Government of India

Ministry of Water Resources

Central Water Commission

ANNUAL REPORT

2012 - 13

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	431BCM
•	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)	253 BCM
•	Estimated Additional Likely Live Storage Available due to Projects Under Construction / Consideration	155 BCM

LAND RESOURCES

•	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 (Installed Capacity)	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 2012–13. 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 2012-13. 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 89 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 by CWC and acceptance by the Advisory Committee in respect of 23 projects comprising of 8 major, 10 medium irrigation projects and 5 flood control projects.
- General Monitoring of 27 Major, 29 Medium and 1 ERM Projects and monitoring of 152 nos. of 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 release of Rs. 3911.384 crore of Central grant under AIBP programme in respect of 47 Major and Medium Irrigation Projects.
- Examination of proposals under the scheme for renovation, restoration and revival of water bodies.
- Monitoring storage position of 84 reservoirs in the country.

Flood Management

- Timely issue of 5031 flood forecasts (with 98.17 % accuracy) during the monsoon period of 2012 to help effective flood management.

(A B Pandya)
CHAIRMAN

HIGHLIGHTS OF THE YEAR 2012-13

- **DESIGNS**
  - Design units of CWC undertook detailed designs and drawings of various types of hydraulic structures for 89 water resources development projects.

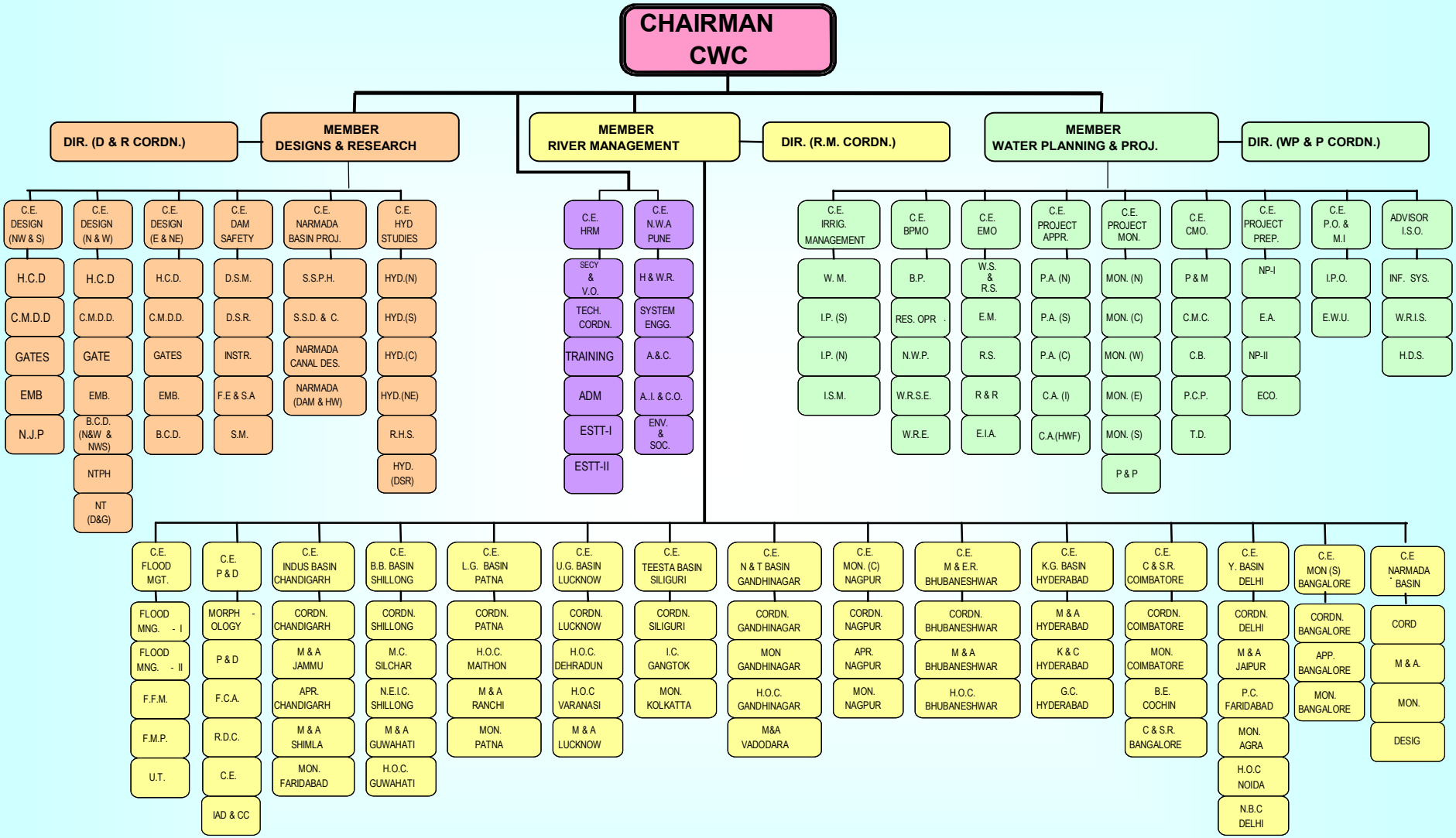
- **RIVER MANAGEMENT**
  - Carried out Hydrological Observations at 954 sites including snow and meteorological observation in different basins spread over the country.
  - Operated 175 flood forecasting stations (including 28 inflow forecasting sites) spread over 9 major river basins. During the flood season 2012, 5031 flood forecasts were issued out of which 4930 (98.17 %) were within prescribed limits of accuracy. Daily flood bulletins and weekly flood news letters were issued during the flood season.
  - Installation of satellite based telemetry system at 445 stations completed upto 11th plan and the work for 125 new stations taken up during the year.
  - Provided assistance to Royal Government of Bhutan for maintenance of 33 Hydro-meteorological sites in Bhutan.

- **WATER PLANNING**
  - During the year 2012-13, 30 major irrigation projects were under appraisal in CWC. 23 projects comprising 8 major, 10 medium irrigation projects and 5 flood control projects were accepted by the Advisory Committee.
  - Monitored 57 Major, Medium and Extension/Renovation/Modernization (ERM), irrigation projects. In addition 152 projects, receiving CLA under AIBP were also monitored.
  - 84 important reservoirs with total live storage of 154.421 BCM were monitored on weekly basis.
  - Examination of proposals for release of Rs. 3911.384 crore of Central grant under AIBP programme in respect of 47 Major and Medium Irrigation Projects.
  - Provided technical assistance to MoWR in respect of the inter-State water disputes such as Cauvery Water Dispute, Mandovi Water Dispute, Krishna Water Dispute and the Vamsadhara Water Dispute.

- **HRM**
  - National Water Academy, CWC, Pune conducted 33 training programmes during 2012-13 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 1322.

C O N T E N T S

Organogram of Central Water Commission 2012- 13



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 2012-13 were:

1.	**Chairman**, CWC	:	Sh. R. C Jha (01-04-2012 to 31-07-2012) Sh. S.P. Kakran (01-08-2012 to 31-10-2012) Sh. Rajesh Kumar (01-11-2012 to 31-03-2013)
2.	**Member** (D&R)	:	Sh. A.K. Ganju (01-04-2012 to 31.07.2012) Sh. A B Pandya (01-08-2012 to 31-03-2013)
3.	**Member** (RM)	:	Sh. S.P. Kakran (01-04-2012 to 30-10-2012) Sh. Devendra Sharma (01-11-2012 to 31-03-2013)
4.	**Member** (WP&P)	:	Shri Rajesh Kumar (02-04-2012 to 31-03-2013)

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;
- 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 provide Design Consultancy including Hydrological Studies in respect of Water Resources Projects, when so requested, to the state governments concerned/project authorities.
- 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.

1.3 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.

1.4 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.

1.5 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 152 ongoing projects under AIBP which are getting grant and are being monitored by CWC.

A grant of 3911.384 Crores has been released to 47 Major & Medium Irrigation Projects under AIBP during 2012-13 till 31.03.2013. The cumulative total Central Loan Assistance / Grant provided to States is Rs. 48562.329 Crores under AIBP since its inception of the programme till 31.03.2013 to 293 projects.

Flood Management Programme

The Government of India has implemented "Flood Management Programme", a State Sector scheme under Central Plan, to provide Central assistance amounting to Rs. 8000 crore to States for taking up flood control, river management, drainage development, flood proofing and anti-sea erosion works during XI Plan. The schemes for central funding are decided by an Empowered Committee headed by Secretary (Expenditure),

Ministry of Finance, GOI, depending upon the critical emergent situation and availability of funds with the GOI. The works under this scheme are implemented generally by the Flood Control/ Irrigation Departments of the State Government. The Flood management Programme is proposed to be continued during the XII Plan with an out lay of Rs. 10,000 crore.

The appraisal of Flood Management schemes in respect of the States other than those in Ganga Basin and all schemes for drainage development and anti-sea erosion works in the country is carried out by CWC. CWC provides 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 web-enabled Water Resources Information System (WRIS) during 11th plan. The estimated cost of the project is ` 78.3164 crores. The MoU was signed between CWC and ISRO during the month of December 2008 and the project is to be completed in 4 yrs time period i.e. December 2012. The project comprises of 30 major GIS layers (viz. River network, basins, canal network, water bodies, hydro meterological network, administrative layers etc.) of the country at a scale of 1: 50000. The First full version of website of INDIA WRIS has been launched on 07 Dec, 2010 in New Delhi by Hon' ble Minister Water Resources. 2nd version INDIA WRIS was launched by Chairman, CWC on World Water Day i.e. 22nd Mar' 2012.

The updated version i.e 3rd version (that includes Live telemetry data in respect of CWC hydrological statons, Mobile Application version 1.0 for Android platform, Climate Trend analysis, 2D-3D linked view) has been launched by Hon'ble Union Minister (MoWR) Shri Harish Rawat on 04 Dec'2012 at MoWR, SS Bhawan. It is anticipated that the full version with complete database of the project would be launched by March' 2014.

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 decided to take up 2nd Phase of programme during remaining period of XI Five Year Plan i.e. year 2010-11 & 2011-12. Though the project was to be completed by 31.03.2012, but one time, time extension up to 31.12.2012 was granted to some institutes to complete the residual demonstration work considering their requests on the ground that the harvesting period/season for Rabi and perennial crops grown in year 2012 were lasting beyond 31.03.2012. The Phase-2 of FPARP scheme has thus been completed by 31.12.2012.

National Projects

Central Govt. has declared 14 water resources projects indicated in Annexure 7.2 as National Projects. For these projects, 90% project cost of irrigation, drinking water component is to be provided as Central Grant. A "High Powered Steering Committee" under the chairmanship of Secretary (WR) has been constituted for Implementation of the Proposals of National Projects.

So far, between August, 2009 and November, 2012, total seven meetings of the High Powered Steering Committee have been held. During 2012-13, Central assistance of Rs. 472.98 Cr has been released and total fund released so far is Rs. 3260.156 Cr.

1.7 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.

1.8 CWC Personal Information System

During the year, CWC personal information System for CWC has been developed. Different modules under this system include APAR Management System (APARMS), GPF information ststem & CWES bio-data information System.

1.8.1 Unique Employee ID for employees of CWC : Unique IDs for all employees of CWC working at Head-Quarters as well as field offices have been

generated. This ID will be a unique number and will serve the purpose of identification of category of service, batch/year of joining, etc. of the employees. These Employee IDs are being used for generation of salary bills of employees through COMP-DDO software at CWC Head Quarter as well as in Personal Information System etc.

1.8.2 APAR Management System (APARMS) : Annual Performance Appraisal Management System (APARMS) has been developed to facilitate proper up-keeping and maintenance of records related to APARs of employees of CWC. As per latest guidelines issued by DoPT, APAR of all Govt. employees have to be communicated to them.

APARMS is an online system in which each official of CWC can view his/her last uploaded APAR, by clicking on the link available on the CWC website **www.cwc.gov.in** on entering the authentication details provided hereunder CWC official can access their latest APAR.

On uploading the APAR of individual official, a system generated mail shall be sent to the concerned official informing him that his APAR has been uploaded on to the APAR management System. For this purpose e-mail IDs of all the employees of CWC has been created and communicated to them.

1.8.3 CWES bio-data information System : Bio-data Information System for Cental Water Engineering Service (CWES) officers has been developed to facilitate CWES officers to upload their bio-data and to mention about their echievements in the field of water resources. The CWES bio-dta inforation system was inaugurated on 12th Feb. 2013 and uploaded on to the CWC web-site. CWC officers can log in to system with their employee ID as login code and unique passwords.

1.8.4 GPF information System : GPF information System is an online system in which each official of CWC can view his /her last uploaded GPF statement by logging on to their system and entering their passwords.

1.9 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 further 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 2012-13. The Library is also engaged in the procurement of books/publications requisitioned by various 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.

1.10 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 taken 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 74 (seventy four) officials participated.

3. Letters received in Hindi are invariably replied to 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 14 to 28 sept. 2012. During this period, various competitions like Hindi Noting/Drafting, Essay writing, Technical essay writing, Dictation for MTS, Kavya Spardha were organized and winners were awarded with books of renowned authors, Dictionaries as well as certificates. Rajbhasha shields were also awarded to the Field Offices of Central Water Commission situated at regions, A, B and C. In region A, this shield was awarded to Madhya Ganga Division-3, Varansi (U.P), in region B, it was awarded to Mahi Division, Gandhinagar (Gujarat) and in region C, the Shield was awarded to Monitoring and Appraisal Directorate, Hyderabad. For CWC (Headquarter) the shield was awarded to Establishment-IX section and Narmada Hyd. Mech. Design Directorate.

5. Apart from translation of documents falling under section 3(3) of the Official Language Act, the Annual Report of the Central Water Commission, 2011-12 and other urgent translation material received from MoWR were translated into Hindi.

6. Second Sub-Committee of Parliament on Official Language inspected the field offices of CWC at Kullu & Bhopal. The suggestions of the Committee 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 to by the senior officers of CWC, Their suggestions are being implemented effectively.

1.11 Welfare Measures and Incentives

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

1.11.1 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.

1.11.2 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. Further, Smt. Lalitha Vasudevan, Vice President of the Society has been awarded with 'Best Co-operator – 2012', Presented by Hon'ble Chief Minister Smt. Sheila Dikshit of National Capital Territory, Delhi.

1.11.3 Sports and Cultural Activities

Employees of CWC are motivated and encouraged to regularly participate in Sports and Cultural Activities. The main achievements during the year 2012-13 are as under:

CWC Hockey Team yet again won Team Championship in the Inter Ministry Hockey Tournament 2012-13 consecutively seventh times in a row.

CWC Athletic Team Stood First position in the March-Past of the Inter Ministry Athletic Meet 2012-13.

Sh. Suriya Narayanan, PA, Technical Co-ordination Directorate, CWC won the Bronze Medal in the Inter-Ministry Chess Tournament 2012-13.

Sh. Ashwani Kumar, Asst., Esst. V Section, CWC won the Bronze Medal in 100 mtr. Race Men (Vet) in the Inter Ministry Athletic Meet 2012-13.

1.12 Employees Strength under various categories:

The representation of OBC, SC & ST officials in different grades is given in Table 1.1.

Table 1.1

Representation of OBC, SC & ST Officials in Different Grades

(As on 01-01-2013)

Category	No. of Filled posts	No. of SCs	No. of STs	No. of OBCs
Group A	514	87	29	43
Group B	1037	130	23	77
Group C	939	236	74	53
Total	**2490**	**453**	**126**	**173**

Note *All Group 'D' Posts upgraded to Gr 'C' and redesignated as MTS.*

Further in pursuance of Section 33 of Persons with Disabilities (Equal Opportunities Protection of Rights and Full participation) Act, 1995 posts for disabled persons have been identified and the position of Disabled Persons in position as on 31.12.2012 is given in Table 1.2. Efforts are being made to fill up the backlog vacancies.

Table 1.2

Number of Disabled Persons in Position

(As on 31.12.2012)

GROUP	OH	VH	HH	TOTAL
'A'	3	0	0	3
'B'	10	0	0	10
'C'	2	0	0	2
Total	**15**	**0**	**0**	**15**

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

Group D employees converted to Group C as per 6th pay recommendation.

1.13 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.

1.14 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://www.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 1121 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 431 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.

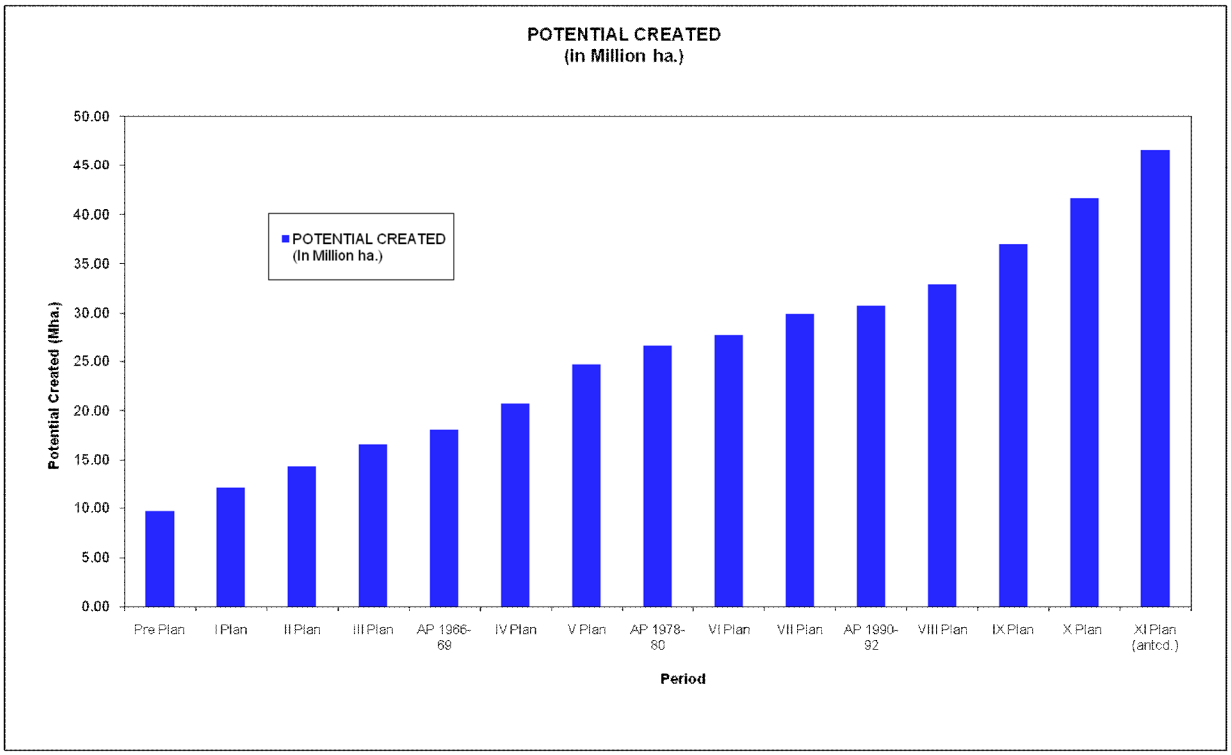


Fig 2.1 - Growth of Irrigation Potential Created During Pre-Plan and Plan Period (Cumulative) (Major and Medium Irrigation Sector)

2.2.2 Major and Medium Irrigation Projects

In 1951, during launching of the First Five Year Plan, there were 74 major and 143 medium irrigation projects in the country. During the plan period since 1951 to end of X Plan in 2007, as per available information, total No. of projects taken up 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 19 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		
	Pre-plan	Upto X Plan + During XI Plan	Total	Pre-plan	Upto X Plan + During XI Plan	Total	Notional	Ongoing	Lia.in XII Plan
Major	74	368+31	473	74	186+35	295	178	148	9
Medium	143	1087+49	1279	143	813+62	1018	261	138	28
ERM	-	215+50	265	-	120+19	139	126	40	1
Total	**217**	**1670+130**	**1800**	**217**	**1119+116**	**1452**	**565***	326	**37**

***Several Projects 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 (2012-17)

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.

