member (WP&P)	Invitee
80.	Technical Advisory Committee for Flood Control, Drainage and Anti-Sea Erosion Schemes (Goa)	Member (RM)	Chairman
81.	Subernarekha Embankment Committee (Orissa, West	Member (RM)	Chairman

Sl. No	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
	Bengal & Bihar)		
82.	Working Group to advise WQAA on the minimum flow in the rivers	Member (RM)	Chairman
83.	Setting up of HISMG (Data and Data dissemination) for Implementation of the World Bank assisted Hydrology Project Phase –II.	Member (RM)	Member
84.	Setting up of HISMG (Technical) for Implementation of the World Bank assisted Hydrology Project Phase –II.	Member (RM)	Chairman
85.	Steering Committee for the Preparation of Status Report on Water Resources requirements and its availability for Urban Areas	Member (RM)	Chairman
86.	Coastal Protection and Development Advisory Committee (CPDAC)	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
105.	High Level Committee to Study the Regulation of Releases from various Hydro-Electric Projects Constructed Along Teesta	Member (RM)	Chairman

Sl. No	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
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.	Research Advisory Committee (RAC) of National Council for Cement and Building Materials.	Member (D&R)	Member
112.	Indian National Committee on Hydraulic Research (INCH)	Member (D&R)	Chairman
113.	R&D Implementation and Monitoring Committee(RIMC)	Member (D&R)	Chairman
114.	National Committee on Seismic Design Parameters of River Valley Projects (NCSDP)	Member (D&R)	Chairman
115.	Standing Advisory Committee (SAC) for R&D Programme	Member (D&R)	Chairman
116.	National Level Steering Committee (NLSC) for Dam Rehabilitation and Improvement Project (DRIP)	Member (D&R)	Member
117.	Technical Committee (TC) for Dam Rehabilitation and Improvement Project (DRIP)	Member(D&R)	Chairman
118.	Technical Advisory and Review Committee (TARC) for preparation of PMP Atlas	Member (D&R)	Chairman
119.	World Meteorological Organization	Member (D&R)	Principal Representative
120.	Board of Directors of Tehri Hydro Development Corporation	Member (D&R)	Part Time Director
121.	Committee to access Quantum on Excess River Water Flowing Across International Boarder and suggest its diversion	Member (D&R)	Chairman
122.	Technical Advisory Committee of the Farakka Barrage Project.	Member (D&R)	Chairman
123.	Committee of CEA to accord of techno-economic appraisal of Power Schemes.	Member (D&R)	Permanent Special Invitee
124.	Indian Meteorological Department (IMD)	Member (D&R)	Hydrological Advisor
125.	Tender Committee of Farakka Barrage Project	Member (D&R)	Chairman
126.	Programme Advisory Committee (PAC) for Fly Ash Unit constituted by Department of Science and Technology	Member (D&R)	Member
127.	Committee to finalize the Action Plan on full utilization of Eastern River flowing across international Boarder	Member (D&R)	Chairman

Sl. No	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
128.	Committee for monitoring progress of Farakka Barrage Project	Member (D&R)	Chairman
129.	Committee for monitoring structural aspects of proposed Tipaimukh Multipurpose Project	Member (D&R)	Chairman
130.	Technical Coordination Committe (TCC) for Tala HE Project, Bhutan	Member (D&R)	Co-Chairman
131.	Farakka Barrage Project Advisory Committee	Member (D&R)	Co-Chairman
132.	Board Meeting of Tala H.E. Project Authority (THPA)	Member (D&R)	Special Invitee
133.	Board Meeting of Punatsangchhu-I H.E. Project Authority (PHPA)	Member (D&R)	Permanent Invitee
134.	Technical Coordination Committee (TCC) for Punatsangchhu-I H.E. Project Authority (PHPA)	Member (D&R)	Co-Chairman
135.	Board of Consultants of Shahpur Kandi Dam, Punjab	Member (D&R)	Member

7.2 Activities of Some Important Committees for R&D

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 2012, 19 no. of research schemes are under implementation.

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 2012, 19 no. of research schemes are under implementation.

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 41 research projects of various research institutes in the field of agriculture and irrigation during financial year 2011-12. 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 Indian National Committee on Geotechnical Engineering and Construction Materials (INCGECM)

The two National Committees on Geotechnical Engineering (INCGE) and Construction Materials and Structures (INCCMS) constituted in 1991 & 1992 respectively have been merged and reconstituted as Indian National Committee on Geotechnical Engineering and Construction Materials (INCGECM) in September 2008. The apex body in geotechnical engineering and construction materials is responsible for coordinating various research activities in the field of rock mechanics and tunnelling technology; soil mechanics and foundation engineering; construction materials, concrete technology and structural engineering. Its secretariat is located at CSMRS, New Delhi.

As on January 2012, 16 research schemes are under implementation.

17.2.5 Indian National Committee on Ground Water (INCGW)

Considering the importance of various issues related to ground water, a new committee viz; Indian National Committee on Ground Water (INCGW) with responsibility of coordinating various research activities in the relevant field has been constituted in September 2008. So far the activities pertaining to research in ground water were being coordinated by INCOH through its Research Committee on Ground Water. The secretariat of INCGW is located at CGWB, Faridabad. The research scheme pertaining to ground water which so far were being dealt by INCOH, have been brought under INCGW.

As on January 2012, 15 research schemes are under implementation.

7.3 Activities of Some Important Committees for Inter-State Matters

17.3.1 Ghaggar Standing Committee

The Ghaggar Standing Committee was constituted in February 1990 to examine and coordinate irrigation , flood control, and drainage works in Ghaggar basin and laid down priority for their implementation and accord clearance to individual schemes in Ghaggar basin from the interstate angle.

17.3.2 Yamuna Standing Committee

The Yamuna Standing Committee was constituted to study the interest of Delhi, its suburbs and the Northern railway bridges and other studies on Yamuna at Delhi against undue increase in maximum flood level in Yamuna at Delhi on account of flood control works upstream, to safe guard the interest of Haryana, UP and Delhi against adverse effect of flood control works in any these areas and to ensure that adequate water way is provided for any new structure built across the Yamuna river.

The 79th and 80th meetings of the Committee were held on 27th January 2012 and 06th March 2012 respectively under the chairmanship of Member (RM), CWC.

17.3.4 Sahibi Standing Committee

The Sahibi Standing Committee was constituted in 1978 to oversee the implementation of all the elements of the master plan and to ensure that regulation of flows at control points is carried out in best interest of the concerned parties.

