Annual Report 2014-15

Central Water Commission

सत्यमेव जयते

Government of India
Ministry of Water Resources,
River Development & Ganga Rejuvenation

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 BCM
•	Mean Annual Natural Run-Off	1869 BCM
•	Estimated Utilisable Surface Water Potential	690 BCM
•	Total Replenishable Ground Water Resources	433 BCM
•	Ground Water Resources Available for Irrigation	369 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

HYDRO-POWER

•	Ultimate Hydropower Potential (As per reassessment)	84044 MW at 60% L.F.
•	Potential Developed by 31st March, 2015 (Installed Capacity)	41267 MW

FROM CHAIRMAN'S DESK

It is our pleasure to bring out this Annual Report of the Central Water Commission (CWC) for the year 2014-15. 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 in 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 2014-15. 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 50 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 16 projects comprising of 4 major& medium irrigation projects and 12 flood control projects.
- General monitoring of 47 projects and monitoring of 149 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 `1901.67 crore of Central Grant under AIBP programme in respect of 26 Major and Medium Irrigation Projects.
- Examination of proposals under the scheme for renovation, restoration and revival of water bodies.
- Monitoring of storage position of 85 reservoirs in the country.

Flood Management

- Timely issue of 4772 flood forecasts (with 97.80 % accuracy) during the monsoon period of 2014 to help effective flood management.

(A B Pandya)
CHAIRMAN

HIGHLIGHTS OF THE YEAR 2014-15

❖ DESIGNS

- CWC provided design consultancy to States / Project Authorities for 50 water resources development projects involving detailed designs and preparation of drawings of various types of hydraulic structures.

❖ RIVER MANAGEMENT

- Carried out hydrological observations, including snow and meteorological observations, at 954 sites in different basins spread over the entire country.
- Provided Flood Forecasting Service at 175 flood forecasting stations (including 28 inflow forecasting stations) spread over 9 major river basins. During the flood season 2014, 4772 flood forecasts (3884 level forecast and 888 inflow forecasts) were issued, out of which 4667 (97.8%) forecasts were within prescribed limits of accuracy. Daily flood bulletins and weekly flood news letters were also issued during the flood season. Satellite based telemetry system is being used at 445 stations for acquisition of data on real time basis. Work for installation of Satellite based telemetry system at 125 more stations is under process.
- Provided technical assistance to Royal Government of Bhutan for maintenance of 33 Hydro-Meteorological sites in Bhutan.

❖ WATER PLANNING

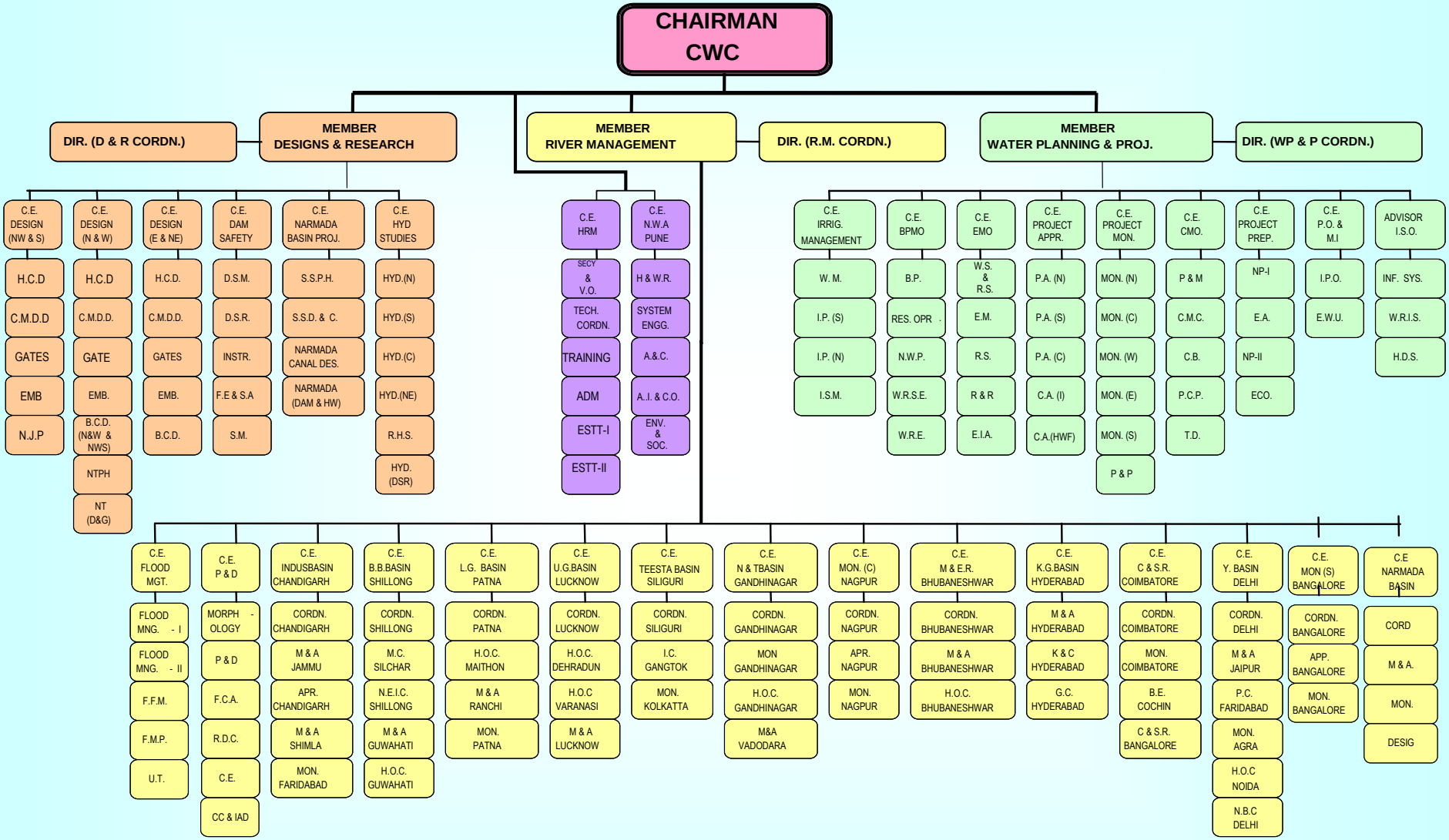
- During the year 2014-15, 37 major irrigation projects were under appraisal in CWC. 16 projects comprising 2 major irrigation projects, 2 medium irrigation projects and 12 flood control projects were accepted by the Advisory Committee.
- Monitored 47 Irrigation projects under General Category and 149 Irrigation projects (including Extension/Renovation/Modernization (ERM) projects) receiving CLA under AIBP.
- Storage positions of 85 important reservoirs, with total live storage of about 155 BCM, were monitored on weekly basis.
- Processing of proposals for release of Rs. 1901.67 crore of Central Grant under AIBP programme to 26 Major and Medium Irrigation Projects were undertaken.
- Provided technical assistance to MoWR in Inter-State water disputes resolution process in respect of Cauvery Water Dispute, Mandovi Water Dispute, Krishna Water Dispute and Vamsadhara Water Dispute.