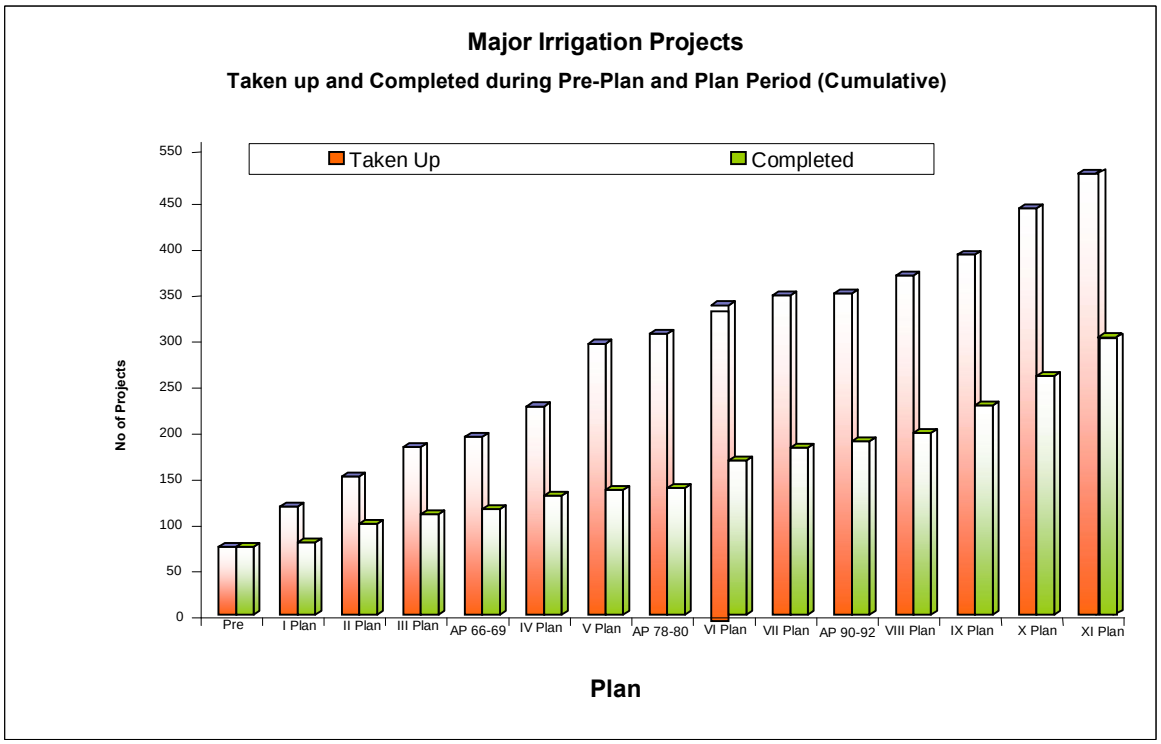


Fig 2.2 Major Irrigation projects taken up and completed during pre-plan and plan period (Cumulative)

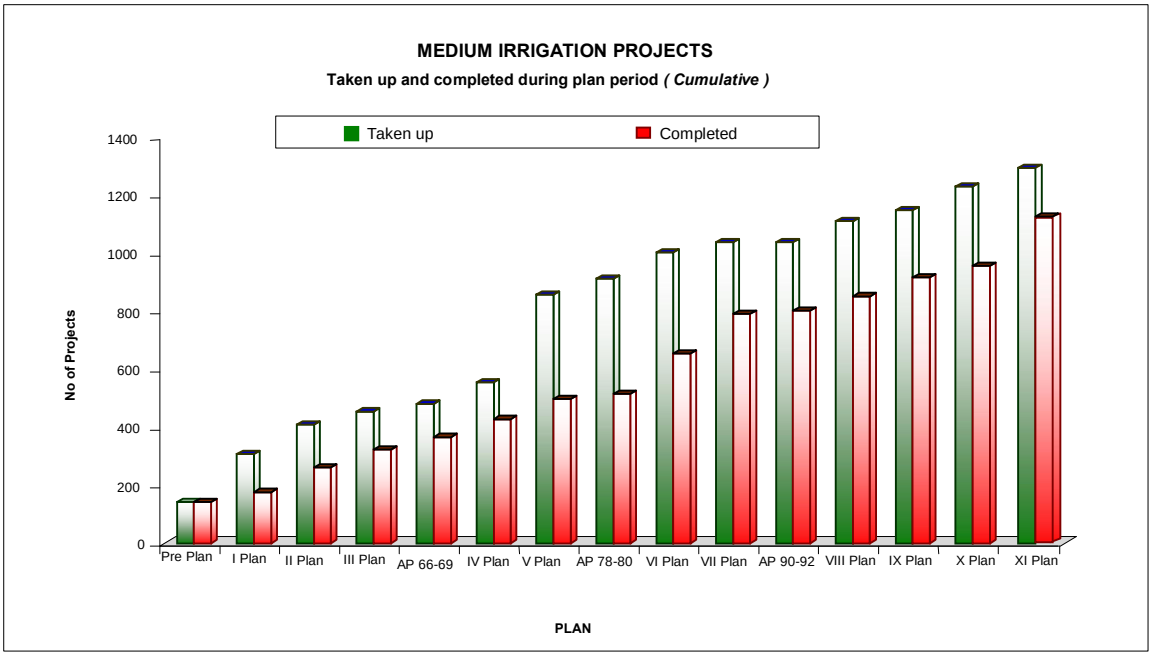


Fig 2.3 Medium Irrigation projects taken up and completed during pre-plan and plan period (Cumulative)

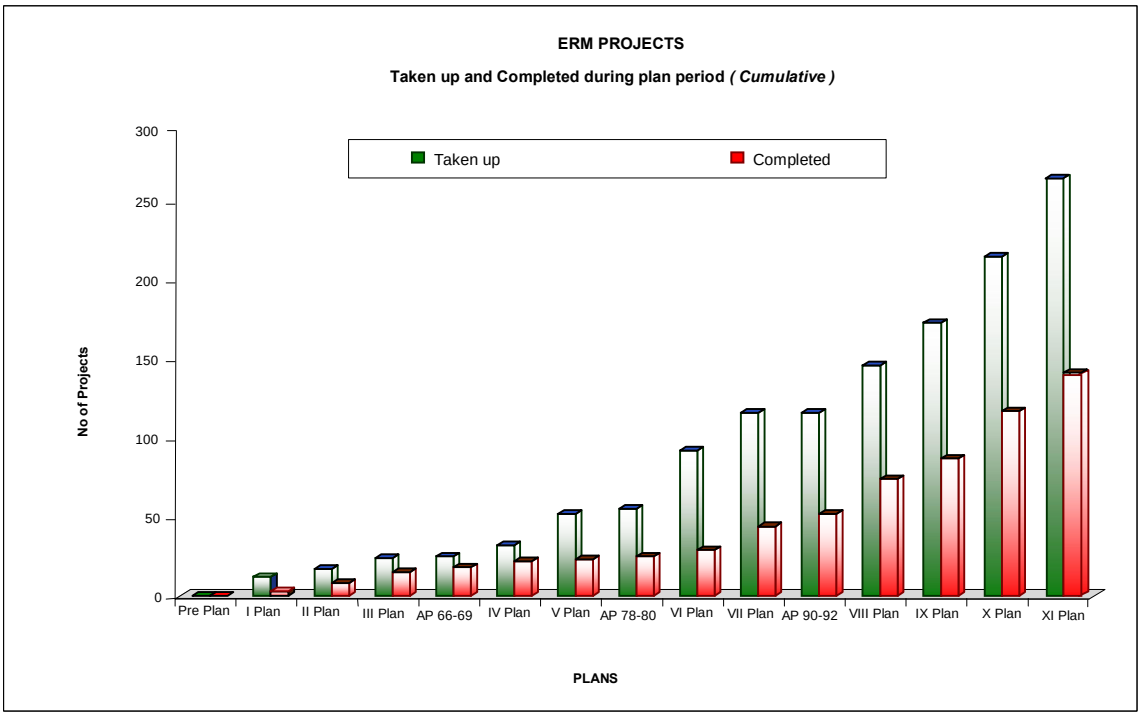


Fig 2.4 Modernisation of ERM Projects taken up and Completed during pre-plan and plan period (Cumulative)

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 Systematic Collection and Compilation of Hydrological Data

Central Water Commission is operating a network of 954 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 basin-wise distribution of HO stations is detailed below in Table 3.1.

Table 3.1

Basin-wise number of Hydrological Observation Stations

S. No.	Name of Basin	No. of Sites
1.	Brahmani-Baitarni Basin	15
2.	Cauvery Basin	34
3.	East Flowing rivers between Mahanadi and Pennar	13
4.	East Flowing rivers between Pennar and Kanyakumari	19
5.	Ganga/Brahmaputra/Meghna/Barak Basin	440
6.	Godavari Basin	75
7.	Indus Basin	24
8.	Krishna Basin	53
9.	Mahanadi Basin	39
10.	Mahi Basin	13
11.	Narmada Basin	28
12.	Pennar Basin	8
13.	Sabarmati Basin	13
14.	Subernarekha Basin	12
15.	Tapi Basin	18
16.	Teesta Basin	11

17.	West Flowing Rivers from Tadri to Kanyakumari	27
18.	West flowing rivers from Tapi to Tadri	21
19.	West flowing rivers of Kutchh and Saurashtra including Luni	15

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. This consists of 916 river gauge stations 7912 observation wells and 436 hydro meteorological stations for collecting data on qualitative and quantitative aspects of

both surface water and ground water. 380 data centers and 31 data storage centers equipped with specialized hardware and software has been established for data processing, storage and reliable data communication. Sufficient manpower has been trained for HIS operations and user support. In addition to current data some of the states have successfully computerized valuable historic data relating to rainfall and river discharge.

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 project was cleared by the CCEA in October, 2005. The agreement for the project between the Govt. of India and the World Bank was signed on 19th January, 2006 and approved by the GOI in the month of May, 2006. Estimated cost of the CWC component of HP-II based on Revised Cost Table 2012 is Rs. 2672.23 Lakh against Rs. 3095.84 lakh as per revised cost table 2011.

The original completion period of HP-II was June, 2012. The project completion period has been extended upto May, 2014 by the World Bank.

CWC component of Hydrology Project-II: Central Water Commission's component for HP-II consists of two major components institutional strengthening and vertical extensions as given below:

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. Almost 98 % of work is completed.

b. Trainings: Total 57 training programmes have been completed since starting of the Project, under which 1217 officers have been trained. 9 International Training course at UNESCO, IHE, Delft, the Netherlands/ in the field of water resources sector, have been attended by the officers of CWC in the different courses. Total 19 officers from CWC have so for been trained.

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 site on river Ganga, Billingundulu on River Cauvery, Garudeshwar on River Narmada and Wadenpalli on River Krishna during the year 2010-11. Eleven ADCP have been procured and installed at Barmanghat, Hoshangabad, Handia, A.P.Ghat, Bhomoraguri, Pandu, Pancharatna, Rishikesh, Shahzadpur, Allahabad (Chhatnag) and Mirzapur sites during FY 2011-12/2012-13.

f. "Web Based Surface Water Information System": The Central Water Commission and other Implementing Agencies operate an extensive network of hydro-meteorological measurement station, from which data are collected on climate, river flows and water quality. A suite of software packages (Surface

Water Data Entry System (SWDES), Hydrological Modelling Software (HYMOS) and Water Information System Data Online Management (WISDOM), collectively the Hydrological Information System (HIS) are used for entry, storage, analysis and dissemination of this data. New software solution is proposed to be developed through this procurement is designed to upgrade the functionality of the HIS by replacing obsolete components, improving system architecture and adding new components. The new HIS will consist of following components:-

1. A Web based Data Entry system (eSWDES)
2. Provision of secondary validation and reporting tools for hydrometric data.
3. Hydro Meteorological Database Backend database for secure encrypted storage of hydrometric data.
4. Hydro Meteorological Database Application.
5. Web Hosting and management of web application i.e. eSWIS.

The development of software is under progress.

g. Real Time Water Quality Monitoring Systems: During the project Real Time Water Quality Monitoring Systems (RTWQMS) was installed at three locations viz. Agra (Jawahar Bridge) on river Yamuna, Lucknow site on river Gomti and Moradabad site on river Ramganga for measurement of pH, Conductivity, Temperature, Dissolved Oxygen, Bio-chemical Oxygen demand (BOD), Chemical Oxygen Demand (COD) parameters. Work is completed at all three locations. Real time Data is available on web site http://cwc.rtwqms.com .

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.

b. Purpose Driven Studies (PDS): 18 proposals received from the States of Andhra Pradesh, Maharashtra, Orissa, Madhya Pradesh, Gujarat, Kerala, Tamilnadu, Himachal Pradesh as well as from NIH and Bhakra Beas Management Board (BBMB) were examined and cleared by HISMG (Tech.) and concurrence of World Bank on these proposals was received in June, 2008. Subsequently, two proposals were received from the State of Chhattisgarh and one from the State of Karnataka which were also examined and cleared by HISMG (Tech) in September, 2009. The PDS have been started by the respective agencies and a review of the progress of the PDS is being made by PCS, MoWR.

3.1.2 Water Quality Monitoring

Central Water Commission is monitoring water quality at 396 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 etc are analysed periodically. The data generated are computerized in the database system and disseminated in the form of hydrological yearbook, status reports and bulletins. Water Quality year books are published and WQ Bulletins are issued regularly.

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 2012

During the flood season 2012 (May to Oct.), 5031 flood forecasts (4200 level forecast and 831 inflow forecasts) were issued out of which 4930 (98.17%) forecasts were found within accuracy limit of +/- 0.15 m for level forecast and +/- 20% for inflow forecast. During the flood season, the real time hourly data of over 250 stations (mostly of flood forecasting stations and few base stations) were collected through satellite and compiled, analyzed and was used to generate flood reports of the regions.

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 2012, 154 daily bulletins (once daily) and 45 Orange Bulletins for High Flood Situation (Twice daily) were issued as per Standard Operating Procedure (SOP) issued by Ministry of Home Affairs (MHA) and National Disaster Management Authority (NDMA). During flood season 2012, Central Flood Control Room (CFCR) of CWC 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 has been operating wireless stations covering almost all river basins to transmit and receive the data since beginning. Telephone, Mobile, FAX and E-mail were also used at all the divisional flood control rooms and central flood control room under CWC, New Delhi for transmission of data. The Central Flood Control Room at Delhi was operated on 24x7 basis during monsoon. The data received in Central Flood Control Room are passed on to various offices daily primarily through Email. Sometimes phone, fax and SMS were also used to disseminate the flood information. The forecast, water level and rainfall information are also uploaded on web site http://india-water.gov.in regularly.

3.2.4 Modernization of Flood Forecasting Services

The Central Water Commission is making an endeavor in updating and modernizing the forecasting services. The forecasting of flood 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.

During 9th Plan, telemetry system at 55 stations was installed in Chambal and Upper Mahanadi basins for real time data collection and transmission to forecast formulation centers under World Bank aided DSARP scheme. During 10th Plan, telemetry system at 168 stations has been installed in different river basins under the scheme "Establishment & Modernization of Flood Forecasting Network in India including Inflow Forecast".

During XI plan, 222 telemetry stations have been installed in different river basins as under:

i)	Indus Basin	–	04
ii)	Lower Ganga Basin	–	18
iii)	Upper Ganga Basin	–	45
iv)	Yamuna Basin	–	25
v)	Narmada Tapi Basin	–	76
vi)	Mahanadi river Basin	–	36
vii)	Brahmaputra Basin	–	14
viii)	Godavari Basin	–	04

Moreover 1 Earth Station and 10 Modelling Centres at Patna (MGD-V) in Bihar, Jalpaiguri (LBD) in West Bengal, Lucknow (MGD-I) and Varanasi (MGD-III) in Uttar Pradesh, Dehradun (HGD) in Uttarakhand, Gandhinagar (MD) and Surat (TD) in Gujarat, Bhusaval (UTSD) in Maharashtra, Shimla (SHD) in Himachal Pradesh and FFM Directorate in NCT, Delhi have been installed. The data reception from all the sites modernised is being monitored from CWC, New Delhi.

To improve the flood forecast modelling, windows based Mike-11 have been procured and supplied to modelling centres established under IX and X Plans. Site specific models for Gandhisagar under Chambal Division, Jaipur, Hirakud under Mahanadi Division, Burla, Naraj, Gunupur, Kashinagar, Anandpur under ERD, Bhubneshwar have been developed and are being used for real time flood forecasting. Models for Jenapur, Rengali, Rajghat under ERD, Bhubneshwar, Bhadrachalam, Jaikwadi under LGD, Hyderabad, Srisailam, Almati under LKD, Hyderabad, Delhi, Mathura under

UYD, new Delhi , Agra, Etawah under LYD, Agra, Guwahati under MBD, Guwahati and Hathnur under Tapi Division, Surat have also been developed and are under testing. Once, the models are successfully tested, the same will be used for flood forecasting. Regular training for working staff in the field are being organised for working on Mike-11 models.

3.2.5 Modernisation of data acquisition system in existing stations under 12th Plan

The EFC memo for 12th Plan period of 2012-13 to 2016-17 with provision of installation of satellite based automatic data acquisition system for existing 219 stations and 568 stations for 240 new inflowforecasting stationsand preparation of Digital Elevation Model (DEM) for 2 MHa area in Bihar, U.P. and West Bengal is under process for approval. Out of 219 stations, 125 stations are under process for modernisation. The station index number, uplink frequency and time slot allotments for these 125 stations have been obtained from India Meteorological Department. Tenders have been floated/under process for the data acquisition system by field organisations.

3.3 Flood Management Programme

The Government of India has implemented "Flood Management Programme", a State Sector scheme under Central Plan, to provide Central assistance amounting to Rs. 8000 crore to States for taking up flood control, river management, drainage development, flood proofing and anti-sea erosion works during XI Plan. The schemes for central funding are decided by an Empowered Committee headed by Secretary (Expenditure), Ministry of Finance, GOI, depending upon the critical emergent situation and availability of funds with the GOI. The works under this scheme are implemented generally by the Flood Control/ Irrigation Departments of the State Government. The Flood management Programme is proposed to be continued during the XII Plan with an out lay of Rs. 10,000 crore.

In exceptional cases, the works can be entrusted to the Central Government Organizations/Undertakings also in exigency of work. The schemes are being monitored by Central Water Commission (CWC), Ganga Flood Control Commission (GFCC) and Brahmaputra Board, with in their respective jurisdiction.

The appraisal of Flood Management schemes in respect of the States other than those in Ganga Basin and all schemes for drainage development and anti-sea erosion works in the country is carried out by CWC. CWC is also providing assistance to the Ministry of Water Resources for processing and coordination of cases for release of funds under "Flood Management Programme" in respect of States other than Ganga Basin and Brahmaputra & Barak Basin States.

State wise schems included under the State Sector Scheme"Flood Management Programme" and funds released during XI Plan and in XII Plan for ongoing Works of XI plan (Rs. In crore)

SN	State	Schemes Included during XI Plan			Funds released during XI Plan for schemes included in XI plan	CS Released during 2012-13 for ongoing works of XI plan
		Nos.	Total cost	Central share		
A	**States**					
1	Chattisgarh	3	31.13	23.34	15.57	
2	Goa	2	22.73	17.05	9.99	2.00
3	Gujarat	2	19.79	14.84	2.00	
4	Haryana	1	173.75	130.31	46.91	
5	Himachal Pradesh	2	225.32	202.78	165.31	19.92
6	Jammu & Kashmir	28	408.22	367.37	243.49	39.36
7	Karnataka	3	59.46	44.59	20.00	
8	Kerala	4	279.74	209.8	63.68	
9	Orissa	67	169	126.74	95.65	
10	Punjab	5	153.4	115.04	40.43	
11	Tamilnadu	5	635.54	476.66	59.82	
12	Uttar Pradesh	2	56.63	42.47	36.25	0
	Sub-Total	**124**	**2234.71**	**1770.99**	**799.1**	**61.28**
B	**Union Terrotories**					
13	Puducherry	1	139.67	104.75	7.50	0
	Sub-Total (UT)	**1**	**139.67**	**104.75**	**7.50**	**0.00**
	Total (States+UT)	**125**	**2374.38**	**1875.74**	**806.6**	**61.28**

3.4 Morphological Studies

The study of river morphology and implementation of suitable river training works as appropriate have become imperative for our nation as large areas of the country are affected by floods every year causing severe damage to life and property in spite of existing flood control measures taken both by Central and State Governments. Problems are aggregating mainly due to large quantity of silt/sediment being carried and deposited in its downstream reaches. The special behaviour of the river needs to be thoroughly understood for evolving effective strategies to overcome the problem posed by it.

Morphological Study of six rivers was proposed in 10th plan, out of which morphological studies of three rivers namely, Ghaghra, Sutluj and Gandak rivers were taken up during 10th plan period. The final reports of rivers Ghaghra and Sutluj submitted by NIH, Roorkee in march 2012 have been accepted by CWC. Final report of river Gandak submitted by CWPRS, Pune in December, 2012 has also been accepted by CWC.

During the 12th Plan period (Five Year Plan 2012-17). Morphological studies of 15 rivers have been planned. CWC requested IITs/NIITs to take up these studies on consultancy basis. A joint meeting of CWC constituted "Consultancy Evaluation-Cum-Monitoring Committee (CEMC) for morphological studies of Indian rivers with the Consultants from IITs/NIITs was held in Jan.2013 . Further cource of action is under progress. A provision of Rs. 14.90 crores has been made on EFC Memo for the 12th Plan under the plan scheme R&D Programme in Water related to morphological study work.

3.5 Coastal Erosion

The Indian coastline is extending to a length of about 7516 km (as per NHO). Almost all the maritime States/UTs are facing coastal erosion problem in various magnitudes. As per the data reported by various maritime States/UT agencies about 1829 km of coastline of the country is affected by erosion and about 844 km of coastline have protection works. CWC is involved in following activities for providing assistance to the states :

1. **Flood Management and Anti-Sea Erosion Schemes :** CWC has recommended to MoWR for reimbursement of Central Assistance of ` 217.3485 crore to the State Govt. of Tamil Nadu under Flood Management Programme for Flood Protection works on Kollidam (Coleroon) River in Thanjavur, Nagapattinam and Cuddalore Districts of Tamil Nadu against the expenditure incurred during 2010-11 & 2011-12.

2. **External Assistance :** Under ADB aided Sustainable Coastal Protection and Management Project, two projects namely Ullal Coastal Erosion & Inlet Improvement Project in Karnataka and Mirya Bay Coastal Erosion and Protection Project in Maharashtra are under implementation.

   Further to above a project namely **Climate Resilient Coastal Protection and Management Project (CRCPMP)** is being envisaged with objectives to strengthen the resilience of the coast, coastal infrastructure and communities to the adverse impacts of climate change through agreed strategies, and effective mainstreaming of climate change considerations into coastal protection and management. Project is proposed to be funded through grant equivalent to 1.8 million USD from Global Environment Facility (GEF)/Special Climate Change Fund (SCCF).

3.6 Real Time Flood Inundation Modelling

CWC has taken up Real Time Flood Inundation Modelling on scientific basis for 4 river basins i.e. Mahanadi, Bramhaputra, Godavari, and Kosi rivers for which NRSC has prepared Digital Elevation Model (DEM) having vertical resolution of 1.0 m for 30,000 sq km area for different locations in different river basins. In the first instance Mahanadi Basin in proposed to be taken up. The international agencies who are carrying out similar activities in other parts of the world have been approached so that best available technology may be used for the work.

The DEM developed by NRSC is not sufficient to meet the modelling requirement, additionally whole area needs to be mapped by surveying physically / LiDAR especially covering salient features i.e. flood embankments, road network, railway lines, airport, important government & industrial establishments, important cities / towns , water bodies etc. with ground truth verification for the developed DEMs with desired resolution of horizontal & vertical grids. The up gradation of existing

infrastructure of CWC (Headquarter and filed offices), apart from procurement of necessary infrastructure , acquisition of data , engagement of consultant, signing of protocol with different agencies etc. are major activities under this work.

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. CWC is actively involved in aspects related to holistic approach towards development and management of water resources considering river basin as 'hydrological unit'. National Water Mission also highlights the importance of principles of Integrated Water Resources Management (IWRM). In this regard, draft guidelines on 'Integrated Water Resources Development and Management' were prepared and circulated to all State Govts/UTs, Field Offices of CWC and other Union Ministries for comments/observations.

4.2 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 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. The draft National Water Policy was formulated by a Drafting Committee consisting of eminent experts in water resources sector and placed in public domain for inviting suggestions/feedback.

The draft of National Water Policy – 2012 was finalized by the National Water Board in its 14th meeting held on 7th June, 2012 at New Delhi whichwas further discussed in

the 6th meeting of the National Water Resources Council held on 28th December, 2012. The Council adopted the National Water Policy, 2012 in this meeting.

4.3 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 constitution of the NWRC is given in figure 4.1. The council has held six meetings so far. The 6th meeting of the National Water Resources Council was held on 28th December, 2012.

4.4 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 constituted a National Water Board in September 1990 under the Chairmanship of Secretary (WR). The constitution of the Board is given in the figure 4.2. The Board has held fourteen regular and two special meetings so far. The fourteenth meeting was held on 7th June, 2012 at New Delhi.