17.3.5 Committee on Special Remedial Works for Flood Protection Embankment on rivers Sutlej and Ravi

Committee on Special remedial Works for Flood protection embankment on rivers Sutlej and Ravi was constituted in December1989 by the Ministry of water Resources under Chairmanship of Chief Engineer(Flood Management), Central Water Commission to technically examine proposal for counter protective works on the river Sutlej and Ravi submitted by the Government of Punjab after verification of development in the field and to monitor the utilization by Punjab of the Central Assistance utilized for such works by periodic inspection of ongoing and completed works.

The members of the committee are from Ministry of Water Resources, Central Water and Power Research Station, Pune, Central Water Commission, Ministry of Defense and Irrigation Department of the State of Punjab. The committee was enlarged during 1996 by co-opting members from Border Security Force, Central Public Works Department and Ministry of Home Affairs at request of Ministry of Home Affairs.

The 31st and 32nd meetings of the Committees were held at Amritsar on 08th January 2011 and 01st December 2011.

17.4 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.

17.5 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.

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 6779 number composed pages and 1,15,040 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. Some of the noteworthy and important Publications relating to Water Resources and administrative aspects of Central Water Commission which were brought out during the above period are mentioned below:

Sl. No.	Name of the Job	Nodal Agency	No. of composed pages	No. of copies
1.	Central Water Commission Annual Report 2010-2011 (English)	TC Dte.	136	130
2.	Central Water Commission Annual Report 2008-2009 (Hindi)	TC Dte.	136	30
3.	Compendium of Minutes of the Commission Meetings [76th to 175th Meetings held between 12th May, 1987 and 5th March, 2010]	Secy., CWC	262	105
4.	Compendium of Minutes of the Commission Meetings [1st to 75th Meetings held between 4th December, 1974 and 15th April, 1987]	Secy., CWC	262	105
5.	CWC – Telephone Directory	TD Dte.	100	1500
6.	Report of Working Group on Flood Management Region Specific issues for XII Plan	F&MI Dte.	108	70
7.	List of Rajya Sabha Members with Address	TD Dte.	18	20
8.	Bhagirath (English) - 5 Nos. Issues: July-Sept., 2009 Oct.-Dec., 2010	Editor Bhagirath (English)	300	2300 each

	April-June, 2011 July-Sept., 2011 Oct.-Dec., 2011	Publicity Section		
9.	Bhagirath (Hindi) - 4 Nos. Issues January-March, 2011 April - June, 2011 July - Sept., 2011 Oct.- Dec., 2011	Editor Bhagirath (Hindi)	232	2300 each
10.	Regular Pension Papers	Estt. IV	20	5000

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

Following publications were also brought out during the year:

- CWC-Schedule of Rate-2012.
- Water Resources at a Glance-2012.

18.2 Microfilming

With a view to preserve important drawings and other documents for future references, the microfilming unit of TD Dte. records documents in microfilms / Digitised form, after proper indexing and coding. During the year 2011-2012, 482 Nos. of important engineering drawings / documents were digitised.

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 2011-2012 bilingually.

18.4 Azo Prints

Nearly 6042 number of Azo prints were developed from the tracings of drawings / documents pertaining to various Directorates of CWC / MOWR at Ferro-printing Unit 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.

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

- Organised Pavilion of Ministry of Water Resources in India International Trade Fair IITF-2011 from November 14th to 27th, 2011 in Hall No. 7E (AC) at Pragati Maidan, New Delhi. A physical working model of size 21'x10' on proposed India-Nepal Pancheshwar Multipurpose Project was fabricated and installed

during IITF-2011. It was for the first time that a working model at such a large scale was prepared for display.

- Participated in International conclave & Exhibition on Climate Change from Oct 12th to 14th, 2011 at Hyderabad.
- Participated in the Exhibition organised in Indian Science Congress held at Bhuvneshwer during 3rd to 7th January, 2012.

Annexure-1.1

Plan Schemes & Annual Budget

Plan Schemes

Details of the Plan Schemes during the year 2011-12 are given below:

(` in Crore)

S. No	Name of Schemes	Objective / Scope of Works	XI Plan outlay	FY 2011-12 (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	3.00	4.0	3.85
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	5.7	5.12	0.04
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	46.18	45.28	42.26
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	6.67	17.65	18.61
5.	Dam Safety Studies & Planning	Setting up of Instrumentation Demonstration Centre (spill over works of Xth Plan Scheme). ●Environmental & Social Assessment (ESA) Studies. ● Risk Analysis Studies and other	10.00	3.0	1.91	1.28

		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	34.0	34.0	32.97
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)	7.59	8.52	7.84

8.	Infrastructure Development	●Scheme includes activities related to (i) land& building of CWC, (ii) lands & buildings of CGWB, (iii) IT development of MoWR and (iv) up gradation and modernisation of computerisation and information system of CWC.	Total cost ` 115.00 crore			
			CWC component			
			(i)Land & Building ` 57.00 crore	11.721	15	9.733
			(ii) Up-gradation and modernisation of computerisation and information system of CWC `6.00 crore.	1.43	1.69	1.748

Annexure-1.2

Non-Plan Budget

The non-plan budget outlays and expenditure for the year 2011-12 are given below:

CWC (NON-PLAN) SCHEMES - OUTLAY AND EXPENDITURE

2701- MAJOR & MEDIUM IRRIGATION

(` in crores)

S NO.	NAME OF THE SCHEMES	BE. 2011-12	EXP. 2011-12
1	Direction & Administration	23.82	24.68
2	Data Collection	87.75	83.40
3	Research	1.84	2.37
4	Training	0.35	0.39
5	Survey & Investigation	8.79	8.06
6	Consultancy	25.73	27.42
7	Exhibition & Trade Fair	0.09	0.07
8	Cell for Mon. externally aided Project	1.04	1.12
9	Mod. Of Equip. CWC Offset Press	0.29	0.25
10	Water Planning Wing	2.06	1.76
11	Hydrological Obs. In Chenab Basin	2.02	2.02
12	Seminars and Conferences	0.004	0
13	Contribution to International Bodies	0.01	0.002
	Total:	**154.50**	**151.08**

2711- FLOOD CONTROL & DRAINAGE

(` **in crores**)

S. NO.	NAME OF THE SCHEMES	BE. 2011-12	EXP. 2011-12
1	Flood Control	72.39	66.61
2	Payment to Government of Bhutan for Maintenance of Flood Forecasting & Warning Centres	1.08	1.08
3	Strengthening & Modernisation of FF and Hyd. Obs. Network in Brahmaputra and Barak Basin	1.88	2.54