❖ HRM

- National Water Academy, CWC, Pune conducted 33 training programmes during 2014-15 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 2737.

C O N T E N T S

Organogram of Central Water Commission



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 05.04.1945. 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, River Development and Ganga Rejuvenation and is its main technical arm. It is manned by the officers of Central Water Engineering Services (CWES) cadre, the only organised service of the Ministry of Water Resources, River Development and Ganga Rejuvenation.

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 (D&R) Wing, Water Planning and Projects (WP&P) Wing and River Management (RM) Wing. 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; 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 duties and responsibility of Chairman and Members are as under:

CHAIRMAN

Head of the Organization – Responsible for overseeing the various activities related to overall planning and development of 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 2014-15 were:

1.	**Chairman**, CWC	:	Sh. A. B. Pandya (01-04-2014 to 31-03-2015)
2.	**Member** (D&R)	:	Sh. A. B. Pandya (01-04-2014 to 26-08-2014) Sh. C.K Agrawal (27-08-2014 to 31-03-2015)
3.	**Member** (RM)	:	Sh.K.N. Keshri (01-04-2014 to 31-08-2014) Sh.V.N.Wakpanjar (01-09-2014 to 30-09-2014) Sh. Narendra Kumar (01-10-2014 to 31-03-2015)
4.	**Member** (WP&P)	:	Sh.A.Mahendran (01-04-2014 to 31-03-2015)

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 and multipurpose projects proposed by the State Governments;
- To collect, compile, analyse and publish the hydrological and hydro-meteorological data relating to major rivers in the country, consisting of stage, runoff, rainfall, 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 operation of network of 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 are also undertaken;
- 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 tools and 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 (AIBP) is being implemented by MoWR,RD&GR. Central Water Commission has been assigned with the responsibility to comprehensively monitor the projects receiving Central Assistance. Presently, there are 149 ongoing projects under AIBP which are receiving grant and are being monitored by CWC.

A total grant of Rs. 1901.67 Crore has been released to 26 Major & Medium Irrigation Projects under AIBP during 2014-15. Since its inception, cumulative Central Loan Assistance / Grant totalling to Rs. 53120.47 Crore has been provided to States till 31.03.2015 for 297 projects included under AIBP.

Flood Management Programme

The Government of India is implementing "Flood Management Programme (FMP)", a State Sector Scheme under Central Plan, to provide central assistance to the State Governments for taking up works related to river management, flood control, anti erosion drainage development, flood proofing, restoration of damaged flood management works, anti sea erosion and catchment treatment etc. During the XI Plan period (2007-12), 420 Nos. of schemes of various State Governments were funded under FMP and an amount of Rs. 3566.00 Crore released. The scheme has been approved during XII Plan period (2012-17) for providing total assistance amounting to Rs. 10,000 Crore.