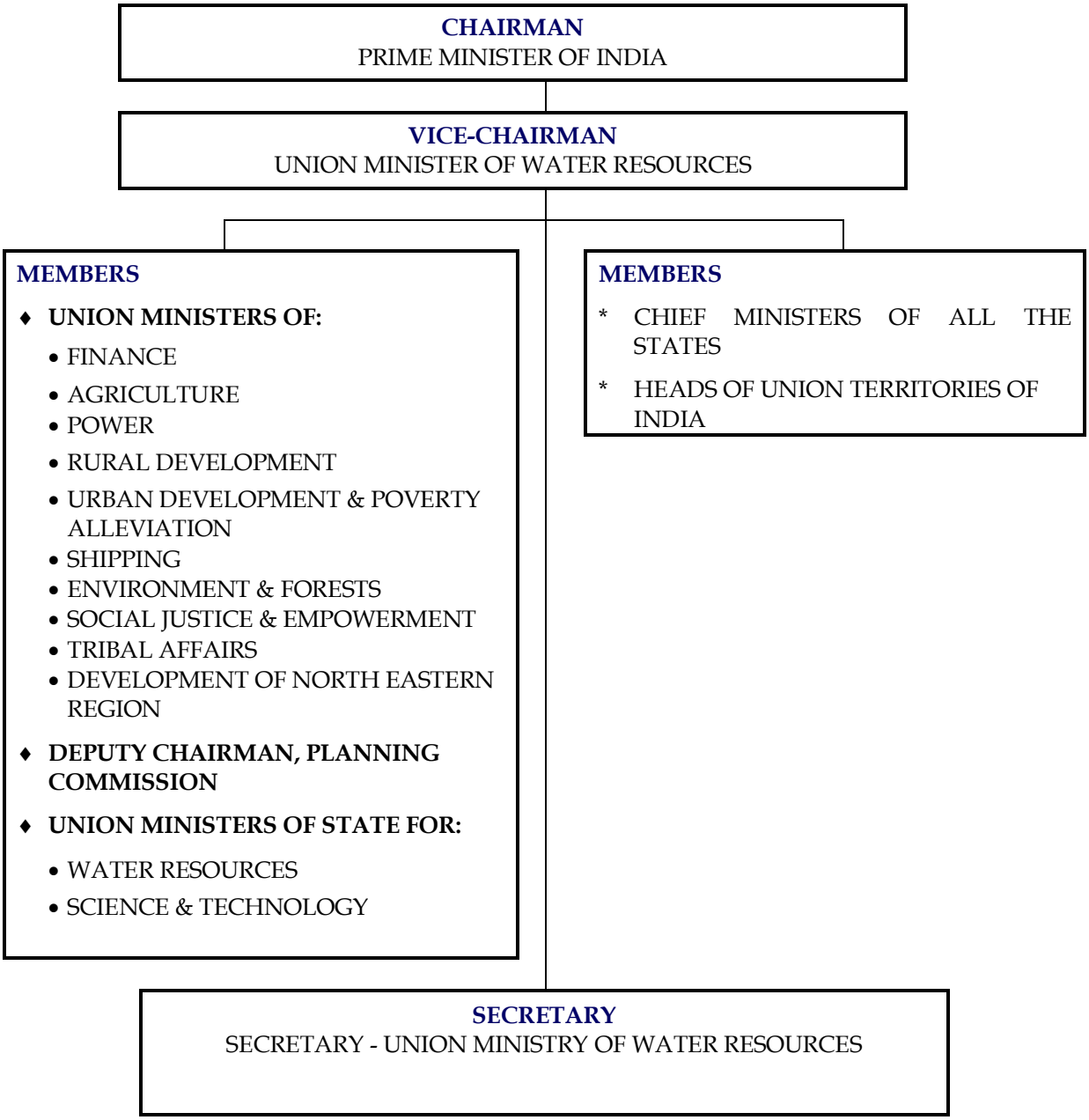


Fig. 4.1 - National Water Resources Council

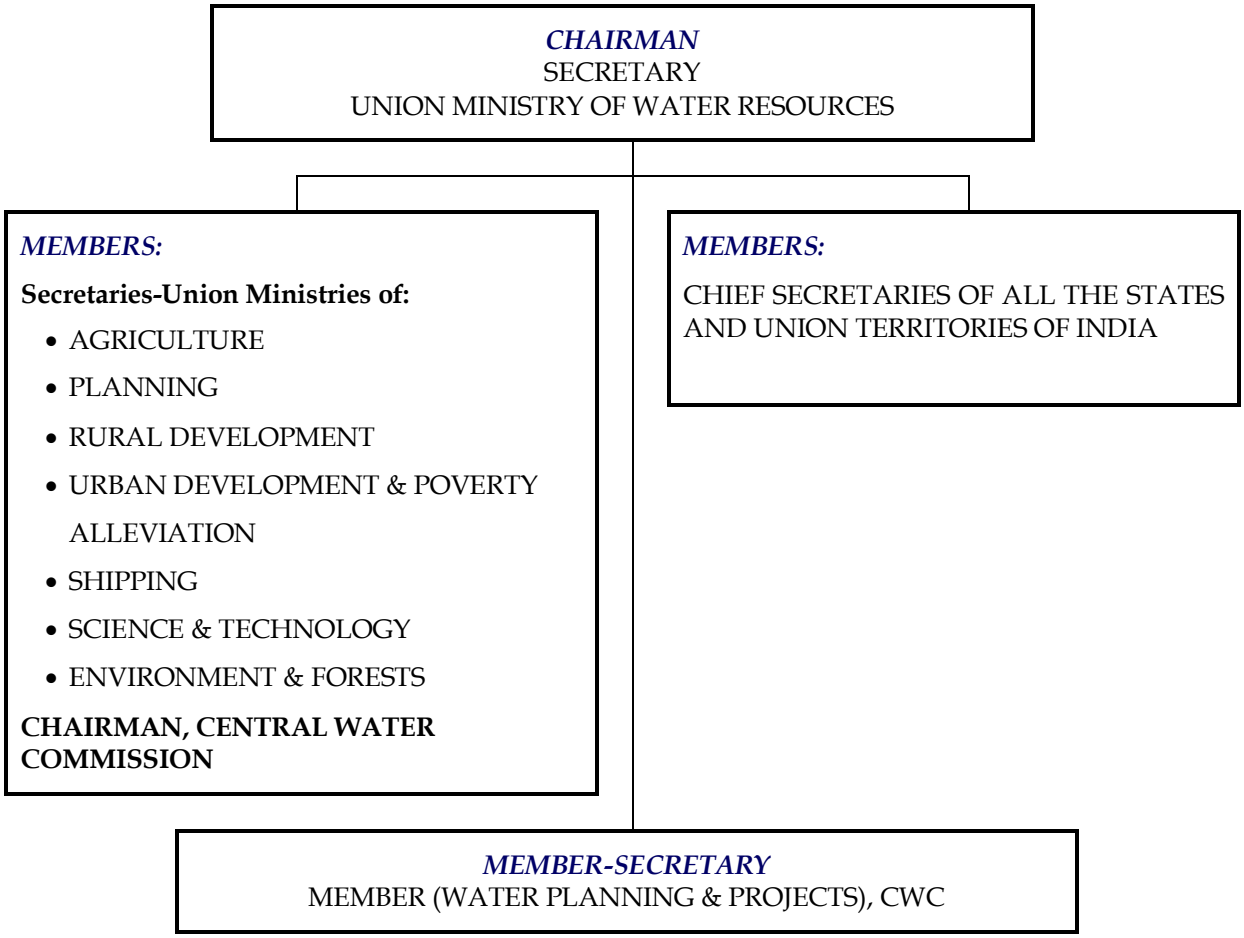


Fig. 4.2 - National Water Board

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 and field surveys and investigations for preparation of feasibility reports of the link canals for water resources development with a national perspective. Now NWDA's function has been extended/amended to prepare pre-feasibility/feasibility/DPR of links under National Perspective Plan as well as Intra-State links proposed by the States. Chairman, Member (WP&P) and Member (D&R), CWC are members of NWDA Society and Governing Body of NWDA. So far 59 meetings of the Governing Body have been held. The 59th meeting was held on 12th September, 2012.

4.5.1 Technical Advisory Committee (TAC) of NWDA

The Governing Body of the 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. So far 41 meetings of the TAC have been held. The 41stTAC meeting was held on 5th October, 2012.

4.5.2 Consensus Group

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

So far ten meetings of the consensus group have been held. The tenth meeting was held on 23rd July, 2010.

4.5.3 Expert Committee

MOWR vide an office memorandum constituted a committee of environmentalists, social scientists and other experts on interlinking of rivers with a view to make the process of proceeding on interlinking of Rivers (ILR). Secretary, MOWR is the Chairman and Chairman, CWC is a member of the committee. So far eight meetings of the committee have been held. The eight meeting was held on 5th March, 2010.

4.5.4 Committee to Monitor and Supervise the preparation of Detailed Project Reports by NWDA.

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 link projects (D-P). Subsequently, MoWR decided to include monitoring and supervision of all the DPRs by NWDA in the functions of the above committee vide office order No 2/56/2003-BM dated 11th November, 2009.

Three meetings of Committee to Monitor and supervise the overall work for preparation of DPR of P-T-N &D-P link projects have been held so far. The 3rd meeting was held on 14th March, 2011.

4.6 Basin Planning and Related Issues

4.6.1 Reassessment of Basinwise Water Resources Availability in the Country – Strategy identified under 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 (CWC) and National Remote Sensing Centre (NRSC) 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.

Meanwhile, a Committee was constituted under the Chairman, CWC in May 2011 for the purpose. A Working Group (WG) consisting of officers from CWC and NRSC was constituted in April 2012 for (i) preparation of a draft proposal for reassessment of water availability in the country jointly by CWC and NRSC in other remaining basins and for (ii) further refinement of the approach. The WG comprised of Director level officers from BPMO, IMO, Remote Sensing Directorate, CC&IA Directorate from CWC and officers from NRSC.

The Working Group held two meetings on 21.09.2012 and 08.11.2012 and prepared a draft proposal for reassessment of water availability in the country jointly by CWC and NRSC which envisages carrying out the reassessment in three phases for all the remaining basins from April 2013 to March 2016. The approximate financial

requirement for the study is estimated to be Rs. 6.34 Crore (NRSC Component- Approx Rs 2.19 Crore; CWC Component- Approx Rs 4.15 Crore).

4.6.2 Indo-Australia Cooperation

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 the two countries has been constituted. CWC is represented by Director (Basin Planning) as 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. Brahmani-Baitarni basin has been selected for the case study. The work is proposed to be carried out in association with concerned State Govts and experts of Australia.

A workshop alongwith a meeting of Indo-Australia JWG was held on preparation of Integrated Water Resources Management (IWRM) Plan for Brahmani Baitarni rivers basin at Bhubaneshwar on 05th October, 2012 in which officers from all the concerned State Govts also participated in addition to officials from various departments of Central Govt and experts of Australia. Further course of action was decided towards preparation of Integrated Water Resources Management (IWRM) Plan of Brahmani-Baitarni Basin.

In a later development, Indo-Australia Water Technology Partnership has also been announced under which Australia and India would share technologies to build capacity to better manage water resources. The partnership would include sharing advanced Australian modelling work on river basin flows. eWater Source which is Australia's Integrated Water Resources Modelling System is likely to be the main focus of the partnership. Dr. Geoffrey Adams, an Australian expert conducted a training programme on eWater Source for 18 officers during 18th-22nd March, 2013 at CWC (HQs), New Delhi. Thirteen officers from CWC participated in the training

programme on eWater Source apart from officers from CGWB, IMD, NIH and Governments of Odisha and Jharkhand.

4.6.3 Decision Support System (Planning)

Under World Bank funded Hydrology Project-II, the preparation of a Decision Support System (Planning) 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, twelve (12) meetings of 'Review Committee' have been held. The last meeting was held on 30.11.2012 in Bhopal.

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 by 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 from 2011 onwards. This monitoring is continuing during 12th Five Year Plan (2012-2017). Training program of CWC officers has been conducted in NRSC, Hyderabad as part of technology transfer. NRSC has been authorized to incur expenditure up to Rs. 99.42 lakhs during 2012-13.

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 has started from April 2012. Second instalment of Rs.61.17 lakhs has been released to NRSC in Sepetember, 2012. NRSC has been further requested to take up developemnet of Snowmelt Runoff Models of Teesta & Brahmaputra basin also.

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.

MOWR/CWC has entered into an agreement to undertake a study on "Operational Research to Support Mainstreaming of Integrated Flood Managemnt under Climate Change"" through technical assisitance with the Asian Devlopment Bank (ADB) in order to meet the objective of strentheneing the protection and resilience of flood prone areas in India.

A total of 27 nos. of Academic and Research Institutes of excellence have been requested to frame the Proposal for research and studies of Impacts of Climate change. In response 16 nos R&D proposals have been received which are under examination in Indian National Committee on Climate Change (INCCC) and 10 nos have already been approved for study purposes. Further, Stae governments have been requested to take up related Base line studies through WALMIs, WALMATARI, NERIWALM and retired engineers of Water resources Departments.

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 Planning and Design of Water Resources Projects

The following four design units cater to specific requirements and 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.

Design consultancy work in respect of 89 projects was carried out in the design units of D&R Wing during the year 2012-2013 as detailed below:

Sl. No.	Category	No. of Projects
1.	Projects at construction stage.	58
2.	Projects at investigation and planning stage (for which detailed project reports are being prepared)	18
3.	Projects with special problems	13
	Total	**89**

This includes 7 foreign projects, 1 each in Myanmar, Afghanistan, Tajikistan and Nepal and 3 in Bhutan.

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. Sapta Kosi High Multipurpose Project, Indo-Nepal

Preliminary studies of Sapta Kosi High Dam Multipurpose Project envisages construction of a 269 m high dam to divert river waters through a dam toe power house with an installed capacity of 3000 MW (at 50 % load factor) and irrigation of 15.22 lakh ha. Gross Command Area through construction of a barrage 1 km downstream of the dam. An additional capacity of 300 MW is further contemplated by construction of three canal type power houses along the canal system. Field investigation studies and preparation of DPR for Sapta Kosi High dam Multipurpose Project and Sun Kosi Storage-cum-Diversion Scheme are being taken up jointly by Govt. of India and HMG Nepal. A Joint Project Office (JPO) has been set up in Nepal for investigation of the project. DPR stage design engineering for this project is being carried out by Central Water Commission.

2. Sun Kosi Storage-cum-Diversion Scheme, Indo-Nepal

DPR stage design engineering for this project is to be carried out by Central Water Commission. CWC has furnished the investigation stage layout for power house related components for the Kamala Dam Power House for the Rock fill Dam alternative. DPR stage drawings and chapter pertaining to power house will be prepared after the receipt of data from project authorities. CWC has also provided alternative barrage alignment; the design of barrage shall be taken up after receipt of data from Project Authorities.

3. Punatsangchhu-I H.E. Project (1200 MW), Bhutan

Punatsangchhu-I HE Project envisages construction of a concrete gravity type dam, 130m high above the deepest foundation, and 240.0 m long at the top. The project has an installed capacity of 1200 MW and construction of the project is underway. Presently, river diversion has been done and excavation for dam is in progress. About 120 nos. construction drawings have been issued till date.

4. Punatsangchhu-II H.E. Project (1020 MW), Bhutan

The Punatsangchhu-II H.E. Project, (PHEP-II), Bhutan envisages construction of 86m high concrete gravity dam, with an installed capacity of 1020 MW. Presently, construction of diversion arrangement is in progress. The diversion tunnel has been fully completed and river has been diverted through it by constructing a temporary dyke in the river. The construction of coffer dams is under progress. 67 Nos. construction drawings have been issued so far.

5. Tehri Dam Project, Uttarakhand

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

provided in the core of fill dam joining left and right abutments, which is a unique feature for rock fill dam undertaken for the first time in India. CWC had carried out structural design of lining and issued all the necessary construction stage drawings in respect of Intermediate Level Outlet tunnel (ILO at EL 700) and additional ILO (at EL 750). CWC is rendering consultancy for recommending remedial measures to various post-commissioning problems related to civil structures of the project.

Member (D & R), CWC is a Member of the Board of Directors of THDC. CWC has been advising THDC and Ministry of Power on safety aspects of Tehri Dam and National Committee on Seismic Design Parameters with its secretariat in CWC has been considering related issues.

6. Koteshwar HE Project, Uttarakhand

Koteshwar HE Project is an integrated part of Tehri Power Complex comprising of Tehri Hydro Power Plant (1000MW), Tehri Pumped Storage Plant (1000MW) and Koteshwar Hydro Electric Project (400 MW) to develop the hydro-electric potential of river Bhagirathi. The project envisages construction of a 97.5 m 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 power house including intake and tailrace etc.

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

A Memorandum of Understanding (MoU) for complete design engineering including pre-award engineering & assistance during construction for technical and site related

issues for the 600 MW Loharinag Pala and 520 MW Tapovan Vishnugad H.E. Projects had been signed between NTPC and CWC during the year 2004**.** Complete engineering support covering planning, detailed specifications, drawings, evaluation of quantities etc. in respect of Tapovan -Vishnugad HE Project is being carried out.

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

Ujh Multipurpose Dam Project proposes a 119 m high concrete faced roc-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 capcity is 216 MW through 3 units of 72 MW each. Geological investigations are under progress. CWC is involved in the survey investigation & preparation of DPR. The Design & Drawings for Barrage and Canal design chapter of DPR are being issued.

9. Salma Dam Project, (A Reconstruction & Rehabilitation project), Afghanistan.

The Salma Dam project is being funded by Government of India as an aid to Afghanistan for rehabilitation and reconstruction. The work is entrusted by Ministry of External Affairs (MEA) to M/s Water and Power Consultancy Services (India) Ltd. (WAPCOS), who are carrying out construction and related works including detailed tendering and design. Technical consultancy and design inputs, as and when necessary, are being provided by Central Water Commission to WAPCOS).

CWC is providing design consultancy to WAPCOS for the design of 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 in time bound manner. The power house in advance stage of construction with the service bay being raised up to the crane beam level.

10. Subansiri Lower H.E. Project, Assam-Arunachal Pradesh

The Subansiri Lower H.E. Project (SLP) is located on the River Subansiri, a right bank tributary of the River Brahmaputra. The Subansiri River joins the river Brahmaputra at Majuli Island which is around 110 km downstream of the project site. The Project envisages construction of 116m high concrete dam for generating 2000 MW of power. The Techno Economic Clearance (TEC) of the project was accorded by CEA in Jan-2003. The other remaining statutory clearances were obtained subsequently, and the construction of the project commenced from Jan-2005.

Presently the project's construction work stands suspended since Dec-2011 because of agitation by local groups. About 50% of the works in terms of cost has been completed, incurring an expenditure of around Rs. 6269 crore (March-2013) out of estimated cost of Rs. 10667crore (at Dec-2010 price level).

On the recommendations of TEC, MoP in Dec-2012 a Dam Design Review Panel (DDRP) comprising members from CWC, CEA, GSI, CWPRS, IIT-Roorkee and NHPC under the Chairmanship of Chairman, CWC was constituted to address the issues raised by TEC.

The Terms of reference of the Panel includes the following: -

- Review of Energy Dissipation Arrangement.
- Examine the adequacy of single concrete diaphragm wall only under sluice blocks.
- Non-provision of concrete diaphragm wall under NOF blocks.

The DDRP has submitted its report to MoP and the same has been accepted.

11. Water Resources Development Projects in North Eastern Region

CWC has a dedicated design unit for East and North Eastern region to undertake design and consultancy for Multipurpose, Irrigation, Water Supply and Hydro Electric Projects. The scope of work also includes preparation of pre-feasibility and detailed project reports for schemes investigated by the field offices of CWC in North East or projects undertaken by Brahamputra Board, NEEPCO, State Govt. departments etc. Technical appraisal of PFRs and DPRs are also being carried out.

At present, there are 7 projects at construction stage for which design consultancy is being provided by D&R wing of CWC. In addition, there are 9 projects for which DPRs are under preparation.

The projects in North Eastern Region dealt in D&R Wing during 2012-13 are listed below:

Arunachal Pradesh		
1	HE Projects on Nuranang chu River	DPR stage
2	Nao Dehing HE Project	DPR stage
Assam		
3	Amjur Drainage Development Scheme	Construction stage
4	Barbhag Drainage Development Scheme	Construction stage
Manipur		
5	Thoubal Multipurpose Project	Construction stage
6	Dholaithabi Barrage Project	Construction stage
7	Khuga MP Project	Construction stage
Meghalaya		
8	New Umtru HE Project	Construction Stage
9	Ganol HE Project	Construction Stage
10	Kulsi HE Project	DPR stage
11	Myntdu HE Project Stage-II	DPR stage
12	Killing Dam Project	DPR stage
Mizoram		
13	Tuipui HE Project	DPR stage

14	Tuichang HE Project	DPR stage
Sikkim		
15	Kalezkhola HE Project	DPR stage
16	Santaley HE Project	DPR stage

5.4 Hydrological Studies

The Hydrological Studies Organization (HSO), a specialized unit under D&R Wing of Central Water Commission, carries out hydrological studies in respect of most of the projects in the country. The success of the projects is largely governed by the hydrological inputs. The inputs at Detailed Project Reports (DPR) or pre-feasibility (PFR) stage are made available in the form of

i. Water availability/Yield studies
ii. Design flood estimation
iii. Sedimentation studies
iv. Diversion flood studies

The consultancy services in the field of hydrology are also offered to the State Water Resources Departments, State & Central Agencies at various stages of the project implementation.

During the year 2012-13 HSO has dealt with 130 projects from hydrological point of view which includes 07 projects for consultancy and 123 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 un-gauged 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 are received.

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

Design precipitation (viz. 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 organizations like IMD and CWC. To overcome this, it was decided to publish generalized PMP Atlases covering the whole country, to give a first hand - estimate of design storm depths. The existing PMP Atlases prepared in the nineties are being widely used. Further work of preparation of new PMP Atlases and updating of existing PMP Atlases as listed under has been taken up in the XI plan scheme "Dam Safety Studies and Planning":

(i) Preparation of New PMP Atlases for:

- Ganga River Basin
- Brahmaputra River Basin

(ii) Updating of six existing PMP Atlases for:

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

The work is being carried out through a consultant, who has submitted Draft Final Report of Godavari Basin in Feb, 2013. The draft report of Ganga basin is likely to be submitted by May, 2013 and the project is likely to be completed by March, 2014.

5.5 Dam Safety Aspects.

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

- Monitoring and Rehabilitation of Large dams.

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

5.5.1 Dam Rehabilitation & Improvement Project (DRIP)

As part of continuous strengthening of the dam safety activities in India, **Dam Rehabilitation & Improvement Project (DRIP)** has been taken up with World Bank assistance at an estimated cost of ` 2100.00 Crore. About 223 large dams in four states i.e. Madhya Pradesh, Orissa, Kerala and Tamil Nadu would be rehabilitated under this project. The State-wise numbers of dams covered under DRIP and the estimate of the project cost is summarized in the table below:

State	Total No of large dams	No of DRIP dams	Total Project Cost (in ` Crore)
Kerala	59	31	279.98
Orissa	204	38	147.74
Madhya Pradesh	906	50	314.54
Tamil Nadu	116	104	745.49
CWC			132.00
Unallocated Resources			480.24
Total		**223**	**2100.00**

Five more States/Organization (namely Karnataka, Punjab, Uttar Pradesh, Uttaranchal Jal Vidyut Nigam Limited, and Damodar Valley Corporation) have also been identified to join DRIP at a later date, for which a provision of unallocated resources had been provided in the project estimate.

Out of the total project cost, 80% will be funded by the World Bank loan/credit, while 20% will be borne by respective State governments and Central Water Commission. 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.

The project implementation agencies for DRIP are 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 assistance of a management and engineering consulting firm. The project has become effective from 18th April, 2012 and will be implemented over a period of six-years. The lining up of Engineering and Management Consultant for Central Project Management Unit (CPMU) of DRIP is under process. Design flood reviews of 46 DRIP dams have been completed. First tender documents in respect of five dams have been approved and works are expected to commence shortly. Project Screening documents in respect of 23 dams have been prepared and are at different stages of review.

5.5.2 Central Dam Safety Legislation

The Standing Committee in its report of July 1986 has recommended for unified dam safety procedures for all dams in India and the necessary Dam Safety Legislation. The need for legislation was also repeatedly emphasized by the National Committee on Dam Safety in its several meetings. 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. The States of Andhra Pradesh and West Bengal have adopted resolutions in their respective Assemblies for enactment of dam safety legislation for regulation in their States by an Act of Parliament. In pursuance of the above, the Union Government has decided to enact a Central Dam Safety Legislation.