	Total:	**75.35**	**70.23**

Annexure – 5.1

List of Active Consultancy Projects in D&R Wing during the Year 2011-12

S. no.	State/ name of projects	S. no.	State/ name of projects
Projects at construction stage			
	Andaman & Nicobar Islands	26	Omkareshwar Project Unit
1	Indira Nalla Water Supply Scheme	27	Man Project D/S Bridge
2	Chouldhary Nallah Project	28	Yashwant Sagar Water Supply Project
3	Kamsrat Water Supply Scheme		**Manipur**
	Andhra Pradesh	29	Thoubal M.P. Project
4	Indira Sagar (Polavaram) Project	30	Dholaithabi Barrage Project
	Arunachal Pradesh	31	Khuga M.P. Project
5	Kameng H.E. Project		**Mizoram**
	Assam	32	Tuirial H.E. Project
6	Amjur Drainage Development Scheme		**Meghalaya**
7	Barbhag Drainage Development Scheme-Sluice Regulator	33	Ganol H.E. Project
8	Pagaladiya Dam Project	34	New Umtru H.E. Project
	Bihar		**Orissa**
9	Durgawati Reservoir Project	35	Anandpur Barrage Project
	Chattisgarh		**Rajasthan**
10	Kelo Irrigation Project	36	Kalisindh Project
11	Sukha Nalla Barrage Project	37	Lhasi Medium Irrigation Project
12	Ghumeria Nalla Barrage Project		**Tripura**
13	Hasde Bango (Minimata) Dam Project	38	Kalasi Barrage
	Himachal Pradesh	39	Champaichera Dam Project
14	Rampur H.E. Project	40	Howrah Dam Project
	Madhya Pradesh		**Uttar Pradesh**
15	Rani Avanti Bai Lodhi Sagar	41	Arjun Sahayak Pariyojna (Kabrai Dam)
16	Sitarewa Irrigation Project		**Uttarakhand**
17	Upper Beda irrigation Project	42	Tapovan Vishnugad Project - NTPC
18	Upper Beda irrigation Project – D/S Bridge	43	Koteshwar H.E. Project
19	Pench Diversion Project	44	Tehri Pumped Storage Scheme
20	Bargi Diversion Project (RBC/LBC)		**Afghanistan**
21	Indira Sagar Project	45	Salma Dam Project
22	Belkund Canal Syphon		**Bhutan**
23	Jobat Project U/S&D/S Bridges	46	Punatsangchu Stage-I HE Project
24	Punasa Lift Irrigation Scheme	47	Punatsangchu Stage-II H.E. Project

25	Lower Goi Project (Shaheed Bhima Naik Sagar Project)	48	Chukha Damchu Highway Project
Projects at DPR stage			
	Arunachal Pradesh	15	Rosara Small H.E. Project
1	Jiadhal M.P. Project	16	Dudhi Irrigation Project
2	Lohit H.E. Project	17	Raghavpur Small HE Project
3	Nuranang Chu H.E. Project	18	Indira Sagar Project Unit-II
4	Nyukcharong Chu H.E. Project	19	Upper Budhner Irrigation Project
	Gujarat	20	Ganjal Irrigation Project
5	Garudeshwar Weir Project	21	Machchrewa Irrigation Project
	Jammu & Kashmir	22	Chinky H.E. Project
6	Ujh M.P. Project	23	Punasa Lift Irrigation Project
	Jharkhand	24	Dukrikheda Irrigation Project
7	Balpahari MP Project		Omkareshwar Project Unit-II
	Madhya Pradesh	25	**Mizoram**
8	Ken Betwa Link Phase-II		Tuichang H.E. Project
9	Sher Irrigation Project	26	**Meghalaya**
10	Shakkar Irrigation Project	27	Kulsi H.E.Project (DPR)
11	Basania Small H.E. Project	28	Myntdu H.E. Project Stage-II
12	Ataria irrigation Project	29	Killing Dam Project (DPR)
13	Morand Irrigation Project	30	Jadukata H.E. Project Stage-I
14	Jadukata H.E. Project Stage-II		**Indo-Nepal**
	Sikkim	34	Sapta Kosi High Dam MP Project
31	Santaley H.E. Project	35	Sun Kosi Storage cum Diversion Scheme
	Gujarat & Maharashtra		**Myanmar**
32	Damanganga - Parinjal Link Project	36	Tamanthi Hydro Power & MP Project
33	Par -Tapi - Narmada Link Project	37	Shwezaye Hydro Power & MP Project
Projects with Special Problems			
	Andhra Pradesh		**Kerala**
1	Srisailam Right Bank HE Scheme	9	Mulla Periyar Dam
	Assam		**Madhya Pradesh**
2	Kopil H.E. Project	10	Chanderi Water Supply Scheme
	Bhutan		**Rajasthan**
3	Chukha HE Project	11	Garda Dam Project
	Haryana		**Uttar Pradesh**
4	Hathnikund Barrage	12	Matatila Dam Rehabilitation Project
	Jharkhand	13	Rihand Dam Rehabilitation Project
5	Tilaiya Dam Rehabilitation Project		**Uttarakhand**
	Jammu & Kashmir	14	Tehri Dam Project
6	Lower Kalani HE Project		**West Bengal**

7	Ratle HE Project	15	Farakka Barrage Project
8	Upper Sindh HE Project Stage - II		

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	Madhya Pradesh

		72 MW 2.25 MAF	

Annexure 7.2

List of Projects Considered and Accepted By Advisory Committee of MoWR during 2011-12

Sl. No	Project Name	Name of the State	Major/ Medium	Estimated Cost in crore	Benefits in ha	Date of Approval by Planning Commission
1	Rehabiliation, Renovation and Modernisation of critically damaged channels of Haryana irrigation network-ERM	Haryana	Major	115.94	1,46,000	27.01.2012
2	Sri Rameshwar Lift Irrigation Scheme	Karnataka	Major	331.55	41,052	01-11-2011
3	Rajghat Canal Project-ERM	Madhya Pradesh	Major	34.15	164789	01-11-2011
4	Rangwan High Level Canal System-ERM	Madhya Pradesh	Major	39.04	17085	01-11-2011
5	Urmil Right Bank canal system-ERM	Madhya Pradesh	Major	45.69	7692	01-11-2011
6	Bembla River Project (Revised)	Maharahstra	Major	2166.35	70756	21.09.2011
7	Shahnehar Irrigation Project (Revised)	Himachal Pradesh	Major	387.17	24772	
8	Anti Erosion & Flood Protection work in Tawangchu basin in Arunachal Pradesh.	Arunachal Pradesh	Flood Control	36.47 (PL-2010)	4060 ha (Population-18400 nos.)	
9	Protection of Majuli Island from flood and erosion Phase-II & III.	Assam	Flood Control	115.99 (PL-2010)	1246 sq km	28-11-2011
10	Restoration of rivers Dibang and Lohit to their original corrses at Dholla Hatighuli course	Assam	Flood Control	54.43 (PL-2010)	16197 ha	28-11-2011
11	Flood Protection works for river banks of Bhadra river (Ch. Km 29.659 - km 31.932) at Bhadravathi town of Shimoga District	Karnataka	Flood Control	86.16 (PL-2010-11)	22 ha (Population-35000.)	
12	Protection of balat Village from flood and erosion of river Umngi in west Khashi Hill District	Assam	Flood Control	5.63 (PL-2008-09)	300 ha (Population-3250.)	