During XII Plan period, the Inter Ministerial Committee for Flood Management Programme (IMC-FMP) has approved 97 schemes of various States having total estimated cost of Rs. 4412.58 Crore for funding under FMP. Central Water Commission coordinates the release of funds for scheme under FMP in areas other than Ganga and Brahmaputra basin.

Development of Water Resources Information System (DWRIS)

Central Water Commission is implementing the Plan scheme "Development of Water Resources Information System (DWRIS)" with an objective to operate a standardized national water information system in the country with provision for data collection, data processing and storage and online data dissemination. The scheme has following five major components:

i. Hydrological Observations Monitoring System
ii. Irrigation Census
iii. Water Quality Assessment Authority and Monitoring System
iv. Strengthening of Monitoring Unit in CWC
v. Data Bank and Information System

Under DWRIS Plan scheme, CWC & ISRO has jointly developed India-WRIS during 11th plan. Initially, the India-WRIS comprised of 30 major GIS layers (viz. River network, basins, canal network, water bodies, hydro meteorological network, administrative layers etc.) of the country at a scale of 1: 50000. The first full version of website of India-WRIS was launched in December 2010. The URL of the portal is www.india-wris.nrsc.gov.in. So far, four versions of portal India-WRIS have been launched. The Ver. 4.0 was launched in March' 2014 and is available in public domain at 1:250000 scale. All unclassified data collected by CWC has been uploaded at India-WRIS portal as per Hydro-meteorological data Dissemination Policy 2013.

The center maintaining India-WRIS was transferred to CWC HQ at Sewa Bhawan in February 2015. The following activities were taken up by the center during 2014-15:

a. Generation of unique code for all the water bodies in the country for undertaking census of water bodies.
b. Generation of district wise statistics and maps of surface water bodies.
c. Quantitative Precipitation Forecast based delineation of IMD sub-basin for providing information to IMD.

d. Support to RD Dte., CWC by creating hydro-meteorological network layer for HP-III project. Correction of spatial location of 800 Proposed HO sites of CWC is under progress.
e. Support in design of meteorological network for HP-III project with reference to 0.25 grid distribution.
f. The center worked on Mahanadi Godavari link under guidance of Shri B. K. Panda, OSD, MoWR, RD & GR and generated thematic maps showing benefits of Mahanadi Godavari link. Analysis for Volume of Storage, submergence area and villages under submergence was done for eight sites identified by Shri Panda for creating required storage for Mahanadi Godavari link. Further routes of 3 intra-basin flood moderation schemes of Odisha Government (IB (Mahanadi) – Sankha (Brahmani), Nagavali-Vamsadhara-Rushikuliya Link, Mahanadi (Barmul)- Rushikulya Link were analyzed using SRTM DEM.
g. Provided support to Hydrology unit, CWC for undertaking Feasibility analysis for storage of flood water between Kanpur and Varanasi in Ganga basin.

National Projects

Government of India is implementing scheme of National Projects since XI Plan with a view to expedite completion of identified National Projects for the benefit of the people. As per present guidelines, financial assistance of 75% and 90% of cost of balance works of irrigation and drinking water component of the projects is provided as Central Grant to projects in Non-Special Category States and Special Category States respectively. Central Government has declared 16 water resources projects as National Project so far.

1.6 Modernization and Renovation works in CWC HQ

The modernization and renovation works of CWC Head Quarter Building (Sewa Bhawan, R K Puram) was started in 2010-11 through CPWD. The works for 9th floor (South) was completed till March 2014. The work for 8th floor (North Wing) has been completed during 2014-15 and for 8th floor (South Wing) is in progress.

1.7 CWC Personal Information System

A Personal Information System is operational in CWC for up-keeping and maintenance of personal records of employees working in CWC. Different modules under this system include APAR Management System (APARMS), GPF Information System and CWES Bio-data Information System. The details of the system are as under:

1.7.1 Unique Employee ID for employees of CWC:

Unique IDs for all employees of CWC working at Head-Quarters as well as field offices are maintained in CWC. This ID is a unique number and serves the purpose of identification of category of service, batch/year of joining, etc. of the employees. The Employee ID is used for generation of salary bills of employees through COMP-DDO software at CWC Head Quarter as well as in various module of Personal Information System.

1.7.2 APAR Management System (APARMS):

Annual Performance Appraisal Management System (APARMS) is operational in CWC 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 Government employees are to be communicated to them.

The APARMS is an online system in which each official of CWC can view his/her APAR. Whenever any APAR of individual official is uploaded, a system generated e-mail is sent to the concerned official informing him about the same. For this purpose e-mail IDs of all the employees of CWC has been created and communicated to them. The system can be accessed through link available on the CWC website **www.cwc.gov.in**. Any employee can access their latest APAR after entering the authentication details provided to him.