Accordingly, Ministry of Water Resources formulated a (Draft) **Dam Safety Bill 2010**, which was introduced in the Parliament on 30th August 2010. The Bill was referred to the Parliamentary Standing Committee on Water Resources for the examination of the Bill, which had submitted its recommendations in June 2011. The observation and recommendations of the Parliamentary Standing Committee on Water Resources were

examined by Ministry of Water Resources for necessary compliance. Owing to significant changes/modifications entailed in the Bill while complying with the recommendations of the Parliamentary Standing Committee, the Ministry of Water Resources decided to withdraw the Bill and introduce the modified Bill as a new Bill in the Parliament. The modified draft **Dam Safety Bill** has been approved by the Ministry of Law and Justice and is under process in the MoWR for introduction in the Parliament.

The proposed Dam Safety Legislation will provide for proper surveillance, inspection, operation and maintenance of all dams of certain parameters in India to ensure their safe functioning and for matters connected therewith or incidental thereto. The proposed Legislation seeks to enjoin responsibility on Central Government, State Governments and owners of specified dams to set up an institutional mechanism for ensuring safety of such dams and reporting the action taken. It defines the duties and functions of these institutions in relation to perpetual surveillance, routine inspections, operation and maintenance, maintenance of log books, instructions, funds for maintenance and repairs, technical documentation, reporting, qualifications and trainings of concerned manpower etc. Provisions have been made concerning the necessity of periodical inspections, instrumentations and establishment of hydrological and seismological stations. The Bill addresses the issues of emergency action plan and disaster management, and also enlists the requirements of comprehensive dam safety evaluation.

5.5.3 National Committee of Dam Safety (NCDS)

Government of India, Ministry of Irrigation constituted a Standing Committee in1982 to review the existing practices and to evolve unified procedures of dam safety for all dams in India, under the Chairmanship of Chairman, Central Water Commission Subsequently Government of India, Ministry of water Resources reconstituted the Standing Committee in 1987 as the National committee on dam Safety to:

- Monitor the follow-up action on the report on Dam safety Procedures both at the Centre and at the State level,
- Oversee dam safety activities in various states and suggest improvements to bring dam safety practices in line with state-of the art practices consistent with Indian conditions, and

- Act as a forum of exchange of views on techniques adopted for remedial measures to relieve distress in dams.

The National committee was reconstituted in 2002 and consists of 28 members drawn from 16 states and various other organizations viz. MoWR, CWC, GSI, IMD, and BBMB. The 31st meeting of NCDS was held on 13th July,2012 .

5.5.4 National Committee on Seismic Design Parameters (NCSDP)

The National Committee on Seismic Design Parameters (NCSDP) was constituted through MoWR Order dated 21st October, 1991 with the objective to recommend the site specific design seismic coefficients, Maximum Credible Earthquake (MCE), Design Basis Earthquake (DBE) etc. for the proposals received from the dam owners. The Member (D&R), CWC is the chairman of the Committee with 11 other experts from various engineering disciplines from different technical institutions and Govt. organizations as its Members.

During 2012-13, two meetings (23rd & 24th) of NCSDP were held. In the 23rd meeting, held on 20th November, 2012, the site specific seismic study reports of 11 projects were discussed and 8 projects were cleared by the Committee. The 24th meeting of NCSDP was held on 15th March 2013 to discuss the seismic Design Earthquake Parameters of Subansiri Lower Project (SLP) and the recommendations of NCSDP have been issued.

5.5.5 Consultancy Services on Instrumentation in Hydraulic Structures

During the year 2012-13, consultancy services towards planning and preparation of specification/ construction drawings have been provided for the following projects:

I. Punatsangchhu-I HE Project, Bhutan.
II. Anandpur Barrage Project, Odisha

The instrumentation drawing for spillway block No.2 of Kanpur Irrigation project, Odisha was vetted during the year 2012-13.

5.6 Special Studies

CWC undertakes special studies e.g. Dam Break Analysis, GLOF Studies, etc. for water resources projects. Dam break analysis is carried out to prepare the inundation map and disaster management plan in the unlikely event of dam failure. It estimates the maximum water level at the downstream locations of the dam in the event of a hypothetical failure of the dam. The dam break analysis is being carried out in CWC on consultancy basis. GLOF Studies are carried out to account for the flood, resulting from the breach of moraine dams, in the design of the projects. The glacial lakes are formed by accumulation of glacier melt behind the moraine dams formed by landslides or some other natural phenomenon.

During the year following special studies were carried out:

- GLOF study of Wangchu H E Project, Bhutan.
- GLOF Study report in respect of Kholongchu HEP and Chamkharchhu-I HEP, Bhutan and Nyukcharong Chu HEP and Rho HEP, Arunachal Pradesh were examined and cleared.
- The Crisis Management Plan on "Flood Forecasting, Dam Failures and Construction of Water Bodies" was prepared and submitted to Ministry of Water Resources.

CHAPTER-VI

WATER MANAGEMENT

6.1 Monitoring of Reservoir Storage

Central Water Commission monitors live storages of important reservoirs of the country. The information is 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.

During the water year 2012-2013 Central Water Commission monitored live storages of 84 important reservoirs of the country having total live storage capacity at FRL of 154.421 BCM. The status is given in table 6.1.

Table 6.1
Storage status of current year vis-a-vis previous year

Description			Water Year	
			2011-12	2012-13
Number of Reservoirs			84	84
Total Designed live storage Capacity at FRL (in BCM)			154.421	154.421
ACTUAL STORAGE	On June, 1st (Start of Water Year)	In BCM	37.244	29.889
		In % of Storage at FRL	24	19
		In % of 10 Years Avg. Storage	169	129
	On Sept, 30th (End of Monsoon Period)	In BCM	133.689	115.123
		In % of Storage at FRL	87	75
		In % of 10 Years Avg. Storage	128	106
	On Dec, 31st	In BCM	95.233	88.316
		In % of Storage at FRL	62	57
		In % of 10 Years Avg. Storage	118	106

A bulletin on the status of reservoir storages monitored by CWC is being issued every week. The weekly bulletin contains current storage position vis-à-vis storage status on

the corresponding day of the previous year and average of last 10 years on the corresponding day.

In order to expeditiously collect the data required for presentation of reservoir bulletin, a sub-scheme under the scheme DWRIS namely "Telemetry Based Reservoir Monitoring System " with estimated cost of Rs 15.00 crore has been framed. The scheme is proposed to be executed during XII FYP after its approval. In addition to existing 84 reservoirs, 68 new reservoirs are being identified for installation of telemetry system. Thus, the total number of reservoirs under the monitoring would be 152 which will give better representation of storage status in the country. Under the sub-scheme reservoir water level data will be collected by installing censors at reservoir and collecting the data through satellite.

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 .It includes four reservoirs of Karnataka namely Kabini, Hemavathy, Harangi, Krishnaraja Sagar and one reservoir in the state of Tamilnadu namely Mettur. Four such bulletins are issued every month.

6.3 Assesment of Revised Live Storage Capacity

A committee constituted under Director (WM), CWC, had carried out reassessment of live storage capacity of reservoirs in the country during 2011. As per reassessment the live storage capacity of completed dams is 253.388BCM, the live storage capacity of dams under construction is 50.959 BCM and the live storage capacity of dams under consideration for construction is 104BCM.

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 84 important reservoirs being monitored by CWC is used as an important input for crop planning strategy.

The ICAR- CWC Joint Panel was constituted in March 1979 by the ICAR mainly to deal with the issues relating to efficient water use for irrigation and suggest measures for maximizing the return from investment on Irrigation in areas covered under major, medium, minor and other irrigation programme. 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.

6.5 Reservoir Sedimentation-Capacity survey of Reserviors

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 reserviors was carried over to the first year of XI plan.

During XI Plan, it was planned to undertake capacity survey 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 upto March, 2012 and works of remaining two reservoirs were completed during 2012-13.

6.5.2 Capacity Survey using Remote Sensing Technique

The "Estimation of Sedimentation in Reservoirs using Remote Sensing Technique" was taken up under the sanctioned scheme "Research & Development Programme in Water Sector" during 11th Five Year Plan. Satellite Remote Sensing based Reservoir Sedimentation assessment study (In-house) of 1 reservoir i.e. Kharakhra (Chattishgarh State) has been completed in March 2013.

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 2012-13, the performance evaluation studies of following seven irrigation projects have been awarded.

(i) Krishnagiri project, Tamilnadu
(ii) Giri project, Himachal Pradesh
(iii) Jayakwadi stage-I project, Maharashtra
(iv) Salandi project, Odisha
(v) Bhimsager project, Rajasthan
(vi) Som-Kamla-Amba project, Rajasthan
(vii) Subernrekha project, Jharkhand

Proposals for award of five fresh Post Project Performance Evaluation studies have been initiated.

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. A Core Group under the Chairmanship of Member (WP&P), CWC was set up for Benchmarking of Irrigation Systems in India. This core group has been reconstituted.
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, thirteen regional projects 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 developed water resources 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. Delievery 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 2012-13, the approved final reports of the following five projects of Bihar, were sent to respective state governments and project authorities for taking necessary action on the recommendations given in the report for improving the water use efficiency of these projects.

(i) Kamla Irrigation Project
(ii) Durgawati Irrigation Project
(iii) Upper Morhar Irrigation Project
(iv) Eastern Sone Canal Project
(v) Saran Canal System Irrigation Project

In addition, action has been initiated for conducting water use efficiency studies in respect of 16 new proposals received from various states.

6.9 Water Audit and Water Conservation

Water audit is an important aspect from 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 are also placed on the website of Central Water Commission. Some State Govts. are reportedly carrying out Water Audit of irrigation projects. Water audit is also now being resorted to by municipalities/Industries.

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.

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 remaining period of XI Five Year plan i.e. 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 `1,431.00 lakhs. The programme has been completed on 31-12-2012.

MoWR has also awarded the work of concurrent evaluation of 2nd phase of FPARP to same agency engaged for impact assessment study of 1st Phase of FPARP. The interim report has been submitted by the agency.

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 viability 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 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 / 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 aspects of civil 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.

7.2 Appraisal of Major Irrigation Projects

Major Irrigation Projects with Culturable Command Area (CCA) of more than 10,000 hectares are examined for various aspects in specialised Directorates in CWC and in the Ministries of Water Resources, Agriculture, Environment & Forests and Tribal Affairs. In case of multipurpose projects, power components are examined in Central Electricity Authority. According to the existing procedure for scrutiny and examination of irrigation and multipurpose projects by Central Water Commission the concerned State Government in the initial stage submits preliminary report covering surveys and investigations, International/Inter-State aspects, hydrology, irrigation planning, brief environmental aspects, intended benefits etc. which are required to establish soundness of the project proposal. The project proposal is examined and if found acceptable, 'In Principle' consent of CWC for DPR preparation is accorded. Thereafter, DPR is prepared by the concerned State Governments with up-to-date cost and simultaneously the project authorities process and obtain necessary clearances of

Ministry of Environment and Forests in respect of Environment Impact assessment and Forest area being diverted. If Scheduled Tribe population is affected, the clearance of R & R Plan is also obtained from the Ministry of Tribal Affairs. The DPR then prepared is examined in CWC. In State, where Central Design & Planning Organisations do not exist, the CWC checks the design also. Subsequent upon examination and finalization of the technical aspect, the CWC finalises the Cost, Benefit Cost Ratio 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. Afteracceptance by the Advisory Committee and according investment clearance by Planning Commission,the project may be taken up by the project authorities. Out of 46 major / multipurpose projects (29 new & 17 revised) appraised during the year 2012-13 up to March 2013, 8 major / multipurpose projects (4 new & 4 revised) have been accepted by the Advisory Committee of MoWR. Apart from the above, "In principle consent of CWC" for DPR preparation has been given in respect of 6 Major Irrigation Projects. A Pie Chart showing state-wise distribution of major irrigation / multipurpose projects under appraisal during 2012-13 is shown at **Fig. 7.1**.

7.3 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. Out of 59 medium projects (49 new &10 revised) appraised during the year 2012-13, 10 medium projects (8 new & 2 revised) have been accepted by the Advisory Committee of MoWR. Necessary assistance was provided by PAO, CWC to the concerned regional offices for processing the projects for acceptance by the Advisory Committee.

Fig. 7.1

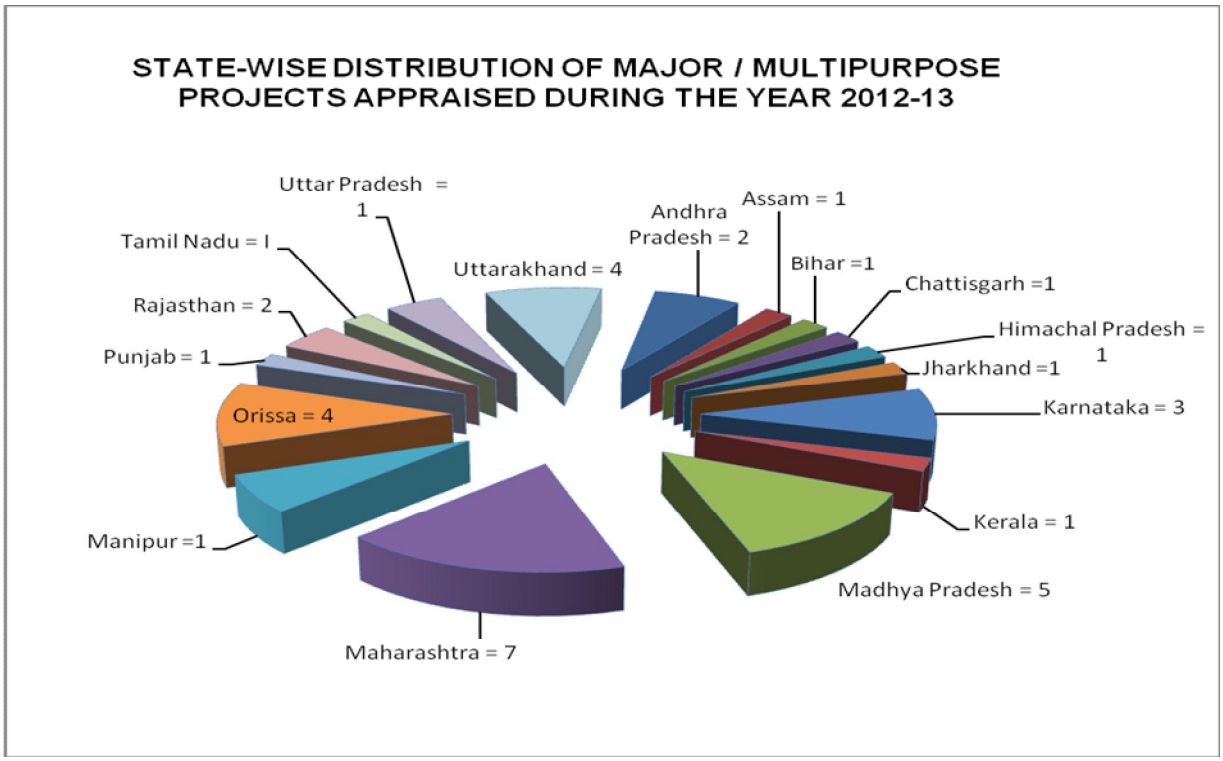
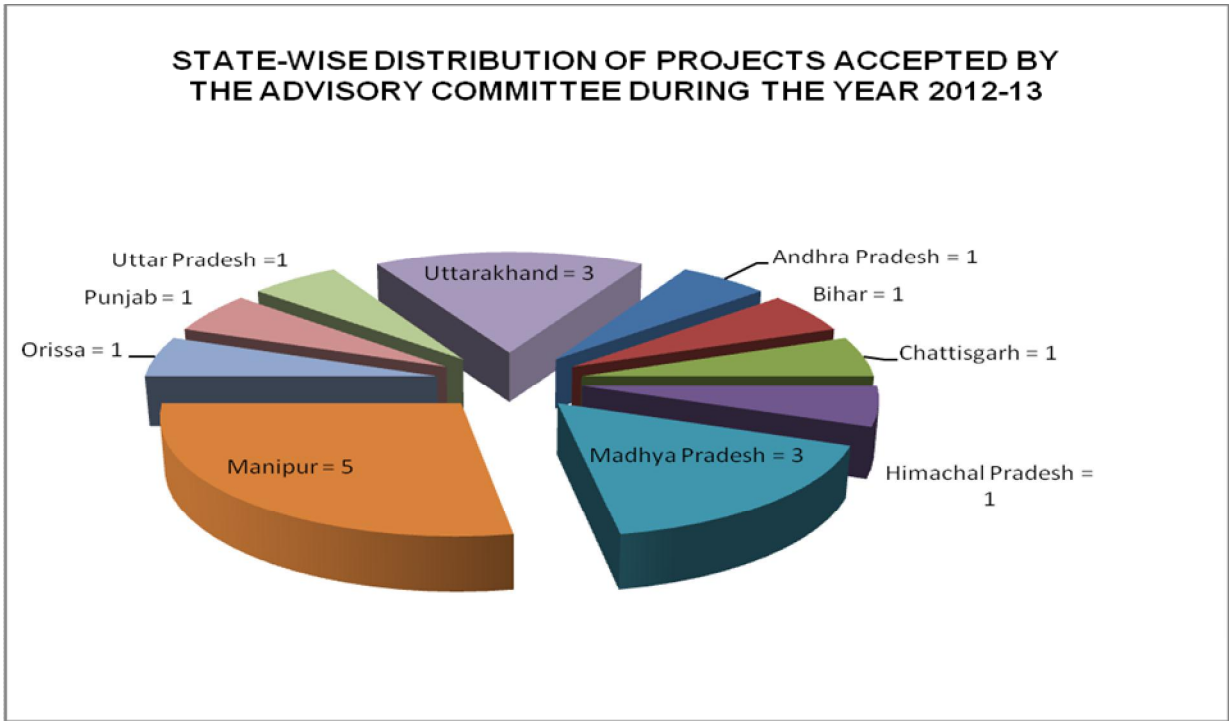

STATE-WISE DISTRIBUTION OF MAJOR / MULTIPURPOSE PROJECTS APPRAISED DURING THE YEAR 2012-13
Uttar Pradesh = 1
Tamil Nadu = I
Rajasthan = 2
Punjab = 1
Orissa = 4
Manipur =1
Maharashtra = 7
Uttarakhand = 4
Andhra Pradesh = 2
Assam = 1
Bihar =1
Chattisgarh =1
Himachal Pradesh = 1
Jharkhand =1
Karnataka = 3
Kerala = 1
Madhya Pradesh = 5

Fig. 7.2


STATE-WISE DISTRIBUTION OF PROJECTS ACCEPTED BY THE ADVISORY COMMITTEE DURING THE YEAR 2012-13
Uttar Pradesh =1
Punjab = 1
Orissa = 1
Manipur = 5
Uttarakhand = 3
Andhra Pradesh = 1
Bihar = 1
Chattisgarh = 1
Madhya Pradesh = 3
Himachal Pradesh = 1

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. During the year 2012-13, meetings with following State Governments were convened by the Project Appraisal Organization in which issues related to projects were resolved:

i)	Jharkhand	20th September 2012 at Ranchi
ii)	Uttarakhand	11-12th November 2012 at Haridwar
iii)	Uttarakhand	1st January, 2013 at New Delhi

7.5 Meeting of the Advisory Committee

During year 2012-13, the Advisory Committee of MoWR under the Chairmanship of Secretary (WR) accepted 23 projects comprising 8 Major Irrigation/Multipurpose, 10 Medium Irrigation and 5 Flood Control schemes in 3 meetings. The list of the projects accepted by the Advisory Committee is enclosed as Annexure 7.1.

The irrigation projects accepted during 2012-13 envisages annual irrigation benefits to 13,39,149 hectare in the States of Andhara Pradesh, Bihar, Chhattisgarh, Himachal Pradesh, Madhya Pradesh, Manipur, Punjab, Orissa, Uttar Pradesh and Uttarakhand. The Flood Control Scheme, accepted during 2012-13 envisages protection to the population of about 13,89,590 Nos. of people and area of 82,260 hectare in the states of Assam, Uttarakhand and Uttar Pradesh. Pie Chart showing State wise distribution of 18 nos. irrigation and multipurpose projects accepted by the Advisory Committee during the current year is shown as **Fig.- 7.2**.

7.6 Appraisal of Power Projects

The civil components of Hydro-Electric Projects are also appraised in PAO, CWC. During 2012-13, 6 Hydro-Electric Projects having total installed capacity of 3414 MW has been cleared by CEA.

7.7 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% cost of

irrigation & drinking water component of the project as central assistance by the Government of India in the form of central grant for their completion in a time bound manner. Central Govt. has declared 15 water resources projects indicated in Annexure 7.2 as National projects.

The criteria for selection of National Projects 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) Inter-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.

(d) Extension, Renovation and Modernisation (ERM) projects envisaging restoration of lost irrigation potential of 2, 00, 000 ha or more would be eligible for inclusion as a National Project subject to:

(i) The command Area Development and Water Management (CAD&WM) works shall be ensured in the entire command area of the ERM project.

(ii) The CAD&WM works shall be taken up simultaneously with the ERM works so as to facilitate achievement of the bench mark efficiency for water use.

(iii) The management of command area system by Water User's association (WUA's) after the ERM works will be necessary. The WUA's may be entrusted with the responsibility for the collection of irrigation service fees and for undertaking annual repairs by retaining a part of the fee collected.

(iv) Independent evaluation of the project will be carried out after project implementation and the project should achieve the benchmark water use efficiency in practice as prescribed by Central Water Commission.

(vi) An ERM Project of a State may be included in the scheme of National Projects only on completion of one ERM Project already being funded in the state under the category of National Projects.

Out of above 15 projects only 4 are under execution at present and balance 11 projects are under DPR preparation/appraisal stage. The four National projects under execution are: Gosikhurd Project of Maharashtra, Shahpur Kandi Project of Punjab, Teesta Barrage project of West Bengal & Saryu Nahar Pariyojana of Uttar Pradesh. The physical & financial progress and the central grants under the scheme of National Projects given to theses projects are indicated in Annexure-7.3.

Besides these, 14 new proposals have been received from State Governments including Uttar Pradesh for consideration under National projects. Out of these, 3 proposals namely, Restoring capacity of Sharda Sahayak system (U.P.), Bargi Diversion Project (M.P.) & Indira Sagar Polvaram Project (Andhra Pradesh) satisfy the criteria and have been recommended by the High Powered Steering Committee. Remaining 11 proposals do not satisfy the criteria. The present status of 14 new proposals is at Annexure-7.4.

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 for inclusion of new projects as National Projects and make appropriate recommendation to the Government.

So far, between August, 2009 and November, 2012, total seven meetings were held by High Powered Steering Committee for implementation of National projects.

7.3 Repair, Renovation and Restoration (RRR) of Water Bodies

During the XI Plan, the Ministry of Water Resources, Govt. of India had launched two schemes of Repair, Renovation and Restoration (RRR) of Water Bodies, one with Domestic Support with an outlay of ` 1250 crore and the other with External Assistance with an outlay of `1500 crore. The scheme envisaged comprehensive improvement of selected tank systems including de-silting of water bodies, improvement of catchment areas of tank commands, increase in storage capacity of water bodies, ground water recharge, improvement in agriculture, horticulture productivity, development of tourism, cultural activities and increased availability of drinking water.

For scheme with Domestic Budgetary support, 90% of the project cost was provided as Central Assistance (grant) by the Government of India and 10% of the cost by State Governments for Special Category States (North-Eastern States including Sikkim, Himachal Pradesh, Jammu & Kashmir, Uttarakhand and undivided Koraput, Bolangir and Kalahandi (KBK) districts of Orissa) as well as projects benefitting drought prone/tribal/naxal-affected areas. For Non-Special Category States, 25% of the cost was provided as Central Assistance (grant) by Government of India and 75% by State Governments.