13	Ullal Costal Erosion & Inlet Improvement Project	Karnataka	Coastal Protection	170.7 (PL-2011)	Protection to fish processing industries	
14	Mirya Bay Coastal Protection Project	Maharashtra	Coastal Protection	62.51 (PL-2011)	Protection to fish processing industries	
15	Flood Protection and Training works on Phyang Nallah	Jammu & Kashmir	Flood Control	58.57 (PL-2010-11)	109.8 ha Population :5600 nos.)	
16	Flood Protection and Training works on Igoo Nala	Jammu & Kashmir	Flood Control	35.83 (PL 2010-11)	38.25 ha (Population :3500 nos.)	
17	Flood Protection and Training works on Saboo Nallah	Jammu & Kashmir	Flood Control	47.04 (PL 2010-11)	46.85 ha (Population :7700 nos.)	
18	Flood Protection and Training works on Ney Basco Nallah	Jammu & Kashmir	Flood Control	59.41(PL 2010-11)	69.60 ha (Population :4700 nos.)	
19	Flood Protection and Training works on Nimoo Nallah	Jammu & Kashmir	Flood Control	26.25 (PL 2010-11)	39.05 ha (Population :3300 nos.)	
20	Mitigation of floods in Onattukara Region comprising of 12 watersheds in Kerala State	Kerala	Flood Control	248.39 (PL-2010)	5890 ha (Population :40322 family)	
21	Flood Protection works for river banks of Kabini river (Ch km 0-km1.68) at Suttur Mutt Township, Najangud Taluk of Mysore District	Karnataka	Flood Control	26.93 (PL 2010-11)	120 ha (Population - 6000)	
22	Protection of Biswanath panpur including areas of uptram Silamari and Far downstream Bhumuraguri to Borgaon aginst erosion of the river Brahmaputra.	Assam	Flood Control	167.09 (PL 2010-11)	33693 ha (Population 1.5 lakh)	
23	Mahi Right Bank Canal project-ERM	Gujarat	Major	300.01	1,83,000 ha (Restoration 8500 ha)	
24	Improvement of Kakrapar RBMC (0 to 60.98 km) and Ukai RBMC (0 to 35.06 km) and LBMC system-ERM	Gujarat	Major	296.51 (2009-PL)	134503 (including restoration of 3500 ha)	13.03.2012

25	Upper Kundalika Project- Revised	Maharashtra	Medium	154.916 (PL 2009-10)	2800	19.12.2011
26	Maharashtra Water sector Improvement Project (MWSIP) (World Bank Aided)-ERM	Maharashtra	Major	2351.5 (PL 2010-11)	5,16,704 ha	
27	Flood Protection works of Lendi nalla at Katol town	Maharashtra	Flood Control	24.37 (PL 2009-10)	28 ha (Population :808 nos.)	24-10-2011 Restricted to ` 21.11 cr
28	Flood Protection works for Hemavathi River at Bankal town and six villages viz. Bankenhalli, Hydaragudda, Bakkihalla, Mugrehalli, Kittlegandi and Subramanya villages (Ch: km 9.41- km 32.3) of midigere Taluk in Chikmangalur District	Karnataka	Flood Control	47.56 (PL 2010-11)	290 ha (Population : 1500 person)	25-10-2011
29	Stabilization of Seer Khad and Flood Protection Works from Jahu to Bum	Himachal Pradesh	Flood Control	23.17 (PL 2010)	12 ha (Population : 5370 person)	02-11-2011
30	Flood Protection works for River Banks of Ghataprabha river at Gokak Town of Belgaum District	Karnataka	Flood Control	34.07 (PL 2010-11)	146 ha (Population : 1400 person)	
31	Improvement of Storm water Drainage below Greenfield Airport at Pakyong	Sikkim	Flood Control	48.55	171.43 ha (Population : 1800 person)	28.11.2011
32	Eastern Gandak Canal System (Gandak Phase-II),	Bihar	New-ERM- Major	1799.50	1,46,000	
33	Udersthan Barrage & other Iner-connected and Independent Schemes.	Bihar	New- ERM	531.01	41,052	
34	Madhya Pradesh Water Sector Restructuring Project (MPWSRP)	Madhya Pradesh	New-ERM	1919.00	4,88,682	
35	Orissa Integrated Irrigated Agriculture and Water Management Investment Programme (OIIAWMIP)-Tranche-II	Orissa	New-ERM	471.43 (PL 2010-11)	79863	

36	Rajgarh Medium Irrigation Project	Rajasthan	New-Medium	192.13(PL 2010-11) (irrigation-140.46, drinking water supply-51.46)	8568	
37	Bank Protection Works from Ismailpur to Bindtoli in downstream of Vikramshila Bridge on the left bank of river Ganga in Bhagalpur District.	Bihar	Flood Control	23.39 (PL 2011-12)	90215 (1,50,000 nos)	-
38	Bagaha Town Protection Works Phase-I on the left bank of river Gandak in west Champaran District	Bihar	Flood Control	48.91(PL 2011-12)	4000 (1,00,000)	-
39	Flood Protection Works along left and right banks of river Beas in Districts Gurdaspur, Hoshiarpur and kapurthala.	Punjab	Flood Control	46.12 (PL 2009)	1800 (2,25,000)	-
40	Purna Barrage (Ner Dhamana) Irrigation Project.(Revised)	Maharashtra	Medium	617.46 (PL 2009-10)	7024	26.03.2012
41	Raising and Strengthening of Adhwara and Khiroi left embankment from RD 0.0 Km to RD 43.60 Km & from RD 44.00 Km to RD 90.50 Km. and Right embankment from RD 0.0 Km to RD 81.50 Km in Sitamarhi, Madhubani and Darbhanga districts of Bihar.	Bihar	New- Flood Control	167.03 (PL-2011)	141760 ha./ 17,32,000 nos.	
42	"Improvement of embankment and ancillary works in Kandi and other adjoining areas of the districts of Murshidabad"	West Bengal	New- Flood Control	438.94 (PL-2011)	51000 ha./ 5,00,000 nos.	
43	Construction of Mahadewa- uska embankment along right bank of river Kunra in Siddharthnagar district of Uttar Pradesh (Scope Change)	Uttar Pradesh	Revised-Flood Control	27.76 (PL-2008-09)	1924 ha./ 16184 nos.	