1.7.3 CWES Bio-Data information System :

Bio-data Information System for Central Water Engineering Service (CWES) officers is operational to facilitate CWES officers to upload their bio-data and to mention about their achievements in the field of water resources. The CWES bio-data information system can be accessed through CWC web-site. CWC officers can log in to system with their employee ID as login code and unique passwords to view and edit their records. The information can also be viewed by common public.

1.7.4 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.

1.8 Central Water Commission Library

CWC Library is one of the most prestigious technical reference library on the subject of Water Resources Engineering and other allied subjects. It has collection of over 1.25 lakh books and 3.50 lakh journal/ bulletins/ newspapers/ reports etc., and is growing with additions of books/journals and other publications every year.

The library is regularly subscribing journals and other publications and is also receiving nearly hundred technical and non-technical journals/ bulletins/ newsletters/ publications from various government, non-government, educational institutes and societies on complementary basis.

Library stock is arranged in a manner to make retrieval of desired publication fast and easy. The Library is located in a dedicated building and has adequate space and improved facilities. There are two fully air-conditioned reading rooms with latest journals / magazines and news papers. The library is being progressively modernized and automated, in order to serve the users in a better, fast and accurate way by providing latest available information from across the globe.

The Map Record Section is also a unit of L&IB. It has collection of approximante eighteen thousand toposheet, state map, rail map, political map etc.

An auditorium, which is a part of library building, has been made operational since January 2014. Other facilites in the permisses includes conference hall for organizing training, seminar, meeting etc.

1.9 Progressive Use of Hindi in Official Work

The official language policy is being implemented in all the offices under the administrative control of the Central Water Commission. Continued measures are 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 Official Language Act and Rules in the Commission.

Following initiatives in regard to progressive use of Hindi in this year were taken:

1. Field offices of the Central Water Commission were inspected regularly with a view to review the progressive use of Hindi and also to keep a watch on the compliance

of orders, instructions etc. and effective measures are taken for rectifying short-comings noticed during the inspection.

2. Four Hindi workshops were organized at Central Water Commission (Headquarter) to generate awareness about Hindi, and to give practical knowledge of the Official Language provisions and incentive schemes etc. A total of 138 (one hundred thirty eight) officials participated in these workshops .
3. Letters received in Hindi are invariably replied in Hindi. The progress made in the implementation of important instructions issued by the Department of Official Language regarding progressive use of Hindi for official purpose, the Official Language Act, 1963 and the Official Language Rules, 1976 is monitored through the quarterly progress report.
4. "Hindi Pakhwara" was organized from 14 to 28 September 2014 for effective implementation of the official language policy and to create awareness about Raj-bhasha,. During this period, various competitions like Hindi Noting/Drafting, Essay Writing, Technical Essay Writing, Dictation for MTS, Hindi Typing for UDC, LDC & MTS, Poem Recitation competition for Hindi and non-Hindi officials were organised and winners were awarded cash prizes and certificates. Cash Prizes and Certificates were also awarded to the officials who did their maximum official works in Hindi under the Annual Noting & Drafting Scheme.
5. Raj Bhasha Shields for the year 2014-15 were awarded to the Field Offices of Central Water Commission situated in regions, A, B and C i.e to Narmada Basin Organisation, Bhopal; Tapi Circle, Surat; and Sikkim Investigation Circle, Gangtok respectively. Raj Bhasha Shield for Directorates and Sections at HQs were awarded to River Management Coordination Dte. & Establishment-IX Section respectively for doing their maximum work in Hindi during the year.
6. Apart from translation of documents falling under section 3(3) of the Official Language Act, the Annual Report of the Central Water Commission and other urgent translation material received from MoWR, RD &GR were translated into Hindi.
7. The Parliamentary Committee for Official Language inspected the CWC (Headquarter) on 2nd January, 2015 to review the progress of use of Hindi. During this inspection, the Committee Members were contended with and applauded the efforts of CWC (Headquarter) for progressive use of Official Language Hindi.
8. During the year 2014-15, Regional Offices of CWC at Lucknow, Varanasi, Gandhinagar, Vadodara and Bengaluru were inspected by a team from Headquarter to review the implementation of provision under Section 3(3) of Official Language Act. In addition, 8 sections of the CWC Headquarter were also inspected.
9. Hindi books were purchased for the Central Water Commission Library as per the targets fixed in the Annual Programme of the Department of Official Language.

10. Senior Officers of CWC Headquarter were called by the Parliamentary Committee for Official Language for oral evidence on 27.03.2015 regarding progressive use of Official Language Hindi. The Committee was satisfied with progressive use of Hindi in CWC.

1.10 Welfare Measures and Incentives

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

1.10.1 Benevolent Fund

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

- Immediate Relief up to` 15,000/-
- Long Term Relief up to` 10,000/- payable in ten monthly installments.

The administration of the fund vests in the Governing Body, which comprises of a Chairman, one Honorary Secretary, one Treasurer and 8 Members. The audited accounts are placed before the General Body in the Annual General Body meeting. The existing subscription rate is` 10/- (ten) per month.