For scheme with External Assistance, 75% of the loan taken by the Government of India from the World Bank was passed on to the concerned States on back to back basis and was to be repaid by the States. The balance 25% loan was taken as liability of Government of India and was passed on as Additional Central Assistance (100% grant) to the states for the projects.

Under the scheme with domestic support, 3341 water bodies were taken up for restoration out of which 1736 water bodies have been completed. Under the scheme of external assistance, 10887 water bodies have been taken up for restoration in Andhra Pradesh, Odisha, Karnataka and Tamil Nadu States. During XI Plan `811.85 crore under the scheme with domestic budgetary support and `464.50 crore with external assistance were released. The state-wise fund released during the last foure years, is as below:

(in `crore)

Name of State	Fund released during 2009-10	Fund released during 2010-11	Fund released during 2011-12	Fund released during 2012-13	Total
Orissa	72.12	75.00	70.33	--	217.45
Karnataka	74.04	47.47	77.51	--	199.02
Andhra Pradesh	--	189.00	--	--	189
Bihar	--	25.00	--	27.54	52.54
U.P. (Bundelkhand)	--	29.08	--	10.379	39.459
M.P (Bundelkhand)	--	7.33	2.62	--	9.95
Meghalaya (Umiam Lake)	--	1.78	0.64	--	2.42
Chhattisgarh	--	--	34.68	--	34.68
Gujarat	--	--	10.61	--	10.61
Haryana	--	--	7.04	2.52	9.56
Maharashtra	--	--	80.53	--	80.53
Rajasthan	--	--	7.07	--	7.07
Total	**146.16**	**374.66**	**291.03**	**40.439**	**852.289**

The scheme for RRR of water bodies for implementation during XII Plan is under consideration.

CHAPTER-VIII

MONITORING OF PROJECTS

8.1 Monitoring of Major and Medium Irrigation Projects

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

As per the present arrangement in CWC, Inter-State, Externally Assisted and Centrally aided projects are being monitored by monitoring units at Headquarters and other projects by respective field units. During 2012-13, a total of 57 projects under general monitoring were targeted for monitoring by CWC. In addition, 152 ongoing projects under AIBP were also targeted for monitoring during 2012-13. The list of these projects under General/AIBP monitoring is given in **Annexure- 8.1.**

All the projects identified for monitoring are visited by CWC officers once a year. Thereafter, based on field visit to the project and discussions with the State Govt Officials, a detailed status report is prepared highlighting various constraints impeding construction & suggestions for remedial measures, issues needing attention of the State Govt. to expedite progress for early completion of the projects etc.

8.2 Accelerated Irrigation Benefits Programme

Central Govt., during 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 authorisedto 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 ` 3911.384 Crores has been released to 47 Major & Medium Irrigation Projects under AIBP during 2012-13 till 31.03.2013. The cumulative total Central Loan Assistance / Grant provided to States is `48562.329 Cr. under AIBP since its inception of the programme till 31.03.2013 to 293 projects.

The number of States benefited from the programme is 24 till 31.03.2012. Out of 293 projects, 141 projects have been completed as a result of AIBP. **Anexxure 8.2** gives State wise list of Major & Medium projects completed under AIBP.

As reported by the State Governments 6.450 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 152 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.

8.3 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 provides the critical gap areas for further effective monitoring.

In the second phase, the assessment of irrigation potential of 50 AIBP projects using cartosat satellite data covering an area of 851.428 Th Ha has been completed by NRSC, Hyderabad during 2012-13.All the 50 reports have been submitted by NRSC, Hyderabad.

One in-house study for monitoring of AIBP funded project through remote sensing technique in respect of Mahi subsidiary dam command area under Mahi Irrigation Project, taken up on pilot basis during 2011-12, has been completed using Cartosat-1 high resolution (2.5 m) satellite data. Report on "Assessment of Irrigation Potential created in Mahi Subsidiary dam under AIBP funded Mahi Irrigation Project using High Resolution Cartosat Satellite Data" has been finalized and circulated in September, 2012.

CHAPTER-IX

CONSTRUCTION EQUIPMENT PLANNING AND MANAGEMENT

9. 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, 26 project reports of Irrigation, Power and Multipurpose projects of various states of the country were technically examined from plant planning angle. Out of these 19 projects reports were accepted with provisions worth Rs.7317.046 Lakhs in respect of construction equipment. In respect of the remaining 7 project reports, the observations/ comments were conveyed to the project authorities for compliance and further review.

9.2 Consultancy

MOU has been signed with 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 study on "Employment Generation in Major & Medium irrigation projects during Operation and Maintenance" in respect of 55 (21 Major & 34 Medium) irrigation projects for 5 years period from 2000-01 to 2004-05 was finalized by Advisory Group on Manpower Planning in CWC. A group of four members was constituted by

Member (WP&P), CWC to study the trend analysis of data collected and to modify the report.

A Study on "Expenditure and Employment Statistics in Major & Medium Irrigation Projects (Under construction)" for the XIth Five Year Plan (2007-2012) has been initiated in 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 performa, is in progress. During the year, information of 19 major and 35 medium irrigation projects were received /collected personally from the states of Andhra Pradesh, Jammu & Kashmir, Chattisgarh, Goa, Himachal Pradesh, Kerala, Karnataka, Maharashtra, Madhya Pradesh, Odisha & West Bengal.

A Special study on "Employment Generation in Major & Medium Operation and Maintenance stage Irrigation projects" for the 5 years period has also been initiated in CWC. Data collection from the State Water Resources Departments/Project authorities from 106 Major & Medium completed projects selected for the study for 5 years from 2005-06 to 2009-10 as per format, is in progress. During the year, details of 7 major and 12 medium irrigation projects were received/collected personally from the states of Andhra Pradesh, Kerala, Odisha, Madhya Pradesh, Rajasthan and Tamil Nadu.

9.4 Other Activities

- Meetings with project officials from following Projects were held to review the requirement of additional information/ clarifications for examination of the project from plant planning angle:
    a). Dagmara Hydro Electric Project, Bihar
    b). Dikhu Hydro Electric Project, Nagaland
    c). Luhri Hydro Electric Project, HP
    d). Bunakha Hydro Electric Project, Bhutan
    e). Wangchhu HEP, Bhutan
    f). Chamkarchhu HEP, Bhutan
    g). Tawa Irrigation Project(ERM), MP

- Technical Specifications of Amphibious Excavator (0.60 Cum bucket capacity) with Long Boom Front attachment to be procured by irrigation & Flood Control deptt., Govt. NCT of Delhi were vetted.

- During the year 2012-13, 25 numbers of Photo Copier machines, 4 Numbers of Fax Machines, 6 Numbers of Computers, 4 numbers of Scanner, 1 number UPS, 17 numbers of Air Conditioners, 4 Numbers of Drinking Water Coolers and 3 numbers Invertor were installed to facilitate better service condition at CWC(HQ).

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

The Cauvery River Authority has so far held seven meetings, last being on 19.9.2012.The CRA in its meeting held on 19-09-2012 directed to State of Karnatka to release @ 9000 cusecs of water daily from 20th September to 15th October 2012 which has been complied with as per discharge data observed by CWC at BIlligundlu.

The Cauvery Monitoring Committee has so far held 32 meetings. Six meetings namely 27th to 32nd were held during 2012-13. In its meetings, CMC directed the State of Karnatka to make available specified quantum of water to state of Tamil Nadu as follows

Sl. No. of the meeting	Date of the meeting	Quantum of water directed to be released(TMC)	Period of effect
27th	28-05-2012	No quantum was decided	Not applicable
28th	11-10-2012	8.85	16-10-2012-31-10-2012
29th	31-10-2012	3.94	01-11-2012-14-11-2012
30th	15-11-2012	4.81	16-11-2012-30-11-2012
31st	7-12-2012	12	December,2012
32nd	10-01-2013	1.51	January,2013

The flow reaching Tamilnadu was monitored on daily basis since September 20, 2012.

A Central Team consisting of officers of CWC and M/o Agriculture, Govt. of India visited Cauvery Delta area from 4th to 8th October, 2012. The mandate of the central Team was to asses the extent of area sown under the current crops and the requirement of water beyond Oct. 15 for this crop. The Central Team submitted its report to Secretary, M/o Water Resources, Govt. of India on 11-10-2012

Also, an Expert Team was constituted by the Chairman, CWC on 4th February ,2013 on the Direction of Supreme Court for the assessment of requirement of water for standing crop in the delta region of Tamilnadu of Thanjavur and Nagapatinam. The Team submitted its report to Supreme Court on 6-2-2013. The report of the expert team was highly appreciated by Supreme Court.

Publication of final award of CWDT

Issue of notification of final decision of CWDT was discussed in the 32nd meeting of Cauvery Monitoring Committee (CMC) held on 10-01-2013 at New Delhi under the Chairmanship of Secretary, MOWR, New Delhi. Subsequently, as per direction of Honorable Supreme Court dated 4th February2013, the Govt. of India has notified the final order of Cauvery Water Dispute Tribunal (CWDT) in the official Gazette on 19th

February, 2013 and as per the Section 6 of ISRWD Act-1956, the order is now final and binding on the parties to the dispute and is to be given effect to by them.

10.1.2 Krishna Water Disputes Tribunal -II

The Krishna Water Disputes Tribunal was constituted during April 2004. Later on the effective date of constitution of the Tribunal was revised to 01.02.2006. Krishna Water Disputes Tribunal (KWDT-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 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.

MOWR had given instructions to CWC to assists Advocate of Central Government for making submission on the further references filed by it before the KWDT-II Accordingly, . CWC, provided technical assistance to Advocate before the KWDT-II from time to time during 2012-13.

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 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 constitution of a tribunal for adjudicating the disputes. The Cabinet on 10th December, 2009 approved the constitution of the Tribunal.

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 Inter-State Projects- Control Boards/ Committees

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 jurisdiction is being carried out by the concerned states independently and work of Power Houses is being executed by MPEB. The benefits and cost of the dam including land acquisition and rehabilitation are to be shared by Madhya Pradesh, Uttar Pradesh and Bihar in the ratio of 2:1:1(MP : UP : Bihar).

The work on the Dam including Crest Gates have been completed in June 2006 and the reservoirs has been filled up EL 334.06 m against FRL 341.65 m in September, 2010. Power generation is 425 MW up to September 2010 in the financial year 2010-11.

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. The State Government of Madhya Pradesh, Uttar Pradesh and Bihar fund the project in the ratio of 2:1:1. The details of share due/received in relation to the expenditure incurred as on 31.01.2013 of `1563.983 Crore.

Status of contribution of fund as on 31.01.2013

(` In Crore)

	Total Exp.	Share Due			Share Received			Balance Share		
		MP	UP	Bihar	MP	UP	Bihar	MP	UP	Bihar
Upto 31.3.12	1540.109	770.0545	385.02725	385.02725	780.943	369.599	389.562	(+) 10.8935	(-) 15.42825	(+) 4.53475
During 2012-13	23.874	11.937	5.9685	9.9685	(-) 4.795	(+) 28.689	-	(-) 16.732	(+) 22.7005	(-) 5.9698
Total As On 31.01.13	1563.983	781.9915	390.99575	390.99575	776.153	398.268	389.562	(-) 5.8385	(+) 7.27225	(-) 1.43375

This year i.e. 2012-13 due to normal rainfall in the catchment the reservoir got filled upto its full reservoir level F.R.L. 341.64m. The full reservoir level will provide irrigation to an area of 5.00 lakh hectare in three states, besides hydropower generation of 125 MW in addition to providing domestic and industrial water supply.

Based on the decision taken in the 73rd meeting of Executive Committee of BCB a Base paper for restructuring of the BCB was prepared by CWC and circulated to party states on Dt. 21.03.2013.

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 (BRB) 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 (EC) 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 with 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 cost as well as benefits of the project is to be shared equally by both the States. The Project was completed in June 2005.

So far 86 meetings of the Executive Committee of BRB have taken place. The 86th meeting of Executive Committee was held on 16.07.2012. The Committee discussed/decided the financial, technical and administrative matters of the Board. The Executive Committee desired that a model set up for the Joint River Board may be formulated on the lines of Tungabhadra Board. Accordingly, a draft M O U was prepared and sent to party states for the comments/views. Due to divergent views of the party states, the MOU could not be finalised.

10.2.3 Joint Operation Committee (JOC) of Rihand Reservoir

Ministry of Water Resources set up a Joint Operation Committee (JOC) for Rihand Reservoir under the Chairmanship of Member (WP&P), CWC and comprising of members from Utter Pradesh State Electricity Board (UPSEB), WRD-Bihar, and CEA. So far 25 meetings of JOC have taken place. The last meeting of JOC was held in New Delhi on 10th October 2012 under the Chairmanship of Member (WP&P) in which the actual releases made from Rihand reservoir during 2011-12 were discussed and the operation plan for 2012-13 was finalized.

10.2.4 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 lay down priority for their implementation and accord clearance to individual schemes in Ghaggar basin from the interstate angle.

10.2.5 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 of these areas and to ensure that adequate water way is provided in any new structure built across the Yamuna river.

The 80th and 81st meetings of the Committee were held on 06.03.2012 and 14.12.2012 respectively under the chairmanship of Member (RM), CWC. The minutes of the meeting were finalized and circulated among the members of the committee.

10.2.6 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.

10.2.7 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 December 1989 by the Ministry of Water Resources under Chairmanship of Chief Engineer(Flood Management), Central Water Commission to technically examine proposals 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 32nd and 33rd meetings of the Committees were held at Amritsar on 01.12.2011 and 22.02.2013.

CHAPTER-XI

ENVIRONMENTAL MANAGEMENT OF WATER RESOURCES PROJECTS

11.1 Environmental Management

The implementation of environmental safeguards for river valley projects is 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).

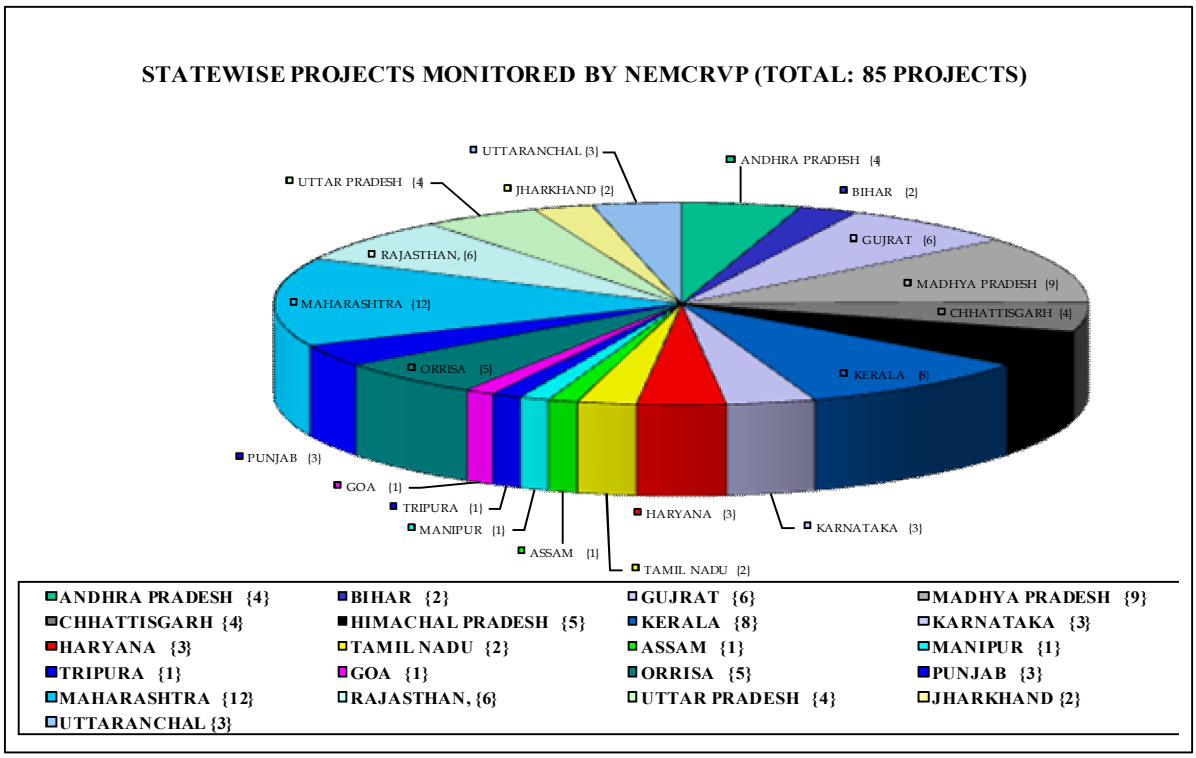

STATEWISE PROJECTS MONITORED BY NEMCRVP (TOTAL: 85 PROJECTS)
UTTARANCHAL {3}
ANDHRA PRADESH {4}
UTTAR PRADESH {4}
JHARKHAND {2}
BIHAR {2}
GUJRAT {6}
RAJASTHAN, {6}
MADHYA PRADESH {9}
MAHARASHTRA {12}
CHHATTISGARH {4}
ORRISA {5}
KERALA {8}
PUNJAB {3}
GOA {1}
TRIPURA {1}
MANIPUR {1}
HARYANA {3}
KARNATAKA {3}
ASSAM {1}
TAMIL NADU {2}
ANDHRA PRADESH {4}
BIHAR {2}
GUJRAT {6}
MADHYA PRADESH {9}
CHHATTISGARH {4}
HIMACHAL PRADESH {5}
KERALA {8}
KARNATAKA {3}
HARYANA {3}
TAMIL NADU {2}
ASSAM {1}
MANIPUR {1}
TRIPURA {1}
GOA {1}
ORRISA {5}
PUNJAB {3}
MAHARASHTRA {12}
RAJASTHAN, {6}
UTTAR PRADESH {4}
JHARKHAND {2}
UTTARANCHAL {3}

Fig.1

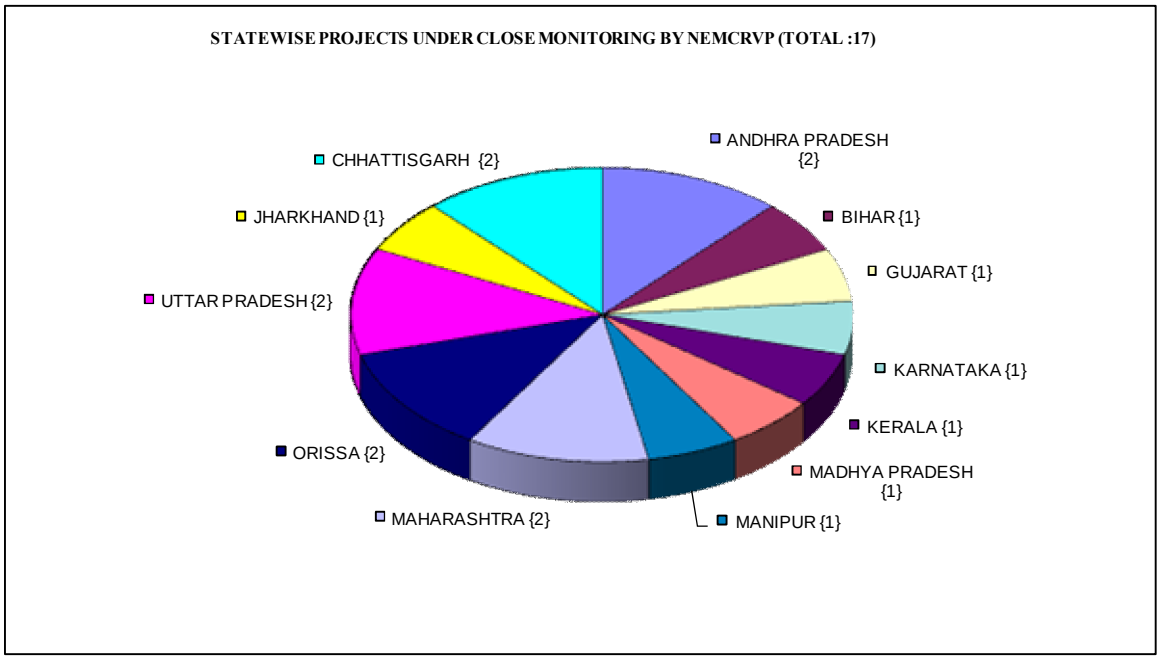

STATEWISE PROJECTS UNDER CLOSE MONITORING BY NEMCRVP (TOTAL :17)
ANDHRA PRADESH {2}
CHHATTISGARH {2}
JHARKHAND {1}
BIHAR {1}
GUJARAT {1}
UTTAR PRADESH {2}
KARNATAKA {1}
KERALA {1}
ORISSA {2}
MADHYA PRADESH {1}
MAHARASHTRA {2}
MANIPUR {1}

Fig.2

11.1.2 Constitution of NEMCRVP

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

The latest status of the implementation of the environmental safeguards of the projects has been sought from the Chairmen of the State Level Environmental Monitoring Committee for consideration of National Environmental Monitoring Committee for appropriate action in the matter. The matter is being persued with the State Governments for reviewing the progress of Environmental Safeguards to be implemented in the respective projects.

11.2 Conservation of Rivers- National Ganga River Basin Authority (NGRBA)

11.2.1 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 of NGRBA under the chairmanship of Secretary, MoEF has been constituted. 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 Uttarakhand, Uttar Pradesh, Bihar, Jharkhand, West Bengal and Chairman of Central Pollution Control Board, Central Water Commission, Additional Secretary & Financial Advisor (MoEF) are Members of the committee. Mission Director (NGRBA) is the Member Secretary of the Committee.

Chief Engineer (EMO) has been nominated for attending the meetings of NGRBA.

11.2.2 Functions of 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.

11.3 Environmental Impact Assessment (EIA)

Studies on Environmental (including social) impacts of completed Water Resources Projects have been taken up by EIA Directorate through Consultants, under R&D Scheme of the Ministry of Water Resources. Four such studies have been taken up during 2008-09, out of which, two projects namely Singur Irrigation Project (AP) and Ram Ganga Dam (U.P) were competed and final reports circulated to the concerned State Governments for needful action in the matter. The studies of other two projects viz., Mahanadi Delta Project (Orissa) and Mahi Bajaj Sagar Project, (Rajasthan) are in progress. Revised draft final Reports have been received from the consultant.

Activities in the North East Region:-

Central Water Commission CWC has also taken up Environmental Impact Assessment studies of Subansiri and Siang Sub Basins in Arunachal Pradesh based on the recommendation of an Inter- Ministerial Group which 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 impact on Assam. Administrative Approval for these studies have been received from MoWR and accordingly Memorandum of Understanding for conducting Environmental Impact Assessment studies of Subansiri and Siang sub basins had been executed with the consultants on 16.12.2011.

The corrected Interim Report of Siang sub basin submitted by the consultant during 2nd week of July 2012 was discussed by the Expert Appraisal Committee of Ministry of Environment and Forests during its 62nd Meeting held on 24.11.2012 and the observations/suggestions made by the Expert Appraisal Committee on the Interim

Report have been communicated to the Consultant for compliance during first week of Jan 2013.

Appraisal of EIA reports.

Final Second Interim Report on Environmental Impact Assessment Studies of Par-Tapi-Narmada Link Project and Damanganga – Pinjal Link Project" along with compliance by WAPCOS on the observations of the Committee submitted by NWDA, Valsad was further examined and comments offered.