44	Construction of Balrampur-Bhadaria embankment along right bank of river Rapti in Balrampur district of Uttar Pradesh	Uttar Pradesh	Revised-Flood Control	25.61 (PL- 2008-09)	14373 ha./ 56000nos.	

Annexure 8.1

List of Projects Under Monitoring (2011-12)			
S.No.	**Name Of Project**	**Major/Medium /ERM**	**State**
General Monitoring			
1	Pulivendula Branch Cannal	Major	Andhra Pradesh
2	Tungabhadra Hlc St.II	Major	Andhra Pradesh
3	Buridehing	Medium	Assam
4	Champamati	Major	Assam
5	North Koel Reservoir	Major	Bihar
6	Bateswar Asthan Ganga Pump Canal Phase-I	Major	Bihar
7	Hasdeo Bango	Major	Chhattisgarh
8	Mahanadi	Major	Chhattisgarh
9	Und-Ii	Medium	Gujarat
10	Ajoy Barrageproject	Major	Jharkhand
11	Dhansinghtoli Res. Project	Medium	Jharkhand
12	Katri Res.Project	Medium	Jharkhand
13	Nakti Res. Project	Medium	Jharkhand
14	Punasires.Project	Medium	Jharkhand
15	Kans Reservoir	Medium	Jharkhand
16	Ghataprabha St-II	ERM	Karnataka
17	Hippargi	Major	Karnataka
18	Hirehalla	Medium	Karnataka
19	Upper Krisjna St.II	Major	Karnataka
20	Gudada Mallapura	Medium	Karnataka
21	Varahi	Major	Karnataka
22	Amarja	Medium	Karnataka
23	Bennathora	Major	Karnataka
24	Lower Mullamari	Medium	Karnataka
25	Bhima Lift Irrigation Scheme.	Major	Karnataka
26	Idamalayar Irri. Project	Major	Kerala
27	Muvattupuzha Valley Irr. Project	Major	Kerala
28	Karapuzha Irr. Project	Medium	Kerala
29	Bargi Div.	Major	Madhya Pradesh
30	Jobat Project	Major	Madhya Pradesh
31	Man Project	Major	Madhya Pradesh
32	Sindh Ph.II	Major	Madhya Pradesh
33	Mahi	Major	Madhya Pradesh
34	Upper Beda	Medium	Madhya Pradesh
35	Gosikhurd	Major	Maharashtra
36	Hetwane	Medium	Maharashtra

37	Lower Terna	Major	Maharashtra
38	Upper Penganga	Major	Maharashtra
39	Waghur	Major	Maharashtra
40	Warna	Major	Maharashtra
41	Punand	Major	Maharashtra
42	Upper Pravara	Major	Maharashtra
43	Khuga	Major	Manipur
44	Thoubal	Major	Manipur
45	Lower Indra	Major	Odisha
46	Lower Suktel	Major	Odisha
47	Upper Indravati	Major	Odisha
48	Raising Of Lining Of Bhakra Main Line Canal	ERM	Punjab
49	Gumti	Medium	Tripura
50	Saryu Nahar Pariyojana	Major	Uttar Pradesh
51	Beko Irrigation	Medium	West Bengal
52	Khaira Bera Irrigation	Medium	West Bengal
53	Patloi Irrigation	Medium	West Bengal
54	Tatko Irrigation	Medium	West Bengal
	Vigorous Monitoring		
1	Dhansiri	Major	Assam
2	Durgawati Reservoir	Major	Bihar
3	Western Kosi Canal	Major	Bihar
4	Tillari	Major	Goa
5	J.L.N. Lift Irr.	Major	Haryana
6	Malaprabha	Major	Karnataka
7	Upper Krishna St.I	Major	Karnataka
8	Karanja	Major	Karnataka
9	Sindh Ph.I	Major	Madhya Pradesh
10	Bariarpur Lbc	Major	Madhya Pradesh
11	Upper Wardha	Major	Maharashtra
12	Rengali	Major	Odisha
	AIBP Monitoring		
1	F.F.C Of SRSP (Flood Flow Canal Of Sriram Sagar Project)	Major	Andhra Pradesh
2	Gollavagu	Medium	Andhra Pradesh
3	Gundla Kamma	Major	Andhra Pradesh
4	J.Chokkarao Godavari L.I. Scheme	Major	Andhra Pradesh
5	Mathadivagu	Medium	Andhra Pradesh
6	Musurumilli Res.	Medium	Andhra Pradesh
7	Palemvagu	Medium	Andhra Pradesh
8	Peddavagu At Jagannathpur	Medium	Andhra Pradesh

9	Peddavagu At Nilwai	Medium	Andhra Pradesh
10	Pushkara L.I. Scheme	Major	Andhra Pradesh
11	Rajiv Bheema L.I. Scheme	Major	Andhra Pradesh
12	Ralivagu	Medium	Andhra Pradesh
13	Sri Komaram Bhim	Medium	Andhra Pradesh
14	Sriram Sagar Project St.II	Major	Andhra Pradesh
15	Maddigedda Project	Medium	Andhra Pradesh
16	Tadipudi L.I.Scheme	Major	Andhra Pradesh
17	Tarakramathirtha Sagaram(Trts)	Medium	Andhra Pradesh
18	Thotapally Barrage	Major	Andhra Pradesh
19	Velligallu Reservoir	Medium	Andhra Pradesh
20	Yerrakalva Reservoir	Medium	Andhra Pradesh
21	Indira Sagar Polavaram	Major	Andhra Pradesh
22	Borolia	Medium	Assam
23	Buridehing	Medium	Assam
24	Champamati	Major	Assam
25	Dhansiri	Major	Assam
26	Mod. Of Jamuna	ERM	Assam
27	Bateshwar Asthan Ganga Pump Canal Project, Ph-II	Major	Bihar
28	Durgawati Reservoir	Major	Bihar
29	Punpun Barrage Project	Major	Bihar
30	Restoration Of Kosi Barrage And Its Appurtenants	ERM	Bihar
31	Western Kosi Canal	Major	Bihar
32	Restoration Of Eastern Kosi Main Canal And Its System	ERM	Bihar
33	Batane Reservoir	Major	Bihar
34	Nepal Benefit Scheme-09 Gandak Project	ERM	Bihar
35	Mahanadi	Major	Chhattisgarh
36	Hasdeo Bango Phase-IV	Major	Chhattisgarh
37	Koserteda	Major	Chhattisgarh
38	Kelo	Major	Chhattisgarh
39	Tillari	Major	Goa
40	Sardar Sarovar (Narmada)	Major	Gujarat
41	Changer Area, Medium Lift Irrigation Project	Medium	Himachal Pradesh
42	Shahnahar Irrigation Project	Major	Himachal Pradesh
43	Sidhata Irri. Project	Medium	Himachal Pradesh
44	Balh Valley (Left Bank) Medium Irrigation Project.	Medium	Himachal Pradesh
45	Kandi Canal	Medium	Jammu & Kashmir
46	Mod. Of Babul Canal	ERM	Jammu & Kashmir
47	Mod. Of Dadi Canal	ERM	Jammu & Kashmir
48	Mod. Of Kathua Canal	Medium	Jammu & Kashmir