1.10.2 Co-Operative Thrift and Credit Society

Department of Irrigation Co-operative Thrift & Credit Society Ltd., has been functioning with its registered office at West Block–I, R.K. Puram, New Delhi since March 1959 for the welfare and benefit of the officers and staff of the Ministry of Water Resources, River Development and Ganga Rejuvenation, Central Water Commission, Central Soil & Materials Research Station, Department of Power, Principal Pay & Accounts Office of the Ministry of Water Resources and Pay &Accounts Office, Central Water Commission. It provides its member loans to the extent of Rs. 1,50,000/- and emergency loan of Rs. 15,000/-, 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.

1.10.3 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 2014-15 are as under:

- CWC Hockey Team won Team Championship in the Inter Ministry Hockey Tournament in 2014-15 consecutively nine times in a row.

- Sh. Ravi, Mon(S), CWC won the Silver & Bronze Medal in 400 m and 200 m Race Men respectively in the Inter Ministry Athletic Meet 2014-15 held at Jawahar Lal Nehru Stadium, New Delhi.

- Sh. Parminder, A/C-IV, CWC won the Silver & Bronze Medal in weightlifting (75 kg) and best physique (75 kg) respectively in the Inter Ministry weightlifting and best physique tournament 2014-15.

- Sh. Mukesh, Estt.III Section, CWC won the Silver Medal in best physicque (65 kg) respectively in the Inter Ministry best physique tournament 2014-15.

- Sh. Ashwani Kumar, Esst. V Section, CWC won the Bronze Medal in 100 m Race Men (40+) in the Inter Ministry Athletic Meet 2014-15 held at Jawahar Lal Nehru Stadium, New Delhi and Bronze Medal (vet. Mixed double) in the Inter Ministry Badminton tournament 2014-15 held at Tyagraj Stadium, New Delhi.

- CWC Cultural & Short Play team under the captainship of Sh. Sanjeev Kumar, Cash Section won the Silver medal in Folk Dance (Group) in Inter Ministry Cultural & Short Play Competition 2014-15.

- Sh. Pushpatre Mehra CWC won the Silver medal in Western Dance in Inter Ministry Cultural & Short play competition 2014-15.

- Sh. Kameleshwar Tripathi, CWC won the Bronze medal in Folk Song in Inter Ministry Cultural & Short play competition 2014-15.

1.11 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 31-03-2015)

Category	No. of Filled posts	No. of SCs	No. of STs	No. of OBCs
Group A	584	87	37	40
Group B	1153	159	68	176
Group C	889	204	59	147
Total	**2626**	**450**	**164**	**363**

Note *All Group 'D' Posts upgraded to Gr 'C' and re-designated as MTS.*

1.12 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 finalized with the concurrence of MoWR and has been uploaded on CWC website.

1.13 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 Meters (BCM). It constitutes a little over 4% of the total river flows of the world. However, due to various constraints of topography and uneven distribution over space and time, only about 1123 BCM of the total annual water potential can be put to beneficial use. This can be achieved through 690 BCM of utilizable surface water and 433 BCM through ground water.

While water for drinking purpose has been accorded top most priority in water use, irrigation is the major consumer of water. Ultimate Irrigation Potential which can be created through major and medium irrigation projects is assessed as 58.47 Mha. Irrigation potential created in the country from major and medium irrigation projects, which stood at 9.7 Mha. in 1951, has risen to 47.97 Mha by the end of XI Plan. Besides this, an additional irrigation potential of about 35 Mha can be created by taking up long distance inter basin transfer of water from surplus to deficit basins.

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 from coastal erosion;
- Dam safety and rehabilitation;
- Revival and restoration of existing water bodies;
- Appropriate regulation and management of ground water;
- Ground water recharge;
- Inter-linking of rivers;

- Rural drinking water supply and sanitation;

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

2.2 Highlights of Water Resources Sector

As the variability of rainfall over the country is well known, the development of water resources for irrigated agriculture received high priority in the different Plan periods. Expansion of irrigation facilities, along with consolidation of the existing systems, has been the main strategy for increasing production of food grains.

Irrigation support is provided through major, medium and minor irrigation projects and command area development.

2.2.1 Irrigation Potential: Major & Medium Irrigation Sector

The Ultimate Irrigation Potential of the country is estimated as 139.9 Mha, out of which Irrigation Potential from major and medium irrigation projects is assessed as 58.47 Mha. Irrigation Potential Created in the country from major and medium irrigation projects, which stood at 9.7 Mha in 1951, has risen to 47.97 Mha at the end of XI 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 up to end of IX Plan, during & cumulative up to X Plan and anticipated potential creations during XI Plan are given in Table 2.1.

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. As per information provided to Working Group on Major Medium Irrigation & Command Area Development (MMI & CAD) for XII Plan formulation, 399 major, 1136 medium and 265 ERM schemes were taken up during the plan period i.e., from 1951 to end of XI Plan in 2012. Out of this 221 major, 875 medium and 139 ERM projects have been reportedly completed by end of XI Plan. Number of MMI Projects taken up and completed up to XI Plan are given in Table 2.2.