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, two major projects proposed for JBIC (JICA) assistance and one major project proposed for Asian Development Bank Assistance were under appraisal in CWC during 2012-13. 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

SI. No.	Name of Project	Estimated cost (` crore)
1.	Andhra Pradesh Water Sector Improvement Project	4444.41

Table 12.2

Projects proposed for JICA Assistance

SI. No.	Name of Project	Estimated cost (Rs. crore)
1.	AP Irrigation and Livelihood Improvement Project, Ph-II*	----
2.	ERM proposal of Tawa Irrigation Project, M.P.	2366.00

* Out of 20 sub-projects under APILIP, Ph-II, DPR of only 07 sub-projects received till date.

Table 12.3

Major projects proposed for Asian Development Bank Assistance

SI. No.	Name of Project	Estimated cost (crore)
1.	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 and are the latest generation irrigation projects being financed by World Bank. Water Sector restructuring projects are planned with the objective to take care of water sector 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 44 World Bank aided projects, 40 projects have been closed and the assistance utilized is as shown in Table 12.4

Table 12.4

Details of Closed Agreements

SI. No.	State	No. of Projects	Assistance in million US $	
			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 2	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.	Rajasthan	1	XDR 93.45 M	XDR 76.39 M
12.	Tamil Nadu	3	340.90	268.36
13.	Uttar Pradesh	2	125.00 + XDR 87.27M	125.76 + XDR 85.67M
	Total	**40**	**5226.60+XDR 180.72M**	**4584.73+XDR 162.06 M**

12.2.3 On-going Credits / Loans Agreements

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

Table 12.5

External Assistance to Projects (World Bank)

Sl. No	Name of Project	Credit No/Loan No.	Agency	Time Slice		Est. Cost (` Million)		Assistance	
				Starting month	Closing month	Total as per SAR	Latest	Total	Utilized ending 03/13
1	2	3	4	5	6	7	8	9	10
1.	Maharashtra Water Sector Improvement Project	Ln4796-IN	IBRD	09-2005	3-2014	18595.58	18595.58	325.00 M, USD	268.3 M, USD
2.	Madhya Pradesh Water Sector Restructuring Project	Ln.4750-IN	IBRD	01-2005	6-2012*	20402.23	20402.23	387.04 M, USD	221.03 M, USD
3.	Andhra Pradesh Water Sector Improvement Project	LR.7897-IN	IBRD	14-08-10	7-2016	44444	44444	450.00 M, USD	96.73 M, USD
4.	Additonal Financing for Rajasthan Water Sector Restructuring project	Cr.4709-IN	IDA	05.2010	03.2013	2080	2080	12.40 M, XDR	3.26 M, XDR

*òIn-principleò consent for extension of closer date upto December 2014 has been granted.

12.3 Japan Bank of International Cooperation Assistance

In water resources sector JBIC (JICA) 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 two ongoing projects under JICA funding. The assistance utilized is given in Table 12.6.

Table 12.6
External Assistance to Project (JICA)

SI. No.	Name of Project	Loan Agreement No.	Loan Period		Estimated Cost	Total Assistance (M Yen)	Assistance utilized ending 03/13 (M yen)	Remarks
			Starting Date	Closing Date	As per agreement (Rs. Million)			
1.	Rengali Irrigation Project	ID-P-210	03/10	11/15	19583.4	3052.0	2686.49	On-going
	Rengali Irrigation Project –(III)*	ID-P-210A	03/10	11/15	-----	20.00	15.08	On-going
2	AP Irrigation and Livelihood Improvement Project	IDP 181	3/07	07/16	11377	23974	7791.01	On-going
Total						**27046**	**10492.58**	

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

12.4 Asian Development Bank

Asian Development Bank (ADB) in partnership with its developing member countries and other stakeholders, help create a world in which everyone can share in the benefits of sustained and inclusive growth. Whether it be through investment in infrastructure, health care services, financial and public administration systems, or helping nations prepare for the impact of climate change or better manage their natural resources, ADB is committed to helping developing member countries evolve into thriving, modern economies that are well integrated with each other and the world.

The main devices for assistance are loans, grants, policy dialogue, technical assistance and equity investments.

12.4.1 On-going Agreements

There is one ongoing project under ADB funding. The assistance utilized is given in Table 12.7.

Table 12.7

External Assistance to Project (ADB)

SI. No.	Name of Project	Loan Agreement No.	Loan Period		Estimated Cost	Total Assistance (M USD)	Assistance utilized ending 03/13 (M yen)	Remarks
			Starting Date	Closing Date	As per agreement (`Million)			
1.	Orissa Integrated Irrigated Agriculture and Water Managemen t Investment Program (OIIAWMIP)	2444-IND	02/09	09/13	4714.3	16.5	9.30	On-going

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

13.2 Cooperation with Nepal

Most of the rivers, which cause floods in the States of UP and Bihar originate from Nepal. These rivers are Ghaghra, Sarda, Rapti, Gandak, Burhi Gandak, Bagmati, Kamla, Kosi and Mahananda. In order to make flood forecasting and advance warning in the flood plains of the above rivers, a scheme namely, "*Flood Forecasting and Warning system on rivers common to India and Nepal*" which includes 42 meteorological/ hydro-meteorological 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.

JCWR headed by Water Resource Secretaries of both countries has been functioning with the mandate to act as an umbrella Committee for all committees and groups. In order to prevent spilling of flood waters from Lalbekeya, Bagmati, Khando and Kamla rivers from Nepal side into Bihar, India and Nepal have agreed to extend the embankments along these rivers. Financing of works in Nepal is done through

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 of the decision taken during the 4th meeting of the India-Nepal Joint JCWR held on 12-13 March, 2009 Joint Committee on Inundation and Flood Management (JCIFM) with Member(C), GFCC, Patna as Team Leader from India side was constituted replacing erstwhile bilateral committees namely, Standing Committee on Inundation Problem (SCIP), Standing Committee on Flood Forecasting (SCFF), High Level Technical Committee (HLTC), Sub Committee on Embankment Construction (SCEC), Joint Committee on Flood Management (JCFM). The JCIFM has met 7 times so far and the last meeting was held on 19-24 March, 2013 at Kathmandu, Nepal.

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 been set up in Nepal for investigation of the projects. DPR stage design engineering for these projects is to be carried out by Central Water Commission. Preliminary studies of Sapta Kosi High Dam Multipurpose Project envisages construction of a 269 m high dam to divert river waters through a dam toe power house with an installed capacity of 3000 MW (at 50% load factor) and irrigation of 15.22 lakh ha. gross Command Area through construction of a barrage, 1 km downstream of the dam. An additional capacity of 300 MW is further contemplated by construction of three canal type power houses along the canal system. Based on the preliminary studies carried out so far, four alternatives proposals for present study by JPO/SKSKI have been selected for Sun Kosi Storage-cum-Diversion Scheme. An optimal option amongst the four alternatives is required to be investigated in detail. CWC has furnished the investigation stage layout for power house related components and has also provided alternative barrage alignment.

II. Pancheshwar Multipurpose Project

A Treaty on Integrated Development of Mahakali (Sharda) River including Sharda Barrage, Tanakpur Barrage and Pancheshwar Multipurpose Project was signed between Government of India and Government of Nepal in February 1996, which came into force in June, 1997 (Mahakali Treaty). The Treaty is valid for a period of 75 years. Pancheshwar Multipurpose Project is the Central piece of Mahakali Treaty. Required field investigations for the Pancheshwar Multipurpose Project having an installed capacity of 5600 MW at Pancheshwar with irrigation and incidental flood control benefits and a re-regulating structure to primarily meet irrigation requirements downstream in Uttar Pradesh, have been completed. The Detailed Project Report (DPR) is to be finalized after mutually resolving the pending issues. During the 5 th meeting of JCWR held on 20-22 November, 2009 at Pokhara, Nepal, the Committee finalized the TOR of Pancheshwar Development Authority (PDA) and discussed several issues pertaining to PDA. The Indian side again reiterated its request to the Nepalese side to provide sufficient security arrangements at all sites, so that the investigations may be resumed immediately. As per the finalized TOR of PDA, it was agreed that Chief Executive Officer (CEO) will be appointed from India or Nepal and the Headquarter of PDA would be located at Mahendranagar (Nepal).

13.4.3 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 six times. The last meeting was held at Bejing on 17-20 July, 2012.

13.4.4 Cooperation with Bangladesh

In order to ensure the most effective joint effort in maximizing the benefits from common river systems an Indo-Bangladesh Joint Rivers Commission (JRC) is functioning since 1972, which is headed by Water Resource Ministers of both the countries. So far, 37 meetings of JRC have been held and its last meeting was held in March, 2010. As per the provision of the Treaty, signed by the Prime Ministers of India and Bangladesh on 12 th December 1996 for the sharing of Ganga/Ganges waters, a Joint Committee has been set up for implementing, joint inspection and monitoring of the sharing arrangements at Farakka in India and at Hardinge Bridge in Bangladesh for the dry season (Jan to May) every year. Under bilateral arrangements, India provides the flood data of Farakka for Ganga and flood data of Pandu, Goalpara and Dhubri for Brhamaputra and Silchar for Barak during monsoon period to Bangladesh for use by their flood forecasting and warning arrangements besides data of river Teesta, Manu, Gumti, Jaldhaka and Torsa etc. The transmission of flood forecasting information from India during the monsoon which is being supplied free of cost, has enabled the civil and military authorities in Bangladesh to take precautionary measures and shift the population affected by flood to safer places. In addition to above, India has agreed to provide flood data of above sites to Bangladesh on continuous basis for use of data in development of flood forecasting models by Bangladesh.

13.4.5 Cooperation with Bhutan

A scheme titled "Comprehensive Scheme for Establishment of Hydro-meteorological and Flood Forecasting Network on rivers common to India and Bhutan" is in operation since 1979. The network consists of 33 hydro-meteorological/ meteorological stations located in Bhutan maintained by Royal Government of Bhutan (RGoB) with funding from India. Central Water Commission utilizes the data received

from these stations for formulating the flood forecast. A Joint Team of Experts (JTE) consisting of officials from the Government of India and Royal Government of Bhutan regularly reviews the progress and other requirements of the scheme. The 26 Th meeting of the Joint Expert Team (JET) between Government of India (GOI) AND Royal Government of Bhutan (RGoB) to oversee and review the comprehensive scheme for establishment of Hydro-Meteorological and Flood Forecasting Network on rivers common to India and Bhutan was held at Guwahati, India from 5-6 March, 2011.

The matter relating to problem of floods created by the rivers originating from Bhutan and coming to India was taken up with the Royal Government of Bhutan. A Joint Group of Experts (JGE) on Flood Management has been constituted between India and Bhutan to discuss and assess the probable causes and effects of the recurring floods and erosion in the southern foothills of Bhutan and adjoining plains in India and recommend appropriate and mutually acceptable remedial measures to both Governments. The India side of JGE is headed by Commissioner (B&B), MOWR. The JGE has meet 4 times so far and the last meeting was held on 27-28 February, 2012 at New Delhi.

13.4.6 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 is being sent to Pakistan every month. Flood flow data for agreed sites on the rivers Ravi, Sutlej, Tawi and Chenab is 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.

CHAPTER-XIV

WATER RESOURCES DATA MANAGEMENT

14.1 Water Resources Information System (WRIS)

Under the plan scheme 'Development of Water Resources Information System' in the 11th Plan, CWC and ISRO has jointly undertaken the work of developing web-enabled Water Resources Information System (WRIS) for which MoU was signed in December 2008. The project comprises of several GIS layers on water resources projects, thematic layers like major water bodies, land use/land cover, waste lands, land degradation etc., environmental layers as well as infrastructure and other administrative layers at a scale of 1: 50000. The First full version of website of INDIA WARIS was launched on 7th December 2010 by Hon'ble Minister Water Resources. Subsequently, the 2nd version was launched by Chairman, CWC on World Water Day i.e. 22nd March,2012. Further, development of Information System is under progress.

The following are the main achievements during the year 2012-13.

(i) River Basin Atlas of India was released by Hon'ble Union Minister (MoWR) on 1st November 2012 at New Delhi.
(ii) The updated version i.e. 3rd version (which includes Live telemetry data in respect of CWC hydrological stations, Mobile Application version 1.0 for Android platform, Climate Trend analysis, 2D-3D linked view) has been launched by Hon'ble Union Minister (MoWR) on 4th December 2012.

The URL of the website is www.india-wris.nrsc.gov.in.

14.2 Computerisation Activities in CWC

Software Management Directorate of CWC is operating the Plan Scheme Component "Data bank & Information System-Upgradation and Modernization of I.T. in CWC" costing Rs. 105 Crore which is part of Plan Scheme "Development of Water Resources Information System" for XII Plan" costing Rs. 2247 Crore. In the course of operation of the plan scheme, SMD has procured hardware, software and networking items. It has

also provided for maintenance of IT items at CWC Hq. In the financial year 2012-13, 247 Nos of old computers were upgraded, 10 Nos of network license of Auto CAD were installed and training was conducted. Finite Element software Abaqus, Math CAD, ArcGIS were also procured and installed. Training and conference halls were upgraded with interactive boards and projectors.

14.3 Hydrological Data

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

- Description of Different River Basins,
- Gauge & Discharge details of Water at different locations of River Basins,
- Sedimentation Statistics,
- Water Quality Statistics
- Land Use Statistics

The publication for the year 2012 containing data up to 2009-10 was up-loaded on the website of CWC.

14.4 Water and Related Statistics

A publication titled 'Water and Related Statistics' is brought out by CWC which interalia 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 containing data upto August 2010 has been published and action for updation of the same has been initiated during the year.

14.5 Financial Aspects Flood Control Anti-sea erosion and Drainage Projects

This publication contains information on financial aspects of Flood Control, anti-sea erosion and drainage projects as available in the Finance Accounts of the Union and State Governments brought out by the CAG and Accountant Generals of respective States.

The present publication containing the following information for the period from 1998-99 to 2010-11 at State and UT level has been drafted:

- Financial & Physical performance of flood control and drainage projects.
- Distribution of Capital expenditure by Minor Head Accounts and State.
- Distribution of total (Revenue+Capital) by Minor Head of Accounts and State.

CHAPTER-XV

TRAINING

15.1 Training

One of the important functions of Central water Commission is capacity building of the professionals as well as non-professionals associated with Water resources sector. In order to impart knowledge and develop technical and managerial skills of in-service officers of CWC and other Central/State Govt. Departments and their Organisations, CWC arranges and co-ordinates training programmes/seminars/ workshops in water related fields. CWC accomplishes this objective through a dedicated unit at HQ and a full fledged training institute namely, National Water Academy (NWA) at Pune. Officers of CWC are also deputed to various programmes including seminars, conferences, workshops etc., held both within and outside the country. Further, CWC provides support to other professional organisations and societies and co-sponsors some of the National level seminars, conferences, workshops etc. It 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.

15.2 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 and 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 programs 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. In addition, the academy is one of the nodal agencies for conducting training programmes under World Bank aided Hydrology Project. Induction training to Assistant Directors recruited through UPSC (CWES-Gr A) and for newly promoted Asstt. Directors of CWC are also conducted by National Water Academy at Pune.

During the year 2012-13, in all 33 number of training programmes including Workshop/Seminar have been conducted. This include regular training programs of NWA, programs conducted under Hydrology Project-II, programs conducted in association with World Mateorological Organisation, programs sponsored by ISRO etc. During the year 787 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 1322. ITP for newly promoted Asst Directors of CWC has been conducted during 8th May to 7th September in the year 2012-13.

Out of 33 training programmes conducted by NWA, following programmes/ Workshops were introduced for the first time.

a) Water Conservation Day – Water Conservation Day was celebrated on 19th November 2012 at NWA. On this occasion, various activities by NWA were undertaken in order to create awareness regarding the conservation of water e.g. organizing Drawing and Painting Competition on "Water conservation" for school going children, special session involving all stakeholders like farmers, Panchayats, Media, Women folk, citizens, school children etc.

b) Training Program on "Increasing Water Use Efficiency (WUE) in Irrigation Sector under National Water Mission (NWM)" was conducted at NWA during 21st January 2013 to 1st February 2013. 16 officers from various organisations attended this program. A two day training at WALMI, Aurangabad was also arranged during 24-25 January 2013.

c) Training Program on "Basics of Hydro Electric Projects" was conducted at NWA during 25th February to 1st March 2013. 32 officers from various organisations participated in this program.

d) Training Program on "Application of MATLAB" was conducted at NWA during 4-6 March 2013. 23 officers from various organisations participated in this program.

e) Training Program on "Telemetry" was conducted at NWA during 19-21 March 2013. This program was conducted under HP-II funds. 26 officers from various organisations participated in this program.

f) Water Resources Department, Govt. of Kerala requested Central Water Commission to train their engineers in assessing the water yield of the basins and up to date their publication "Water Resources of Kerala – 1974" using Geospatial tools and latest techniques.

15.2.1 Infrastructure Development during the year 2012-13

a) The work of construction of swimming pool was completed and the swimming pool was inaugurated by Chairman, CWC on 21st July 2012.

b) The construction work of office annexe building consisting of 2 lecture halls and a computer lab is near completion. The finishing work is going on. Similarly the construction work of extension of Krishna Guest House consisting of 14 suites and dining hall is also near completion and the finishing work is going on in full swing.

Various training courses, workshops and seminars organized by Training unit of CWC and by NWA, Pune during 2012-13 are given at **Annexure -15.1** & **Annexure -15.2** respectively.

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 2012-13, 22 complaints were received and taken up for investigation. Final decision was taken in respect of 12 cases. In respect of 3 cases out of 12, 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 (LDC/UDC)	Gr. D (MTS)
a)	No. of cases pending at the beginning of the year	20	15	10	5
b)	No. of cases added during the year	14	06	02	0
c)	No. of cases disposed of during the year	09	02	01	0
d)	No. of cases pending at the end of the year (a+b-c)	25	19	11	5

Out of the above, 4 cases have been forwarded to MOWR. Vigilance Awareness Week was observed at CWC headquarters from 29th October to 3rd November, 2012.

CHAPTER-XVII

REPRESENTATION OF CENTRAL WATER COMMISSION IN VARIOUS COMMITTEES

17.1 Committees Represented by CWC Officers

Chairman, Central Water Commission and Members represent CWC in Technical Committees of various Organisations either as the Chairman or as a Member. List of various Committees on which Chairman, CWC and Member (D&R), CWC represent are 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 of National Water Development Agency	Chairman, CWC Member (WP&P) Member (D&R)	Chairman Member Member
2.	Science and Technology Advisory Committee (STAC-MOWR)	Chairman, CWC	Member
3.	Water Resources Division Council (WRDC) of BIS	Chairman, CWC	Chairman
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.	Working Group of National Water Board	Chairman, CWC Member (WP&P)	Chairman Vice-Chairman
8.	Selection Committee for i) JAIN-INCID Sookshma Sinchai Puraskar ii) JAIN-INCID Krishi Sinchai Vikas Puraskar	Chairman, CWC	Chairman
9.	Executive Committee of Betwa River Board	Chairman, CWC Member (WP&P)	Chairman Member
10.	Executive Committee of Bansagar Control Board	Chairman, CWC Member (WP&P)	Chairman Member
11.	Committee of International Commission on large dams, India	Chairman, CWC	Vice President

Sl. No.	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
12.	Regulation Committee of Bansagar Reservoir	Chairman, CWC Member (WP&P)	Chairman Vice Chairman
13.	Advisory Board of NWA, Pune	Chairman, CWC Member (WP&P)	Chairman Member
14.	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
15.	Governing Council for Central Soil & Materials Research Station, New Delhi.	Chairman, CWC	Member
16.	Governing Council for the Central Water and Power Research Station, Pune	Chairman, CWC	Member
17.	Technical Advisory Committee to the Governing Council for Central Water and Power Research Station, Pune.	Chairman, CWC	Chairman
18.	National Institute of Hydrology Society	Chairman, CWC Member (D&R)	Member Member
19.	Governing Body of National Institute of Hydrology	Chairman, CWC	Member
20.	Monitoring Committee for the National River Conservation Plan (NRCP)	Chairman, CWC	Member
21.	Steering Committee of National River Conservation Plan (NRCP)	Chairman, CWC	Member
22.	Water Quality Assessment Authority (WQAA)	Chairman, CWC	Member
23.	High Powered Review Board of Brahmaputra Board	Chairman, CWC Member (RM)	Member Permanent Invitee
24.	Farakka Barrage Control Board	Chairman, CWC	Member
25.	Sardar Sarovar Construction Advisory Committee	Chairman, CWC Member (WP&P)	Member Invitee
26.	Society of National Water Development Agency	Chairman, CWC Member (D&R) Member (WP&P)	Member Member Member
27.	Governing body of National Water Development Agency	Chairman, CWC Member (D&R) Member (WP&P)	Member Member Member
28.	National Water Board (NWB) of the National Water Resources Council	Chairman, CWC Member (WP&P)	Member Member-Secretary
29.	High Powered Committee (HPC) on Maintenance of Minimum Flow of River Yamuna	Chairman, CWC	Member
30.	Cauvery Monitoring Committee (CMC)	Chairman, CWC	Member

Sl. No.	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
31.	Standing Committee on Water Resources (SC-W) of Planning committee of National Natural Resources Management System (PC-NNRMS) of Planning Commission	Chairman, CWC	Member
32.	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
33.	Ganga Flood Control Board	Chairman, CWC	Invitee
34.	Narmada Control Authority	Chairman, CWC	Invitee
35.	Review Committee of Narmada Control Authority	Chairman, CWC	Invitee
36.	Upper Yamuna River Board	Member (WP&P)	Chairman
37.	National Environmental Monitoring Committee	Member (WP&P)	Chairman
38.	Joint Operation Committee for Rihand Dam	Member (WP&P)	Chairman
39.	Sub-Committee for processing tenders and proposals for purchase of stores & equipments of Bansagar Control Board	Member (WP&P)	Chairman
40.	Technical Advisory Committee on Socio-Economic, Agro-economic and Environmental Impact studies	Member (WP&P)	Chairman
41.	Screening Committee for selection of arbitrators on Arbitration Boards.	Member (WP&P)	Chairman
42.	Standing Project Appraisal Committee of Central Water Commission	Member (WP&P)	Chairman
43.	Task Force for Flood Management in the country (North Western Region)	Member (WP&P)	Chairman
44.	Upper Yamuna Review committee	Member (WP&P)	Member-Secretary
45.	Standing Committee for overall National Perspective Water Planning and Coordination in relation to diverse use of water	Member (WP&P)	Member
46.	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
47.	Committee for Eastern River Waters of Indus System of River	Member (WP&P)	Member
48.	National Watershed Committee	Member (WP&P)	Member
49.	High Powered Committee-Yamuna Action Plan of Ministry of Environment and Forests	Member (WP&P)	Invitee
50.	Working Group to advise WQAA on the minimum flow in the rivers	Member (RM)	Chairman
51.	Setting up of HISMG (Technical) for Implementation of the World Bank assisted Hydrology Project Phase –	Member (RM)	Chairman