49	Mod. Of New Pratap Canal	ERM	Jammu & Kashmir
50	Mod. Of Ranbir Canal	ERM	Jammu & Kashmir
51	Parkachik Khawas Irr. Scheme	Medium	Jammu & Kashmir
52	Rafiabad High Lift Irri.Proj.	Medium	Jammu & Kashmir
53	Rajpora Lift	Medium	Jammu & Kashmir
54	Tral Lift	Medium	Jammu & Kashmir
55	Mod. Of Ahji Canal	ERM	Jammu & Kashmir
56	Gumani Barrage	Major	Jharkhand
57	Kansjore Reservoir	Medium	Jharkhand
58	Panchkhero Res.	Medium	Jharkhand
59	Sonua Reservoir	Medium	Jharkhand
60	Surangi Reservoir	Medium	Jharkhand
61	Uppersankh Res.	Medium	Jharkhand
62	Bhima Samudra. Tank	Medium	Karnataka
63	Ghataprabha-St-III	Major	Karnataka
64	Hippargi	Major	Karnataka
65	Malaprabha	Major	Karnataka
66	Upper Krishna St.I, Ph-III	Major	Karnataka
67	Ukp St-II	Major	Karnataka
68	Dudhganga	Major	Karnataka
69	Mod. Of Bhadra Res.	Major	Karnataka
70	Varahi	Major	Karnataka
71	Gudada Mallapura	Med.	Karnataka
72	Chandrampalli	ERM	Karnataka
73	Hattikuni	ERM	Karnataka
74	Karanja	Major	Karnataka
75	Upper Mullamari	ERM	Karnataka
76	Bhima Lift Irrigation Scheme.	Major	Karnataka
77	Kanhirapuzha Irrigation Project	Medium (ERM)	Kerala
78	Karapuzha Irr. Project	Medium	Kerala
79	Muvattupuzha Valley Irri. Project	Major	Kerala
80	Chitturpuzha Irr.Project	Major (ERM)	Kerala
81	Bansagar-II	Major	Madhya Pradesh
82	Bansagar-I	Major	Madhya Pradesh
83	Sindh Ph.II	Major	Madhya Pradesh
84	Mahan Project	Major	Madhya Pradesh
85	Jobat Project	Major	Madhya Pradesh
86	Bariarpur Lbc	Major	Madhya Pradesh
87	Mahi	Major	Madhya Pradesh
88	Rajiv Sagar (Bawanthadi)	Major	Madhya Pradesh
89	Bargi Diversion	Major	Madhya Pradesh
90	Omkareshwar	Major	Madhya Pradesh
91	Indira Sagar Project	Major	Madhya Pradesh
92	Pench Div	Major	Madhya Pradesh

93	Punasa LIS	Major	Madhya Pradesh
94	Lower GoI	Major	Madhya Pradesh
95	Upper Beda	Medium	Madhya Pradesh
96	Gul	Medium	Maharashtra
97	Arjuna	Medium	Maharashtra
98	Aruna	Medium	Maharashtra
99	Bawanthadi	Major	Maharashtra
100	Bembla	Major	Maharashtra
101	Dongargaon	Medium	Maharashtra
102	Gosikhurd	Medium	Maharashtra
103	Gadnadi	Major	Maharashtra
104	Kudali	Medium	Maharashtra
105	Khadakpurna	Medium	Maharashtra
106	Krishna Koyna	Major	Maharashtra
107	Lower Dudhna	Major	Maharashtra
108	Lower Pedhi	Major	Maharashtra
109	Lower Wardha	Major	Maharashtra
110	Morna	Major	Maharashtra
111	Lower Panzara	Medium	Maharashtra
112	Sangola Branch	Major	Maharashtra
113	Tillari	Medium	Maharashtra
114	Upper Kundlika	Major	Maharashtra
115	Upper Manar	Medium	Maharashtra
116	Upper Penganga	Medium	Maharashtra
117	Uttarmand	Medium	Maharashtra
118	Waghur	Medium	Maharashtra
119	Warna	Major	Maharashtra
120	Wang	Major	Maharashtra
121	Nardave	Medium	Maharashtra
122	Dhom-Balakwadi	Major	Maharashtra
123	Nandur Madhmeshwar Part II	Major	Maharashtra
124	Punand	Major	Maharashtra
125	Tarali	Major	Maharashtra
126	Dolaithabi	Medium	Manipur
127	Khuga	Major	Manipur
128	Thoubal	Major	Manipur
129	Chelligada	Medium	Odisha
130	Integrated Anandpur Barrage Project	ERM	Odisha
131	Kanupur	Major	Odisha
132	Rengali	Major	Odisha
133	Lower Suktel	Major	Odisha
134	Subarnarekha	Major	Odisha
135	Lower Indra	Major	Odisha
136	Upper Indravati	Major	Odisha

137	Telengiri Irr. Project	Medium	Odisha
138	Ret Irr.Project	Medium	Odisha
139	Rukura Irr.Project	Medium	Odisha
140	Kandi Canal Stage_II (Extension From Hoshiarpur To Balachaur	ERM	Punjab
141	Rehabilitation Of Ist Patiala Feeder & Kotla Branch	ERM	Punjab
142	Relining Of Rajasthan Feeder And Sirhind Feeder	Major (New ERM)	Punjab
143	Shapur Kandi Dam Project	Major	Punjab
144	Mod. Of Gang Canal	ERM	Rajasthan
145	Narmada Canal	Major	Rajasthan
146	Indira Gandhi Nahar Pariyojna St-II	Major	Rajasthan
147	Gumti	Medium	Tripura
148	Khowai	Medium	Tripura
149	Manu	Medium	Tripura
150	Kachnoda Dam	Major	Uttar Pradesh
151	Madhya Ganga Canal Stage-II	Major	Uttar Pradesh
152	Mod. Of Lachura Dam	ERM	Uttar Pradesh
153	Arjun Sahayak Pariyojana	Major	Uttar Pradesh
154	Badaun Irrigation Project	Major	Uttar Pradesh
155	Bansagar Canal (Up Portion)	Major	Uttar Pradesh
156	Improving Irrigation Intensity Of Hardoi Branch System (Up)	ERM	Uttar Pradesh
157	Saryu Nahar Pariyojana	Major	Uttar Pradesh
158	Kanhar Canal Project	Major	Uttar Pradesh
159	Restoring Capacity Of Western Gandak Canal Project	ERM	Uttar Pradesh
160	Restoring Capacity Of Sharada Sahayak System	ERM	Uttar Pradesh
161	Teesta Barrage Project	Major	West Bengal
162	Patloi Irrigation	Medium	West Bengal
163	Tatko Irrigation	Medium	West Bengal