The cumulative irrigation potential created till the end of XI Plan is 47.97 Mha Working Group on MMI & CAD for XII Plan has 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.

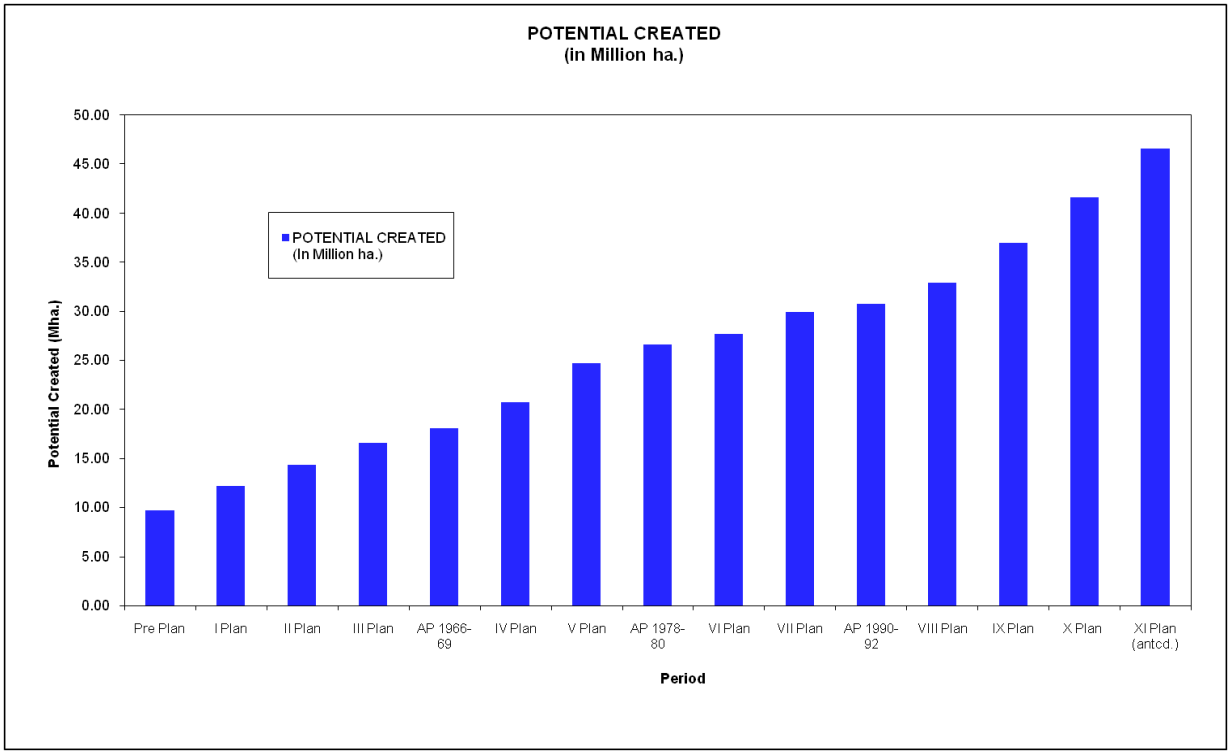


Fig 2.1 Growth of Irrigation Potential Created During Pre-Plan and Plan Period (Cumulative) (Major and Medium Irrigation Sector)

Table 2.1

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

(Thousand ha.)

Sl No	Name of State/ UT	Ultimate Irrigation Potential	Potential Creation					
			Upto IX Plan	During X plan	Upto X Plan	During XI Plan (Ant.)	Upto XI Plan (Ant.)	Target 2012-13**
1	Andhra Pradesh	5000.00	3303.22	439.44	3600.21	1203.52	4803.73	392.000
2	Arunachal Pradesh	0.00	0.00	1.20	1.20	0.00	1.20	0.00