Sl. No.	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
	II.		
52.	Steering Committee for the Preparation of Status Report on Water Resources requirements and its availability for Urban Areas	Member (RM)	Chairman
53.	Flood Control Board set up by the Irrigation and Flood Control Department of Govt. of NCT of Delhi	Member (RM)	Chairman
54.	Committee for Flood Control Works in Brahmaputra Valley	Member (RM)	Chairman
55.	Standing Committee to Brahmaputra Board	Member (RM)	Chairman
56.	Kosi High Level Committee	Member (RM)	Chairman
57.	Damodar Valley Reservoir Regulation Committee	Member (RM)	Chairman
58.	High Level Committee to Study the Regulation of Releases from various Hydro-Electric Projects Constructed Along Teesta	Member (RM)	Chairman
59.	Committee to study Erosion Problem of Bhutani Diara (West Bengal) and Majauli Island (Assam)	Member (RM)	Chairman
60.	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
61.	Standing Technical Advisory Committee (STAC) to the Governing Council for CSMRS, New Delhi.	Member (D&R)	Chairman
62.	Governing Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
63.	Research Advisory Committee (RAC) of National Council for Cement and Building Materials.	Member (D&R)	Member
64.	National Committee on Seismic Design Parameters of River Valley Projects (NCSDP)	Member (D&R)	Chairman
65.	Standing Advisory Committee (SAC) for R&D Programme	Member (D&R)	Chairman
66.	National Level Steering Committee (NLSC) for Dam Rehabilitation and Improvement Project (DRIP)	Member (D&R)	Member
67.	Technical Committee (TC) for Dam Rehabilitation and Improvement Project (DRIP)	Member(D&R)	Chairman
68.	Technical Advisory and Review Committee (TARC) for preparation of PMP Atlas	Member (D&R)	Chairman
69.	World Meteorological Organization	Member (D&R)	Principal Representative
70.	Board of Directors of Tehri Hydro Development Corporation	Member (D&R)	Part Time Director
71.	Committee to access Quantum on Excess River Water Flowing Across International Boarder and suggest its diversion	Member (D&R)	Chairman

Sl. No.	Name of Committees/Boards/Panel of Experts/Technical Groups, etc.	Representation of CWC	
		Officer	Position in the Committee
72.	Technical Advisory Committee of the Farakka Barrage Project.	Member (D&R)	Chairman
73.	Committee of CEA to accord of techno-economic appraisal of Power Schemes.	Member (D&R)	Permanent Special Invitee
74.	Indian Meteorological Department (IMD)	Member (D&R)	Hydrological Advisor
75.	Tender Committee of Farakka Barrage Project	Member (D&R)	Chairman
76.	Programme Advisory Committee (PAC) for Fly Ash Unit constituted by Department of Science and Technology	Member (D&R)	Member
77.	Committee to finalize the Action Plan on full utilization of Eastern River flowing across international Boarder	Member (D&R)	Chairman
78.	Farakka Barrage Project Advisory Committee	Member (D&R)	Co-Chairman
79.	Board Meeting of Punatsangchhu-I H.E. Project Authority (PHPA)	Member (D&R)	Permanent Invitee
80.	Technical Coordination Committee (TCC) for Punatsangchhu-I H.E. Project Authority (PHPA)	Member (D&R)	Co-Chairman

17.2 Activities of Some Important Committees for R&D

17.2.1 Indian National Committee on Surface Water (INCSW)

The Indian National Committee on Surface Water (INCSW) is recently constituted by merging functions/works of 4 earlier INCs (i.e., INCID, INCOH, INCH and INCGECM). INCSW is headed by Chairman, CWC, Chief Engineer, EMO, CWC is Member Secretary and there are 13 members representing MoWR/CWC, CSMRS, CWPRS, NIH, DST, Min.of Agr., WALMIs, IIT, NGOs etc. INCSW's main objective is to promote research work in the field of Water Resources Engineering (Surface Water aspect) by providing financial assistance by way of grants to academicians/experts in the Universities, IITs, recognised R&D laboratories, Water Resources/ Irrigation departments of the Central and State Governments and NGOs under R&D Programme of Ministry of Water Resources (MoWR).
Following major tasks were undertaken by INCSW during 2012-13:

- Compiling details of over 70 ongoing research schemes covering the funds released, Utilisation Certificate (UC) received, annual reports submitted, milestone achieved, present status etc. of each research scheme.

- Processing the service requests in respect of aforesaid research schemes and recommending the same to MoWR for further necessary action.
- Processed 9 nos. of new R&D proposals as per R&D Guidelines of MoWR.
- Organised 1st meeting of the Indian National Committee on Surface Water (INCSW) on 6th December 2012 at New Delhi.
- The process of nomination for Jain INCID Award 2012, scheduled to be awarded during India Water Week 2013 in April 2013, initiated and finalised.
- 1st R&D session of the Indian National Committee on Surface Water (INCSW) was convened on 19 March 2013 at New Delhi.

17.2.2 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. 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.

17.3 Activities of Some Other Important Committees

17.3.1 Technical Advisory Committee of NIH

The research programmes and other technical activities of NIH are monitored and guided by Technical Advisory Committee of NIH headed by Chairman, CWC. Member (D&R) and Chief Engineer, Hydrological Studies Organization are its Members.

TAC gets feedback from 3 Working Groups on Surface Water, Ground Water and Hydrological Observation and Instrumentation. Chief Engineer, HSO and Chief Engineer, BPMO are the Members of the Surface Water Group and Chief Engineer (P&D) is the Member of the Hydrological Observations and Instrumentation Group. The 65th meeting of TAC was held on 14.05.2012 at New Delhi.

17.3.2 Technical Advisory Committee of Farakka Barrage Project

The TAC of Farakka Barrage Project is headed by Member (D&R), CWC, which generally meets once every year and takes decisions about various works to be executed for efficient and safe functioning of the project. Various problems, special studies and related design work were referred to D&R wing from time to time. Member (D&R) held discussions with the Farakka Barrage Project authorities from time to time and chaired the Technical Advisory Committee meeting of Farakka Barrage Project. The jurisdiction of Farakka Barrage Project has also been extended 40 Km on upstream and 80 Km on downstream of Farakka Barrage for carrying out the erosion protection works of River Ganga. The emergent TAC meeting of Farakka Barrage Project headed by Chairman, TAC of FBP & Member, D&R, CWC was held on 21.09.2012 at Farakka (W.B.). 108th meeting of TAC of FBP was held from 5th to 8th March 2013 at Farakka, West Bangal.

17.4 Association with Bureau of India Standards (BIS)

Central Water Commission being an apex technical body in the water resources sector, has been playing an important role in the formulation of standards in the field of Water Resources Development and management and allied areas through its participation in activities of Water Resources Division (WRD) and Civil Engineering Division (CED) of the BIS. The Chairman, Central Water Commission is presently the Chairman of Water Resources Division Council (WRDC).

CWC is represented by its officers of the rank of Chief Engineer and Director in the 17 Sectional Committees of WRDC and 13 Sectional Committees of CEDC.

During the year 2012-13, 16 draft standards and 4 amendments to IS Codes have been approved by the Chairman, CWC for adoption and printing. 15th Meeting of WRDC was held on 12.07.2012.

17.5 Formulation of 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. 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.

17.6 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. CWC is associated with various activities of ICID.

17.7 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.

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.

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 3656 numbers composed pages and 85,121 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. which were completed during the period from 01.04.2012 to 31.03.2013. 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 2011-2012 (English)	TC Dte.	155	300
2.	Compendium of Important Orders/Advisories (July 2010 to May 2012)	O & M	130	500
3.	Agenda Note for 14th Meeting of National Water Board of National Water Resources Council	NWP Dte.	36	200
4.	Hand Book for Flood Protection, Anti Erosion & Training Works	FMO Dte.	145	1000
5.	Summary Record of the Fourteenth Meeting of the National Water Board of NWRC	NWP Dte.	40	150
6.	Details of CWE (Gr. A) Service Officers as on 1.1.2012	Estt. 1 Section	26	200

7.	Summary Record of Discussions of the Meeting (1st to 26th) of Ghaggar Standing Committee	FM-1 Dte.	138	100
8	Bhagirath (English) 2 No. Issues January – March, 2012 April – June, 2012	Editor Bhagirath (English) Publicity Section	104	2300 each
9	Bhagirath (Hindi) 3 No. Issues January - March, 2012 April – June, 2012 July – Sept., 2012	Editor Bhagirath (Hindi)	172	2300 each
10.	Procedure and Time Schedule for Processing Pension Cases	Estt. IV	12	200
11.	Regular Pension Papers	Estt. IV	20	4700
12.	All Forms used in A/c's Sections	A/c Sections	16	25000

In addition following items of regular nature were also printed and published. :

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

18.2 Journals

CWC publishes 'Bhagirath' a quarterly semi-technical journal, both in English and in Hindi separately. Bhagirath (English) Journal upto April-June 2012 and Bhagirath (Hindi) Journal up to July-September, 2012 were printed.

In addition, 'Administrative News Bulletin' on monthly basis was prepared during the year 2012-2013 and uploaded on CWC website.

18.3 Azo Prints

Nearly 3340 number of Azo prints were developed from the tracings of drawings / documents pertaining to various Directorates of CWC / MOWR at Ferro-printing Unit of CWC.

18.4 Publicity and Mass Awareness

As per Media Plan 2012-13 of Ministry of Water Resources, CWC participated in the following fair/exhibitions:

- India Water Week - 2012 at New Delhi from 10th to 14th April 2012.
- India International Trade Fair (IITF)- 2012 at Pragati Maidan, New Delhi from 14th to 27th November, 2012.
- 100th Indian Science Congress - 2013 at Kolkata from 3rd-7th January, 2013.
- Water Ex World Expo – 2013 at Mumbai from 15th-18th January, 2013.

Annexure – 5.1

List of Active Consultancy Projects in D&R Wing during the Year 2012-13

Sl. No.	State/ name of projects	Sl. No.	State/ name of projects
	Andaman & Nicobar Islands		**Jharkhand**
1	Kamsarath Water Supply Scheme (Const.)	19	Kharkai Barrage Project (Const.)
	Arunachal Pradesh	20	Kanhar Irrigation Project
2	Nuranang Chu(DPR)		**Karnataka**
3	Nao Dehing HE Project(DPR)	21	Shivasamundram Run of River Project (Const)
4	Kameng H.E. Project (Const.)		**Madhya Pradesh**
	Assam	22	Harsi High Level Canal (Const.)
5	Amjur Drainage Development Scheme(Const.)	23	Lower Goi Project (Const.)
6	Rukini Irrigation Project	24	Bargi Diversion Project (Const.)
7	Sonai Irrigation Project	25	Jobat Project. (Const.)
8	Barbhag Drainage Development Scheme(Const.)	26	Chinki Multi-purpose Project (DPR)
	Bihar	27	Barna Irrigation Project
9	Durgawati Reservoir Project (Const.)	28	Pench Diversion storage Project
	Chhattisgarh	29	Pench Valley Project
10	Kelo Irrigation Project	30	Gulab Sagr (Mahan) project
	Goa	31	Ken Betwa Link Project Phase-II
11	Opa Barrage Project (Const.)	32	Raghavpur – Rosara – Basania (RRB) Multi-purpose Project (DPR)
	Gujarat	33	Upper Beda Project(Const.)
12	Garudeshwar Weir Project (Const.)	34	Man Project(Const.)
13	Kalubhar water resources project (DPR)	35	Halon Project(Tender)
	Himachal Pradesh	36	Upper Narmada Project(Tender)
14	Rampur H. E. Project (Const.)	37	Ataria Irrigation Project(DPR)
15	Luhri H. E. Project (Const.)	38	Dudhi Project(DPR)
16	Sainj HE Project (DPR)	39	Morand-Ganjal Complex Irrigation Project(DPR)
	Jammu & Kashmir		
17	Ujh Multipurpose Project (DPR)	40	Shakkar-sher-Machchrewa MP Project(DPR)
18	Kirthai II HE Project	41	Birsinghpur Dam & PH (Remedial Measure)
		42	Bansagar Project Power House II(Remedial Measure)

43	Tons HE Project PH II (Remedial Measure)		
	Manipur		**Sp. Problem Projects**
44	Dholaithabi barrage Project (Const.)		**Andhra Pradesh**
45	Khuga M.P Project(Const.)	1	Srisailam Left Bank H. E. Project (Const.)
46	Thoubal M.P. Project (Const.)		**Arunachal Pradesh**
	Meghalaya	2	Lower Subarasiri Project
47	New Umtru H.E. Project (Const.)		**Himachal Pradesh**
48	Ganol HE Project(Const.)	3	Kol Dam Project
49	Kulsi HE Project(DPR)		**Jammu & Kashmir**
50	Myntdu HE Project Stage-II(DPR)	4	Kishanganga HE Project (Const.)
51	Killing Dam Project(DPR)	5	Tulbul Navigation Project
	Mizoram	6	Bursar storage Project, J&K.
52	Turial H.E. Project (Const.)	7	Nimboo Bazgo H E Project
53	Tuichyang HE Project(DPR)		**Madhya Pradesh**
54	Tuipui HE Project(DPR)	10	Kushalpura Dam Project
	NPCIL(A.P & Gujarat)		**Uttrakhand**
55	Estimation of design flood and safe elevation of Nuclear Power Station	11	Loharinag Pala HEP (600 MW)(completed)
	Orissa	12	Koteshwar HEP (400 MW)
56	Anandpur Barrage Project (Const.)	13	Srinagar HE Project (completed)
57	Rangali Irrigation Project.		**Foreign Projects**
58	Lhasi Medium irrigation project (Const.)		**Myanmar**
	Uttar Pradesh	1	Shwezaye H. E. Project (Const.)
59	Arjun Sahayak Pariyojna (Const.)		**Afghanistan**
	Uttarakhand	2	Salma Dam Project(Const.)
60	Tapovan Vishnugad Project - NTPC (Const.)		**Bhutan**
61	Rangali Irrigation Project.	3	Punatsangchu Stage-I HE Project (Const.)
	Rajasthan	4	Punatsangchu Stage-II H.E. Project (Const.)
62	Gararda Dam Project	5	Chukha H.E. Project (Completed).
	Sikkim		**Nepal**
63	Stntaley HE Project(DPR)	6	Sapta Kosi & Sunkosi Multipurpose Project (DPR)
64	Kalezkhola HE Project(DPR)		**Tajikistan**
	West Bengal	7	Varjob-I HE Project (Const.)
65	Turga Pumped Storage (Const.)		**Kerala**
66	Farakka Barrage Project.	8	Mulla Periyar Dam
67	Par-Tapi-Narmada link Project (DPR)	9	Mulapuzah
68	Damanganga - Pinjal link Project (Const.)		

Annexure-7.1

List of the projects accepted by the Advisory Committee during 2012-13

Sl. No.	Project Name	Name of the State	Major/ Medium	Est. Cost Rs. crore	Benefits in ha
1	Andhra Pradesh Irrigation and Livelihood Improvement Project	Andhra Pradesh	Major - ERM	1131.136 (Pl 2010-11)	114,878
2	Restoration of Western Gandak Canal System, (Saran Main Canal &Its Distribution System)	Bihar	New - Major - ERM	2169.51 (PL -2011-12)	478,000
3	Minimata (Hasdeo) Bango Project	Chhattisgarh	Major - ERM	492.31 (PL- 2011-12)	45,116 Restoration
4	Medium Irrigation Project to Nadaun Area in Tahsil - Nadaun, District - Hamirpur	Himachal Pradesh	Medium -New	97.59 (PL-Jun,2011)	6,471
5	Mahuar Medium Irrigation Project	Madhya Pradesh	New - Medium	191.2707 (PL-2009)	13,775
6	Bilgaon Irrigation Project	Madhya Pradesh	New - Medium	182.22 (PL-2009)	12,285
7	Thoubal Multipurpose Project	Manipur	Revised - Major	1387.85 (PL-2011)	33,387
8	Khuga Multipurpose Project	Manipur	Revised- Medium	433.91 (PL-2011)	14,755
9	Dolaithabi Barrage Project	Manipur	Revised- Medium	360.05 (PL- 2011)	7,545
10	Imphal Barrage Project	Manipur	ERM- Medium	16.8 (PL- 2011)	6,400
11	Sekmal Barrage Project	Manipur	ERM- Medium	10.20 (PL-2011)	8,500
12	Revised Estimate of Rehabilitation of 1st Patiala Feeder & Kotla Branch with 20% enhanced capacity and changed value of "N"	Punjab	Revised- Major	199.39 (PL-2011-12)	334,109
13	Construction of Lining of Tumaria-Bahalla & Naktiya Feeder	Uttarakhand	ERM- Medium	11.2 (PL-2010-11)	7,890 Restoration 2,054 and Add. Creation10 ha
14	Anti erosion works from km 0.650 of Retired bund -1 of Sakraur Bhikharipur Ring bund to km 13.600 of Main bund of Sakraur Bhikharipur along left bank of river Sarayu/Ghaghra in Gonda district	Uttar Pradesh	Flood Control	41.51 (PL- 2010)	2675 ha, Population 18430
15	Construction of Marginal Embankment upstream of Elgin bridge along right bank of river Ghaghra in the district of Barabanki	Uttar Pradesh	Flood Control	170.08 (PL-2010)	44,250 ha, Population 334680

16	Flood protection works along left benk of river Ghaghra in the disrict of Basti	Uttar Pradesh	Flood Control	80.24 (PL-2010)	24743 ha, Population 496480
17	ERM of Malan Canal System	Uttarakhand	ERM- Medium	11.40 (PL-2010-11)	3984 ha (Restoration 753 ha and Additional creation 41 ha)
18	Lakhwar Multipurpose project	Uttarakhand	Multipurpose	3966.51 (PL- May 2012)	33,780
19	Protection of Brahmaputra dyke from Sissikalghar to Tekeliphuta at different reaches from Lotasur to Tekeliphuta from the erosion of river Brahmaputra (review)	Assam	Flood control	155.87 (PL 2011-12)	Area protected = 10117 ha & Population 5,00,000
20	Delija Dewada Medium Irrigation project	Madhya Pradesh	NEW Medium - ERM	17.49 (PL 2009)	7200 (Restoration 3600)
21	Anandapur Barrage project (Phase -II) of Odisha (Integrated Anandapur Barrage Project)	Orissa	Major -Revised	1457.63 (PL 2010-11)	56,720
	Salandi Sanskar Project of Odisha (Integrated Anandapur Barrage Project).	Orissa	Major -Revised	145.77 (PL 2010-11)	Annual irrigan=7822 ha, Area protected = 250000 ha & Population 13,50,000
22	Madhya Ganga Canal project Stage -II	Uttar Pradesh	Major -Revised	2865.11 (PL 2011)	1,46,532
23	River Training works (Marginal Bunds & Studs) for protection of population and Agriculture Land , situated along both banks of River Solani of villages Rampur , Ibrhimpur , Solanipuram, Jamalpur etc in district Haridwar.	Uttarakhand	Flood control	33.19 (PL 2012-13.)	Area protected = 475 ha & Population 40,000

Annexure-7.2

Present status of projects declared as National Projects

Sl. No.	Name of the Project	State	1) Irrigation (ha.) 2) Power (MW) 3) Storage (MAF)	Year-wise Central Assistance released under Scheme of National Project (` crores)
1	Gosikhurd	Maharashtra	1) 2.50 lakh 2) 3 MW 3) 0.93 MAF	2008-09(450.00) 2009-10(720.00) 2010-11(1412.94) 2011-12(NIL) 2012-13(405.00) Total= 2987.94
2	Shahpur Kandi	Punjab	1) 0.37 lakh 2) 168 MW 3) 0.012MAF	2009-10(10.80) 2010-11(15.236) 2011-12(NIL) 2012-13(NIL) Total= 26.036
3	Teesta Barrage	West Bengal	1) 9.23 lakh 2) 1000 MW 3) Barrage	2009-10(NIL) 2010-11(81.00) 2011-12(97.20) 2012-13(NIL) Total= 178.20
4.	Renuka	HP	1) Drinking water 2) 40 MW 3) 0.44 MAF	-
5.	Lakhwar Vyasi	Uttarakhand	1) 0.49 lakh 2) 420 MW 3) 0.325 MAF	-
6.	Kishau	HP/ Uttarakhand	1) 0.97 Lakh 2) 600 MW 3) 1.04 MAF	-
7	Ken Betwa	Madhya Pradesh	1) 6.46 lakh 2) 72 MW 3) 2.25 MAF	-
8	Bursar	J&K	1) 1 lakh (indirect) 2) 1230 MW 3) 1 MAF	-
9.	Gyspa project	HP	1) 0.50 lakh ha 2) 240 MW 3) 0.6 MAF	-
10	2nd Ravi Vyas Link	Punjab	Harness water flowing across border of about 3 MAF	-
11.	Ujh multipurpose project	J&K	1) 0.32 lakh 2) 280 MW 3) 0.66 MAF	-
12.	Kulsi Dam Project	Assam	1) 23,900 ha. 2) 29 MW	-

			3) 0.28 MAF	
13.	Noa-Dehang Dam Project	Arunanchal Pradesh	1) 8000 ha. 2) 75 MW 3) 0.26 MAF	-
14.	Upper Siang	Arunanchal Pradesh	1) Indirect 2) 9500 MW 3) 17.50 MAF 4) Flood moderation	-
15	Saryu Nahar Pariyojna	Uttar Pradesh	1) 4.86 lakh (additional) 2) - 3) Barrage	2012-13 (67.98)

Annexure-7.3

Physical & Financial Progress of ongoing National Projects

Sl. No.	Name of Project	Total Estimated Cost (`. In Crore)	Total Potential (In Lakh ha.)	Cumulative potential created (in Lakh ha)	Potential created under National Project (in Lakh ha)	Total Expenditure on Project (` in Crore)	Expenditure incurred under National Project (`. In Crore)	Central Assistance released under National Project up to March, 2013 (`. In Crore)	Balance Cost (`in Crore)
1	Gosikhurd	7777.85	2.51	0.341	0.144	6224.70 (up to 09/2012)	3166.747	2987.94	1553.15 (as on 01.10.2012)
2	Teesta Barrage	2988.61	5.27	1.9349	0.404	1382.37 up to 10/2012	120.26	178.20	1606.24 (as on 01.11.2012)
3	Shahpur Kandi	2285.81	0.37	-	-	285.94 (up to 12/2012)	13.22	26.036	1999.87 (as on 01.01.2013) (including power component)
4	Saryu Nahar	7270.32	14.04 (including 4.37 lakh ha target under National Project)	9.3097	-	2711.,55 (up to 06/2012)	-	67.98	4558.77 (as on 01.07.2012)

Annexure-7.4

New Proposals received from State Governments for Consideration under National Projects

Sl. No	State	Name of the project	Status
Projects under consideration			
1	**U.P.**	Restoring Capacity of Sharda Sahayak System	The project was recommended by the High Powered Steering Committee on 22.12.2011 subject to revision of guidelines for National Project in respect of ERM projects. The Cabinet Committee on infrastructure has approved the revision of the guidelines on 03/08/2012. The project has also been approved by EFC on 6.12.2012. Approval of Union Cabinet is required.
2	**M.P**	Bargi Diversion Project	The proposal was recommended by the High Powered Steering Committee on 17.2.2010. Approval of EFC followed by Union Cabinet is required.
3	**Aandhra Pradesh**	Indira Sagar Polavaram Project	The project has been recommended by High Powered Steering Committee and subsequently discussed in the EFC meeting held on 5.3.2010. Investment clearance from Planning Commission for the revised cost estimate is to be obtained by State Government.
Projects do not satisfy criteria for inclusion in the scheme of National Projects			
4	**Odisha**	Rengali Irrigation Project	The State Govt. has decided to construct LBC with JICA assistance. Remaining project does not satisfy criteria of more than 2 Lakh ha.
5	**Andhra Pradesh**	J. Choka Rao Lift Irrigation Scheme	Proposal in the prescribed format has not been submitted by the State Govt.
6	**Jharkhand, Odisha, West Bengal**	Subernarekha Multipurpose Project	Proposal in the prescribed format has not been submitted by the State Govt.
7	**Andhra Pradesh**	Dr. B.R. Ambedkar Pranahita Chevella Sujala Sravanthi Project	The State Govt. is to obtain investment clearance for the project.
8	**U.P.**	Kanhar Irrigation Project	The irrigation potential of the project is less than 2 Lakh ha and hence not eligible to be consider as national project. The State Govt. has been informed.
9	**U.P.**	Baghain Dam	The irrigation potential of the project is less than 2 Lakh ha and hence not eligible to be consider as national project. The State Govt. has been informed
10	**U.P.**	Ban Sagar Canal	The irrigation potential of the project is less than 2 Lakh ha and hence not eligible to be consider as national project. The State Govt. has been informed
11	**U.P.**	Rajghat Canal Phase-II	The irrigation potential of the project is less than 2 Lakh ha and hence not eligible to be consider as national project. The State Govt. has been informed

12	**Maharashtra**	Bodwad Parisar Sinchan Yojana irrigation potential of the project is less than 2 Lakh ha and hence not eligible	The to be consider as national project. The State Govt. has been informed
13	**Maharashtra**	Clustered projects from Tapi Basin.	It covers cluster of six major and medium irrigation projects out of which 2 projects are not yet approved from the Planning Commission.
14	**J& K**	Pakal Dul H.E. Project	Complete proposal after Investment clearance form Planning Commission is required.