Annexure 8.2

Statewise Major & Medium Irrigation Projects Completed under AIBP

S.No.	STATE	PROJECT	YEAR OF COMPLETION
1	Andhra Pradesh	Sriramsagar St.I	2005-06
2		Cheyyeru (Annamaya)	2003-04
3		Priyadarshini Jurala	2006-07
4		Somasila	2006-07
5		Nagarjunsagar	2005-06
6		Madduvalasa	2005-06
7		Gundalavagu	2006-07
8		Maddigeda	2006-07
9		Alisagar	2006-07
10		Veligallu	2008-09
11		Guthpa LIS	2008-09
12		Swarnamukhi	2008-09
13		Vamsdhara St-II Ph I	2008-09
14	Assam	Hawaipur	2006-07
15		Rupahi	2001-02
16		Kolonga	2006-07
17		Bordikarai	2004-05
18		Integrated Irrigation Scheme in Kollong Basin	2006-07
19		Mod. of Jamuna Irr.	2008-09
20		Pahumara	2008-09
21	Bihar	Upper Kiul	2006-07
22		Orni Reservoir	2006-07
23		Bilasi	2000-01
24		Sone Modernisation	2008-09
25	Chhattisgarh	Hasdeo Bango	2006-07
26		Shivnath Div.	2002-03
27		Jonk Diversion	2006-07
28		Barnai	2006-07
29		Mahanadi Reservoir	2010-11
30		Minimata(Hasdeo Bango Ph-IV)	2010-11

31	Goa	Salauli	2006-07
32	Gujarat	Jhuj	1999-2000
33		Sipu	1999-2000
34		Mukteshwar	2006-07
35		Harnav-II	1997-98
36		Umaria	1996-97
37		Damanganga	1999-2000
38		Karjan	1999-2000
39		Sukhi	1999-2000
40		Deo	1997-98
41		Watrak	1999-2000
42		Aji-IV	2009-10
43		Ozat-II	2009-10
44		Bhadar-II	2010-11
45		Brahmini-II	2008-09
46	Haryana	Gurgaon Canal	2003-04
47		WRCP	2006-07
48	J&K	Marwal Lift	2006-07
49		Lethopora Lift	2006-07
50		Koil Lift	2006-07
51		Mod of Kathua Canal	2006-07
52		Igophey	2006-07
53		Mod. of Zaingir Canal	2006-07
54		Mod. of New Pratap Canal*	2006-07
55		Mod. of Martand Canal	2010-11
56		Mod. of Mav Khul	2010-11
57		Rafiabad High Lift Irr.	2010-11
58	Jharkhand	Latratu	2002-03
59		Tapkara Res.	2002-03
60	Karnataka	Hirehalla	2006-07
61		Maskinallah	2003-04
62		Votehole	2008-09
63	Kerala	Kallada	2004-05
64	M.P	Bansagar Unit I	2006-07
65		Upper Wainganga	2002-03
66		Sindh Ph I	2006-07
67		Urmil	2002-03
68		Banjar	2002-03
		Rajghat Unit - I	1998-99

69	Maharashtra	Surya	2006-07
70		Bhima	2006-07
71		Upper Tapi	2004-05
72		Wan	2005-06
73		Jayakwadi Stage-II	2004-05
74		Vishnupuri(Works)	2005-06
75		Bahula	2006-07
76		Khadakwasla	2004-05
77		Kadvi	2004-05
78		Kasarsai	2004-05
79		Jawalgaon	2004-05
80		Kumbhi	2006-07
81		Kasari	2004-05
82		Patgaon	2006-07
83		Madan Tank	2008-09
84		Shivna Takli	2008-09
85		Amravati	2008-09
86		Krishna	2008-09
87		Kukadi	2008-09
88		Hetwane	2008-09
89		Chaskaman	2008-09
90		Upper Wardha	2009-10
91		Purna	2009-10
92		Chandarbhaga	2009-10
93		Sarangkheda	2009-10
94		Prakasha Barrage	2009-10
95		Sulwade Barrage	2009-10
96		Nandur Madhmeshwar Ph-I	2009-10
97		Pentakli	2010-11
98		Wan - II	2006-07
99		Pothra Nalla	2006-07
100		Tajnapur LIS	2006-07
101		Lalnalla	2006-07
102		Kar	2006-07
103		Arunavati	2006-07
104		Sapan	2007-08
105		Utawali	2006-07
106	Orissa	Upper Kolab	2004-05

107		Potteru	2004-05
108		Naraj Barrage	2005-06
109		Sason Canal	2004-05
110		Salandi Left Main Canal-Ambahata	2005-06
111		Salki Irrigation	2004-05
112	Punjab	Ranjit Sagar	2000-01
113		Irr. to H.P. below Talwara	2000-01
114		Remodelling of UBDC	2006-07
115	Rajasthan	Jaisamand Mod.	2000-01
116		Chhapi	2004-05
117		Panchana	2004-05
118		Bisalpur	2006-07
119		Gambhiri Mod.	2000-01
120		Chauli	2006-07
121		Mahi Bajaj Sagar	2006-07
122	Tamil Nadu	WRCP	2006-07
123	Uttar Pradesh	Madhya Ganga and Upper Ganga Mod.	2003-04
124		Sarda Sahayak	2000-01
125		Providing Kharif Channel in H.K. Doab	2004-05
126		Rajghat Dam	1996-97
127		Gunta Nala	1999-2000
128		Gyanpur Pump Canal	2001-02
129		Jarauli Pump Canal	2006-07
130		Mod. Agra Canal	2008-09
131		Rajghat Canal	2008-09
132		Saryu Nahar	2009-10
133		Eastern Ganga Canal	2010-11
134	Uttarakhand	Tehri	2006-07
135	W.B	Kangsabati	2001-02
136		Mod. of Barrage and Irrigation System of DVC	2006-07
137		Hanumata	2008-09

Annexure 15.1

Courses organized by Central Water Commission (Head Quarter) during the year 2011-12