Sl No	Name of State/ UT	Ultimate Irrigation Potential	Potential Creation					
			Upto IX Plan	During X plan	Upto X Plan	During XI Plan (Ant.)	Upto XI Plan (Ant.)	Target 2012-13**
3	Assam	970.00	243.92	68.98	302.69	153.27	455.96	6.562
4	Bihar	5223.50	2680.00	279.00	2879.00	175.46	3054.46	60.000
5	Chattisgarh	1146.93	922.50	888.18	1137.00	132.32	1269.32	15.882
6	Goa	62.00	21.17	16.48	33.75	21.80	55.55	2.969
7	Gujarat	3000.00	1430.37	788.13	2230.50	1448.59	3679.09	235.000
8	Haryana	3000.00	2099.49	91.87	2193.70	12.59	2206.29	0.00@
9	Himachal Pradesh	50.00	13.35	2.10	15.45	15.00	30.45	4.200
10	Jharkhand	1276.50	354.47	23.61	397.77	132.94	530.71	45.000
11	Jammu Kashmir	250.00	179.69	249.50	187.30	138.31	325.61	42.910
12	Karnataka	2500.00	2121.12	6.63	2637.71	328.12	2965.83	111.390
13	Kerala	1000.00	609.49	480.98	669.49	46.20	715.69	15.000
14	Madhya Pradesh	4853.07	1386.90	65.00	1931.90	574.53	2506.43	230.000
15	Maharashtra	4100.00	3239.00	255.15	3494.15	634.56	4128.71	NF
16	Manipur	135.00	91.15	11.90	106.55	51.95	158.50	26.085
17	Meghayala	20.00	0.00	0.00	-	-	-	-
18	Mizoram	0.00	0.00	0.00	-	-	-	-
19	Nagaland	10.00	0.00	1.00	-	-	-	-
20	Orissa	3600.00	1826.56	163.41	1974.36	173.00	2147.36	46.500
21	Punjab	3000.00	2542.48	62.19	2574.67	109.72	2684.39	64.000
22	Rajasthan	2750.00	2482.15	408.20	2861.58	305.55	3167.13	25.950
23	Sikkim	20.00	0.00	0.00	-	-	-	-
24	Tamil Nadu	1500.00	1549.31	11.75	1562.56	15.71	1578.27	0.00@

Sl No	Name of State/ UT	Ultimate Irrigation Potential	Potential Creation					
			Upto IX Plan	During X plan	Upto X Plan	During XI Plan (Ant.)	Upto XI Plan (Ant.)	Target 2012-13**
25	Tripura	100.00	4.90	13.80	14.05	15.20	29.25	4.078
26	Uttar Pradesh	12154.00	7910.09	871.26	8781.97	506.12	9288.09	199.240
27	Uttarakhand	346.00	280.30	9.35	288.98	0.00	288.98	0.00
28	West Bengal	2300.00	1683.29	86.52	1754.81	146.60	1901.41	140.000
29	Union Territories	98.00	6.51	0.00	0.00	0.00	0.00	0.00
	Total	**58465.00**	**36981.43**	**5295.63**	**41637.86**	**6341.06**	**47972.41**	**1666.77**

***Figures under reconciliation with states**

@ No new potential creation. Only stabilisation

NF: Not Furnished by the State

****As reported by the states in their Annual Plan 2012-13 documents and during the Working Group meetings in the Planning Commission.**

Source: Planning Commission

Table 2.2

Number of Major, Medium & ERM Projects taken up and completed up to XI Plan

Category	Projects Taken Up			Projects completed			Balance
	Pre-plan	Upto XI Plan	Total	Pre-plan	Upto XI Plan	Total	
Major	74	399	473	74	221	295	178
Medium	143	1136	1279	143	875	1018	261
ERM	-	265	265	-	139	139	126
Total	217	1800	2017	217	1235	1452	565

Source: Planning Commission

Table 2.3

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

Period	Outlay/ Expenditure (in Crore Rs.)		Potential created (Mha)		Potential Utilized (Mha)
	During	Cumulative	During	Cumulative	Cumulative
Pre-plan period	-	-	9.70	9.70	9.70
I Plan (1951-56	376	376	2.50	12.20	12.98
II Plan (1956-61)	380	756	2.13	14.33	13.05
III Plan (1961-66)	576	1332	2.24	16.57	15.77
Annual Plan (1966-69)	430	1762	1.53	18.10	16.75
IV Plan (1969-74)	1242	3004	2.60	20.70	18.69
V Plan (1974-78)	2516	5520	4.02	24.72	21.16
Annual Plans (1978-80)	2079	7599	1.89	26.61	22.62
VI Plan (1980-85)	7369	14968	1.09	27.70	23.57
VII Plan (1985-90)	11108	26576	2.22	29.92	25.47
Annual Plans (1990-92)	5459	31535	0.82	30.74	26.32
VIII Plan (1992-97)	21072	52607	2.22	32.96	28.44
IX Plan (1997-2002)	48259	101896	4.09	37.05	31.03
X Plan (2002-2007)	82195	184091	5.30	41.64	33.74
XI Plan (2007-12)*	164853	348944	6.34*	47.97*	35.01*

** Anticipated figures under reconciliation with States*

Source: Planning Commission & Report of the Working Group on MMI & CAD 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.