Annexure 8.1

PROGRAMME OF MONITORING VISITS DURING 2012-13		
General Monitoring		
S.No.	Name of Project	Major/Medium/ERM
	ANDHRA PRADESH	
1	1-Peddagedda Reservoir Project	Medium
2	2-Godavari Lift Irrigation	Major
3	3-Krishna Delta Modernization Scheme including Pulichintala Dam Project (New)	Major
4	4-Pulivendula Branch Canal	Major
5	5-Tungabhadra high level canal	Major
	TOTAL- 05	
	BIHAR	
6	1-North Koel Reservoir	Major
7	2-Bateswar Asthan Ganga Pump Canal Phase-I	Major
	TOTAL- 02	
	TOTAL- 02	
	GUJARAT	
8	1-Und-II	Medium
	Total-01	
	HIMACHAL PRADESH	
9	1-Phina Singh Irrigation Project	Medium
	TOTAL-01	
	JHARKHAND	
10	1-Ajoy BarrageProject	Major
11	2-Dhansinghtoli Res. Project	Medium
12	3-Katri Res.Project	Medium
13	4-Nakti Res. Project	Medium
14	5-PunasiRes.Project	Medium
15	6-Kans Reservoir	Medium
	Total-06	
	J&K	
16	1-Modernization of Zaingir Canal Irrigation Project (ERM)	Medium
17	2-Modernization of Lar Canal Project (ERM)	Medium
18	3-Modernization of Grimtoo canal (ERM)	Medium
	TOTAL-03	

	KARANATAKA	
19	1-Ghataprabha St-II	ERM
20	2-Hirehalla	Medium
21	3-Amarja	Medium
22	4-Bennathora	Major
23	5-Lower Mullamari	Medium
24	6-Sri Rameshwara Lift Irrigation	Major
	Total-06	
	KERALA	
25	1-Idamalayar Irri. Project	Major
	Total-01	
	Maharashtra	
26	1-Wakod Irrigation Project	Medium
27	2-Kirmiri Darur Lift Irrigation Scheme	Medium
28	3-Sonapur Tomta Lift Irrigation Scheme	Medium
29	4-Chilhewadi Irrigation Project	Medium
30	5-Haranghat Lift Irrigation Scheme	Medium
21	6-Kamani Tanda Medium Irrigation Project	Medium
32	7-Ghungshi Barrage Medium Irigation Project	Medium
33	8-Shelgaon Barrage project	Medium
34	9-Urmodi Irrigation Project	Major
35	10-Tembhu Lift Irrigation Project	Major
36	11-Bodwad Parisar Sinchan Yojna	Major
37	12-Maharashtra Water sector Improvement Project (MWSIP) (World Bank Aided)-ERM	Major
38	13- Purna Barrage (Ner Dhamana) Irrigation Project.	Medium
39	14-Upper Pravara	Major
	TOTAL-14	
	Meghalaya	
40	1-Rongoi Valley	Medium
	Total-01	
	NAGALAND	
41	1-D'zuza irrigation scheme	Medium
	TOTAL_01	

	Rajasthan	
42	1-Takli Irrigation Cum Drinking Water Project	Medium
43	2-Gagrin Irrigation Project	Medium
44	3-Piplad Irrigation Project	Medium
45	4-Lhasi Irrigation Project	Medium
	TOTAL-04	
	UTTAT PRADESH	

46	1-Bhupali Pump Canal	Major
47	2-Kanhar Irrigation Project	Major
48	3-Restoring capacity of Western Gandak Canal system ï ERM	Major
	TOTAL-03	
	West Bangal	
49	1-Beko Irrigation scheme	Major
50	2-Khairabera Irrigation Scheme	Major
	Total-02	
	General Monitoring-	
	Total By (FU) -50	
	Total By (HQ) -07	
	Grand Total - 57	

AIBP MONITORING

S.No.	Name of Project	Major/Medium/ERM
	ANDHRA PRADESH	
1	1-Yerrakalva Res.	Med.
2	2-FFC of SRSP	ERM
3	3-SRSP St.II	ERM
4	4-Tadipudi LIS	Maj.
5	5-Pushkara LIS	Maj.
6	6-Ralivagu	Med.
7	7-Gollavagu	Med.
8	8-Mathadivagu	Med.
9	9-Peddavagu	Med.
10	10-Gundlakdamma	Maj.
11	11-J. Chokka Rao LIS	Maj.
12	12-Neelwai	Med.
13	13-Sri Komaram Bheem	Med.
14	14-Thotapally Barrage	Maj.
15	15-Tarakarama thirtha Sagaram	Med.

16	16-Palemvagu	Med.
17	17-Musurumilli	Med.
18	18-Rajiv Bhima LIS	Maj.
19	19-Indira Sagar (Polavaram)	Maj.
20	20-Meddigedda Res.	Med.
	Total-20	
	ASSAM	
21	1-Dhansiri	Maj.
22	2-Champamati	Maj.
23	3-Borolia	Med.
24	4-Burhi Dihing lift	Med.
25	5-Mod. of Jamuna	ERM
	Total-05	
	BIHAR	
26	1-Western Kosi	Maj.
27	2-Durgawati	Maj.
28	3-Batane	Med.
29	4-Punpun	Maj.
	Total-04	
	CHATTISGARH	
30	1-Kelo Project	Maj.
31	2-Kharung	ERM / Maj
32	3-Sutiapat	Med.
33	4-Maniyari Tank (ERM)	Major
	Total-04	
	GOA	
34	Tillari	Major
	TOTAL-01	
	GUJARAT	
35	Sardar Sarovar (Narmada)	Major
	TOTAL-01	
	HIMACHAL PRADESH	
36	1-Changer Area, Medium Lift Irrigation Project	Medium
37	2-Shahnahar Irrigation Project	Major
38	3-Sidhata Irri. Project	Medium
39	4-Balh Valley (Left Bank) Medium Irrigation Project.	Medium
	Total-04	
	Jammu	
40	1-Mod. of Ranbir Canal*	ERM
41	2-Rajpora Lift	Med.
42	3-Tral Lift	Med.
43	4-Mod. Of Dadi Canal	ERM

44	5-Mod. Of New pratap canal	Med.
45	6-Prakachik Khows Canal	Med.
46	7-Mod. Of Ahji Canal	ERM
47	8-Restoration & Mod. Of Main Ravi Canal	ERM / Maj
	Total-08	
	JHARKHAND	
48	1-Gumani	Med.
49	2-Kansjore	Med.
50	3-Sonua	Med.
51	4-Surangi	Med.
52	5-Upper Sankh	Med.
53	6-Panchkhero	Med.
54	7-Subernarekha Multipurpose	Maj
	Total-07	
	KARNATAKA	
55	1-Upper Krishna St.I Phase-III	Maj.
56	2-Malaprabha	Maj.
57	3-Upper Krishna St.II	Maj.
58	4-Varahi	Maj.
59	5-Dudhganga	Maj.
60	6-Mod. Canal System of Bhadra Reservoir Canal System (ERM)	ERM
61	7-Hipparagi LIS	Maj.
62	8-Restoration Bhimasamundra Tank	ERM/ Med
63	9-Guddada Malapura Lift	Med
64	10-Chandrampalli	ERM
65	11-Hattikuni	ERM
66	12-Bhima LIS	Maj.
67	13-Upper Mullamari	ERM
68	14-Karanja	Major
69	15-Ghataprabha Stage-III	Major
	Total-15	
	KERALA	
70	1-Muvattupuzha	Maj.
71	2-Karapuzha	Med.
72	3-Kanhirapuzha	Med./ ERM
73	4-Chitturpuzha	ERM
	Total-04	
	MADHYA PRADESH	
74	1-Kelo	Maj.
75	2-Kharung	Maj.
76	3-Sutipat	Maj.
77	4-Manyari	Maj.

78	5-Indira Sagar	Maj.
79	6-Mahi	Maj.
80	7-Bariarpur LBC	Maj.
81	8-Bawanthadi	Maj.
82	9-Omkareshwar Ph - I	Maj.
83	10-Bargi Diversion	Maj.
84	11-Pench Div-I	Maj.
85	12-Upper Beda	Maj.
86	13-Punasa lift	Maj.
87	14-Lower Goi	Maj.
88	15-Sagar(Sagad)	Maj.
89	16-Singhpur	Maj.
90	17-Sanjay Sagar (Bah)	Maj.
	Total-17	
	MAHARASHTRA	
91	1-Gosikhurd	Maj.
92	2-Waghur	Maj.
93	3-Upper Manar	Med.
94	4-Upper Pen Ganga	Maj.
95	5-Bawanthadi [IS]	Maj.
96	6-Lower Dudhna	Maj.
97	7-Tillari	Maj.
98	8-Lower Wardha	Maj.
99	9-Khadakpurna	Maj.
100	10-Dongargaon	Med.
101	11-Gul	Med.
102	12-Bembla	Maj.
103	13-Sangola Branch Canal	Maj.
104	14-Morna (Gureghar)	Med.
105	15-Arjuna	Med.
106	16-Lower Pedhi	Maj.
107	17-Upper Kundalika	Med
108	18-Wang Project	Med
109	19-Lower Panzara	Med
110	20-Aruna	Med
111	21-Krishna Koyana Lift	Maj.
112	22-Naradave (Mahammadwadi)	Med
113	23-Gadnadi	Med
114	24-Kudali	Med
115	25-Tarali	Maj.
116	26-Dhom Balakwadi	Maj.
117	27-Punad	Maj.
118	28-Nandur Madhameshwar -phase-II	Maj.
	Total-28	

	MANIPUR	
119	1-Khuga	Maj.
120	2-Thoubal	Maj.
121	3-Dolaithabi Barrage	Med.
	Total-03	
	ODISHA	
122	1-Upper Indravati(KBK)	Maj.
123	2-Subernarekha	Maj.
124	3-Rengali	Maj.
125	4-Anandpur Barr./ Integrated Anandpur Barr.	ERM
126	5-Lower Indra(KBK)	Maj.
127	6-Lower Suktel(KBK)	Maj.
128	7-Telengiri(KBK)	Maj.
129	8-RET Irrigation(KBK)	Med.
130	9-Kanupur	Maj.
131	10-Chheligada Dam	Med.
132	11-Rukura-Tribal	Med
	Total-11	
	Punjab	
133	1-Extension of kandi Canal Stage-II	ERM
134	2-Rehabilition of Ist Patiyala Feederand Kotla branch	ERM
135	3-Relining of rajasthan feeder canal	ERM
136	4-Relining of Sirhind Feeder canal	ERM
	Total-04	
	RAJASTHAN	**nil**
137	1-IGNP Stage-II	Maj.
138	2-Narmada Canal	Maj.
139	3-Mod. of Gang Canal	ERM
	Total-03	
	TRIPURA	
140	1-Manu	Med.
141	2-Gumti	Med.
142	3-Khowai	Med.
	Total-03	
	UTTAR PRADESH	
143	1-Saryu Nahar Pariyojana	Maj
144	2-Bansagar Canal	Maj.
145	3-Restoring Cap of Sarda Sahayak	ERM
146	4-Improving Irr. Intensity of Hardoi Branch System	ERM
147	5-Madhya Ganga Canal Ph-II	Maj.
148	6-Kachnoda Dam	Maj.

149	7-Arjun Shyak	Maj.
150	8-Mod. of Lachhura Dam	ERM
	Total-08	
	WEST BANGAL	
151	1-Patloi Irrigation	Medium
152	2-Tatko Irrigation	Medium
	TOTAL-02	
	Grand Total - 152	

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		Restoration of Kosi Barrage and its appurtenants for sustaining created irrigation Potential	2010-11
26	Chhattisgarh	Hasdeo Bango	2006-07

27		Shivnath Div.	2002-03
28		Jonk Diversion	2006-07
29		Barnai	2006-07
30		Mahanadi Reservoir	2010-11
31		Minimata(Hasdeo Bango Ph-IV)	2010-11
32	Goa	Salauli	2006-07
33	Gujarat	Jhuj	1999-2000
34		Sipu	1999-2000
35		Mukteshwar	2006-07
36		Harnav-II	1997-98
37		Umaria	1996-97
38		Damanganga	1999-2000
39		Karjan	1999-2000
40		Sukhi	1999-2000
41		Deo	1997-98
42		Watrak	1999-2000
43		Aji-IV	2009-10
44		Ozat-II	2009-10
45		Bhadar-II	2010-11
46		Brahmini-II	2008-09
47	Haryana	Gurgaon Canal	2003-04
48		WRCP	2006-07
49	J&K	Marwal Lift	2006-07
50		Lethopora Lift	2006-07
51		Koil Lift	2006-07
52		Mod of Kathua Canal	2006-07
53		Igophey	2006-07
54		Mod. of Zaingir Canal	2006-07
55		Mod. of New Pratap Canal*	2006-07
56		Mod. of Martand Canal	2010-11
57		Mod. of Mav Khul	2010-11
58		Rafiabad High Lift Irr.	2010-11
59		Mod. of Babul Canal	2011-12
60	Jharkhand	Latratu	2002-03
61		Tapkara Res.	2002-03
62		Kansjore	2010-11
63	Karnataka	Hirehalla	2006-07
64		Maskinallah	2003-04

65		**Votehole**	**2008-09**
66		**Gandorinala**	**2010-11**
67	**Kerala**	**Kallada**	**2004-05**
68	**M.P**	**Bansagar Unit I**	**2010-11**
69		**Upper Wainganga**	**2002-03**
70		**Sindh Ph I**	**2006-07**
71		**Urmil**	**2002-03**
72		**Banjar**	**2002-03**
		Rajghat Unit - I	1998-99
73	**Maharashtra**	**Surya**	**2006-07**
74		**Bhima**	**2006-07**
75		**Upper Tapi**	**2004-05**
76		**Wan**	**2005-06**
77		**Jayakwadi Stage-II**	**2004-05**
78		**Vishnupuri(Works)**	**2005-06**
79		**Bahula**	**2006-07**
80		**Khadakwasla**	**2004-05**
81		**Kadvi**	**2004-05**
82		**Kasarsai**	**2004-05**
83		**Jawalgaon**	**2004-05**
84		**Kumbhi**	**2006-07**
85		**Kasari**	**2004-05**
86		**Patgaon**	**2006-07**
87		**Madan Tank**	**2008-09**
88		**Shivna Takli**	**2008-09**
89		**Amravati**	**2008-09**
90		**Krishna**	**2008-09**
91		**Kukadi**	**2008-09**
92		**Hetwane**	**2008-09**
93		**Chaskaman**	**2008-09**
94		**Upper Wardha**	**2009-10**
95		**Purna**	**2009-10**
96		**Chandarbhaga**	**2009-10**
97		**Sarangkheda**	**2009-10**
98		**Prakasha Barrage**	**2009-10**
99		**Sulwade Barrage**	**2009-10**
100		**Nandur Madhmeshwar Ph-I**	**2009-10**

101		Pentakli	2010-11
102		Wan - II	2006-07
103		Pothra Nalla	2006-07
104		Tajnapur LIS	2006-07
105		Lalnalla	2006-07
106		Kar	2006-07
107		Arunavati	2006-07
108		Sapan	2007-08
109		Utawali	2006-07
110	Orissa	Upper Kolab	2004-05
111		Potteru	2004-05
112		Naraj Barrage	2005-06
113		Sason Canal	2004-05
114		Salandi Left Main Canal-Ambahata	2005-06
115		Salki Irrigation	2004-05
116		Titlagarh St-II(KBK)	2008-09
117	Punjab	Ranjit Sagar	2000-01
118		Irr. to H.P. below Talwara	2000-01
119		Remodelling of UBDC	2006-07
120	Rajasthan	Jaisamand Mod.	2000-01
121		Chhapi	2004-05
122		Panchana	2004-05
123		Bisalpur	2006-07
124		Gambhiri Mod.	2000-01
125		Chauli	2006-07
126		Mahi Bajaj Sagar	2006-07
127	Tamil Nadu	WRCP	2006-07
128	Uttar Pradesh	Madhya Ganga and Upper Ganga Mod.	2003-04
129		Sarda Sahayak	2000-01
130		Providing Kharif Channel in H.K. Doab	2004-05
131		Rajghat Dam	1996-97
132		Gunta Nala	1999-2000
133		Gyanpur Pump Canal	2001-02
134		Jarauli Pump Canal	2006-07
135		Mod. Agra Canal	2008-09
136		Rajghat Canal	2008-09

137		**Eastern Ganga Canal**	**2010-11**
138	**Uttarakhand**	**Tehri**	**2006-07**
139	**W.B**	**Kangsabati**	**2001-02**
140		**Mod. of Barrage and Irrigation System of DVC**	**2006-07**
141		**Hanumata**	**2008-09**

Annexure-15.1

Training Program during April 2012 - March 2013

Sl. No.	Topics of Programme	Date	Venue	Participants S/Sh.
1..	Hindi Workshop.	18th-19th June, 2012	CWC (HQ)	17 Participants
2.	Training Programme in respect of Non Matric Casual Labourer (T/S) for entering pay Band I.	18th -22nd June, 2012	CWC (HQ)	3 Participants
3.	Workshop on "How to use WRIS".	17th July, 2012	CWC (HQ)	70 Participants
4.	Training Course on "Use of Statistics in Hydrology" .	25th-27th July,2012	CWC (HQ)	30 Participants
5.	Training course on "Preparation of Drawing using Auto Cad.	"10th-12th September, 2012	Guwahati	18 Participants
6.	Second part of 25th Induction Training Programme for the newly appointed officers of CWE(Group- A) Services.	10th-28th	CWC(HQ)	22 participants
7.	Hindi Workshop.	24th September, 2012	CWC(HQ)	26 Officers
8.	Training Programme on "Hindi Typing".	8th-10th October,2012	Bhubaneswar	10 Participants
9.	Training Programme on "Dam Safety Concern and Awareness".	15th-19th October,2012	Bhubaneswar	15 Participants
10.	Training Programme on "Development of Flood Forecasting Models".	5th-9th November, 2012	Hyderabad	9 Participants

11.	Training on "Development of Flood Forecasting Models".	14th-18th January, 2013	UYD, CWC, New Delhi	9 Participants
12.	Training programme on 'eWater Source'	18th-22nd March, 2013	CWC (HQ)	18 Participants

Annexure - 15.2

National Water Academy, Pune

Details of Training Programs completed till **March 2013**

Sr. No.	*Details of the Programs*	*Dates*	*Duration (Weeks)*	*Officers Trained*	*Manweeks of Training*
1.	Orientation Program for newly promoted AD II of CWC	09-27 Apr 12	3	35	105
2.	Flood Disaster Management	30 Apr - 4 May 12	1	34	34
3.	Canal Automation and Modernization	07-11 May12	1	10	10
4.	Induction Training Program (ITP) for the officers of Central Water Engineering (Group 'A') Services	8 May - 07 Sept 2012	18	22	396
5.	Advanced Techniques/Models for Hydrological Design Aids under HP-II (under HP-II)	21-25 May 2012	1	23	23
6.	Using the Dashboard Manager for making scripts for DSS-P (under HP-II)	4-8 June 2012	1	24	24
7.	Long-lead Flood Forecasting and Applications(under HP-II)	18-22 Jun 12	1	11	11
8.	Application of Remote Sensing & GIS for Monitoring of Projects	18-22 June 2012	1	17	17
9.	MDP for Non-Engineering officials of the level of SOs / Under Secretaries	25-29 Jun 12	1	14	14
10.	Investigation and Planning of Water Resources Projects	09-13 July 12	1	15	15
11.	Workshop on Real Time Hydrological Information System Network in India(under HP-II)	23-27 Jul 12	1	34	34

12.	Hydroinformatics and soft computing	06-10 Aug12	1	24	24
13.	HDA-1 : Assessment of Water Resources Potential - availability / yield assessment(under HP-II)	10-15 Sept 12	1	34	34
14.	Coastal Erosion Protection and Coastal Zone Management	24-28 Sept 2012	1	22	22
15.	Hydrological Modelling	01-05 Oct 2012	1	21	21
16.	Project Screening Template (undeR Drip Scheme)	15-16 Oct 2012	0.4	19	7.6
17.	Dam Safety Concern and Awareness	29-31 Oct 2012	0.6	21	12.6
18.	Design, O&M Aspects of Hydro-Mechanical Equipment for Water Resources Structures	26 Nov-14 Dec 2012	1	31	31
19.	Distance learning program in Hydrology for regional audiences (In association with World Meteorological Organization)	26 Nov-14 Dec 2012	3	42	126
20.	Water Resources of India (for school teachers)	5 Dec 2012	0.2	47	9.4
21.	Irrigation Water Management and Modernization	10-14 Dec 2012	1	26	26
22.	Water Quality Management	17-21 Dec 2012	1	18	18
23.	Flood Forecasting Techniques	17-21 Dec 2012	1	21	21
24.	HDA-2 : Estimation of Design Flood **(under HP-II)	07-12 Jan 2013	1	24	24
25.	Increasing Water Use Efficiency (WUE) (Under National Water Mission)	21 Jan - 1 Feb 2013	2	16	32

26.	Orientation Program for newly recruited Junior Engineers of CWC – Batch I	21 Jan - 1 Feb 2013	2	22	44
27.	Application of Finite Element Analysis to Water Resources Structures	11-22 Feb 2013	2	26	52
28.	Orientation Program for newly recruited Junior Engineers of CWC – Batch II	18 Feb – 1 Mar 2013	2	26	52
29.	Basics of Hydroelectric Projects	25 Feb-1 Mar 13	1	32	32
30.	Practical MATLAB for Engineers	04-06 Mar 13	0.6	22	13.2
31.	Contract Management and Financial Procedures	11-15 Mar 13	1	12	12
32.	Environmental and Social Aspects of Water Resources Projects	11-13 Mar 13	0.6	16	9.6
33.	Telemetry (under HP-II)	19-21 Mar 13	0.6	26	15.6
Total			**55**	**787**	**1322**