Sl.No.	Name of the Course	Duration of the Course	Venue of the Course	No. of Officers/officials Nominated
1	Training programme on ñTraining for fresher on SWDESò	23-27 May, 2011	KGBO, Hyderabad	10
2	Workshop on Process of Project Appraisal & Monitoring in CWC	25-27 May, 2011	Shillong	50
3	Hindi Workshop	21-22 June, 2011	New Delhi	25
4	Hindi Training Programme on Software òSARANSHò	27-28 July, 2011	New Delhi	25
5	Training Programme on O&M Matters	1-3 Aug, 2011	New Delhi	60
6	Training Programme on ñMS Office & Other Applicationsò	8-10 Aug, 2011	New Delhi	30
7	Training Programme on ñMS Office & Other Applicationsò	19-21 Oct, 2011	New Delhi	30
8	Training Course on ñPreparation of Appraisal of DPRò for Flood Management Programme	19-21 Oct, 2011	Bangalore	20
9	Workshop on Process of Project Appraisal & Monitoring in CWC	28-30 Nov, 2011	Patna	50
10	Hindi Workshop	8-9 Dec, 2011	New Delhi	28
11	Refresher Course on Basic Computer	9-13 Jan, 2012	Chennai	20
12	Hindi Workshop	23-24 Jan, 2012	New Delhi	28
13	Training Programme on ñBudget Information Systemò	5 Mar, 2012	New Delhi	23
14	Training Programme in respect of Non Metric Casual Labourers(T/S) for entering in PB-1 Pay Scale	25-27 Mar, 2012	New Delhi	34

Annexure – 15.2

List of officers deputed abroad for various training/ seminar/ symposia/ conferences etc. during 2011- 2012

Sl.No.	Name of the Course	Duration of the Course	Venue of the Course	No. of Participant
1	Training Programme on Environmental Monitoring & Modelling at UNESCO-IHE	28th Mar to 15th Apr, 2011	Netherlands	1
2	Training Programme on Introduction to River Flood Modelling at UNESCO-IHE	26th Apr to 13th May, 2011	Netherlands	2
3	Visit of Indian Officials to attend the Secretary Level Talks under composite Dialogue regarding TULBUL Navigation Project	11-14 May, 2011	Islamabad (Pakisthan)	2
4	ICID Work shop on Water Saving organized by Chinese National Committee on Irrigation & Drainage (CNCID)	11-14 July, 2011	Bejing (China)	1
5	Action Plan of Indo-Australia Working Group ï Participation in Water Information Research & Development Allainceôs Science Symposium	1-5 Aug, 2011	Melbourne (Australia)	1
6	TA7417-IND : Support for the National Action Plan on Climate Change & Water Resources to Mekong region organized by Asian Development Bank	4-10 Sept., 2011	Laos & Vietnam	2
7	Visit to Tehran (Iran) to participate in 62nd Annual Meeting of the International Executive Committee & 21st ICID Congress on Irrigation & Drainage	15-23 Oct., 2011	Tehran (Iran)	1
8	Training Course on Advance Management Programme organized by IIM, Ministry of Statistic &PI	6-19 Nov., 2011	Paris, Luxemburg & South Compton	1
9	Group Training course in Integral Water Resources & Management under the technical co-operation programme of Japan Government	20th Nov to 3rd Dec, 2011	Japan	1

10	Training of Trainers Workshop on On-Line Delivery of courses in Hydrology jointly organized by World Meteorological Organisation(WMO) & COMET	28th Nov to 9th Dec., 2011	Boulder (USA)	2
11	Knowledge sharing workshop on Water Related Disaster Risk Management jointly organized by ICHARM & Water Energy Commission Secretariat, Nepal	15-18 Jan., 2012	Kathmandu (Nepal)	1

Annexure – 15.3

CENTRAL WATER COMMISSION
NATIONAL WATER ACADEMY

TRAINING CALENDAR FOR THE YEAR 2011-12

Sr. No.	Training Programme	Duration of Course	No. of participants	Manweeks
1.	Contract Management and Financial Procedure	11-15 April 2011	34	34
2.	Workshop on EHP-At IMD Pune	13- 15 April 2011	40	24
3.	Practical Application of Geomatics in WR	2-13 May 2011	10	20
4.	Workshop on Web Based FMRS	19-20 May 2011	18	7.2
5.	Application of I.T. in Water Resources	23-27 May 2011	23	23
6.	Flood Disaster Management	30.05.11 to 03.06.11	42	42
7.	Leadership Skills, Managerial Effectiveness and Influencing Changes (Off campus-at Gujarat)	01-02 June 2011	27	10.8
8.	Coastal Erosion and Protection	06-10 June 2011	14	14
9.	The World Bank Procurement Procedures	13-17 June 2011	37	37
10.	Ground Water Modelling	27.06.11 to 01.07.11	17	17
11.	Techniques of Hydro-Meteorological Data Processing	11-15 July 2011	17	17
12.	Application of FEA in WRS	18-29 July 2011	14	28
13.	Spillway and Energy Dissipation	23-26 August 2011	14	11.2
14.	Canal Modernisation	25-27 August 2011	37	22.2
15.	ITP for newly promoted Asst. Director of CWC	5-23 Sept. 2011	22	66
16.	Environmental Aspects of Water Resources Projects	26-30 Sept. 2011	35	35
17.	Watershed Analysis using Geospatial Tools	3-14 Oct. 2011	11	22
18.	Offcampus Orientation Program for WAPCOS Offices at Gurgaon	31.10.11-07.11.11	28	56

19.	Mid Career Program for Chief Engineer and Directors of CWC	10-21 Oct 2011	18	36
20.	Water Quality Management	17-21 Oct 2011	28	28
21.	Hydrological Reviews of Existing Projects	14-18 Nov 2011	12	12
22.	Construction and Contract Management	14-19 Nov 2011	17	17
23.	Instrumentation in Dams	21-25 Nov 2011	40	40
24.	Preparation of Detailed Project Report (For African Nationals)	28.11.11 to 09.12.11	16	32
25.	Preparation of Detailed Project Report (For Indian Nationals)	28.11.11 to 09.12.11	15	30
26.	Application of I.T. in Water Sector	09-13 Jan 2012	22	22
27.	DSS Planning under HP-II	16-20 Jan 2012	29	29
28.	Flood Forecasting Techniques	23-28 Jan 2012	22	26.4
29.	One day Program on Water Resources of India	24.02.2012	25	5
30.	Web Based Financial Management Reporting System under Hydrology Project-II	1-2 March 2012	11	4.4
31.	Workshop of Training Coordinators of Hydrology Project -II	14-15 March 2012	16	6.4
		Total	**711**	**774.6**