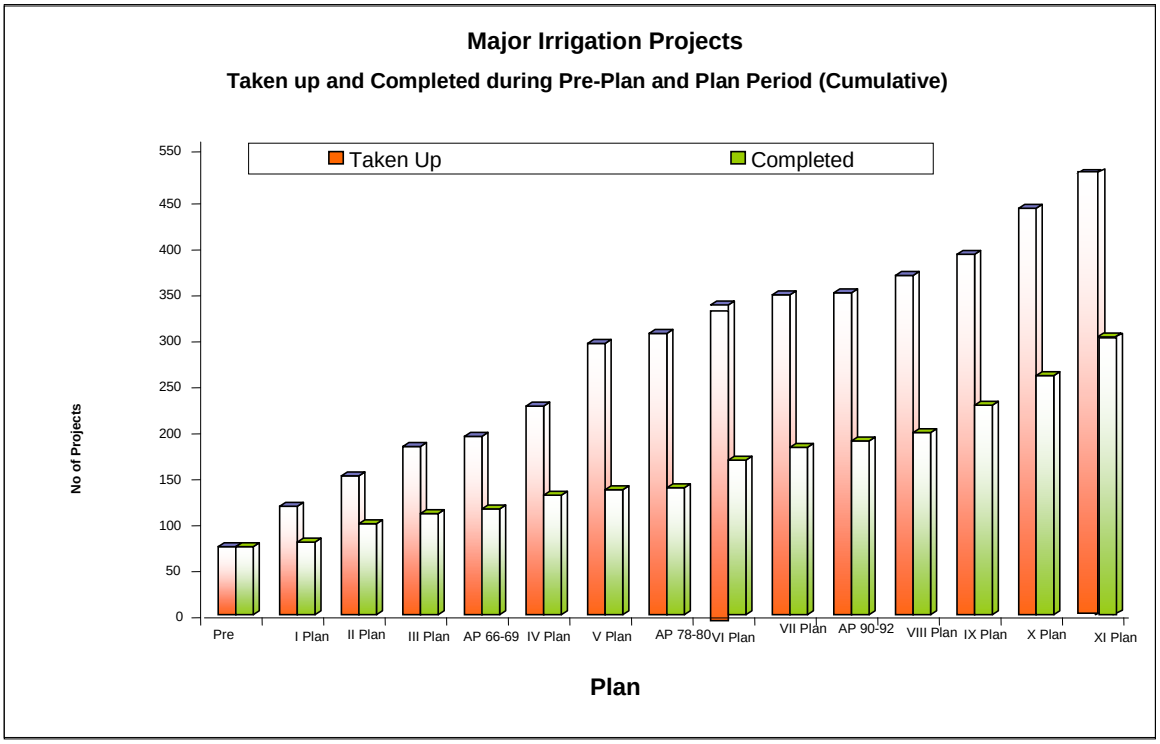


Fig 2.2 Major Irrigation projects taken up and completed (Cumulative)

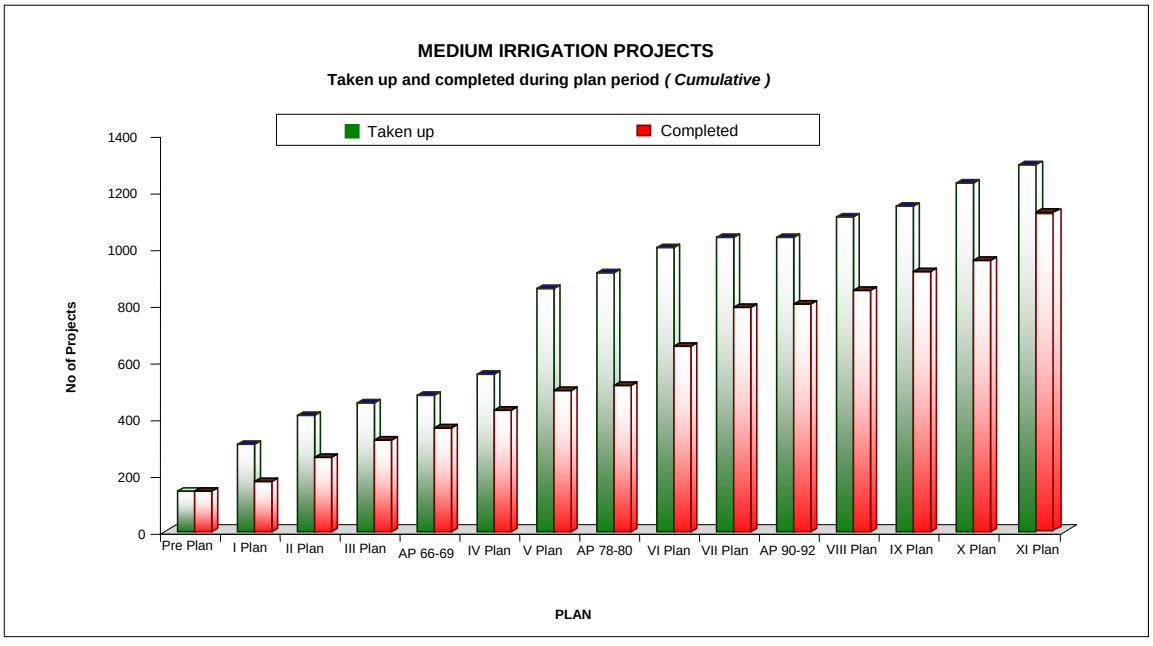


Fig 2.3 Medium Irrigation projects taken up and completed (Cumulative)

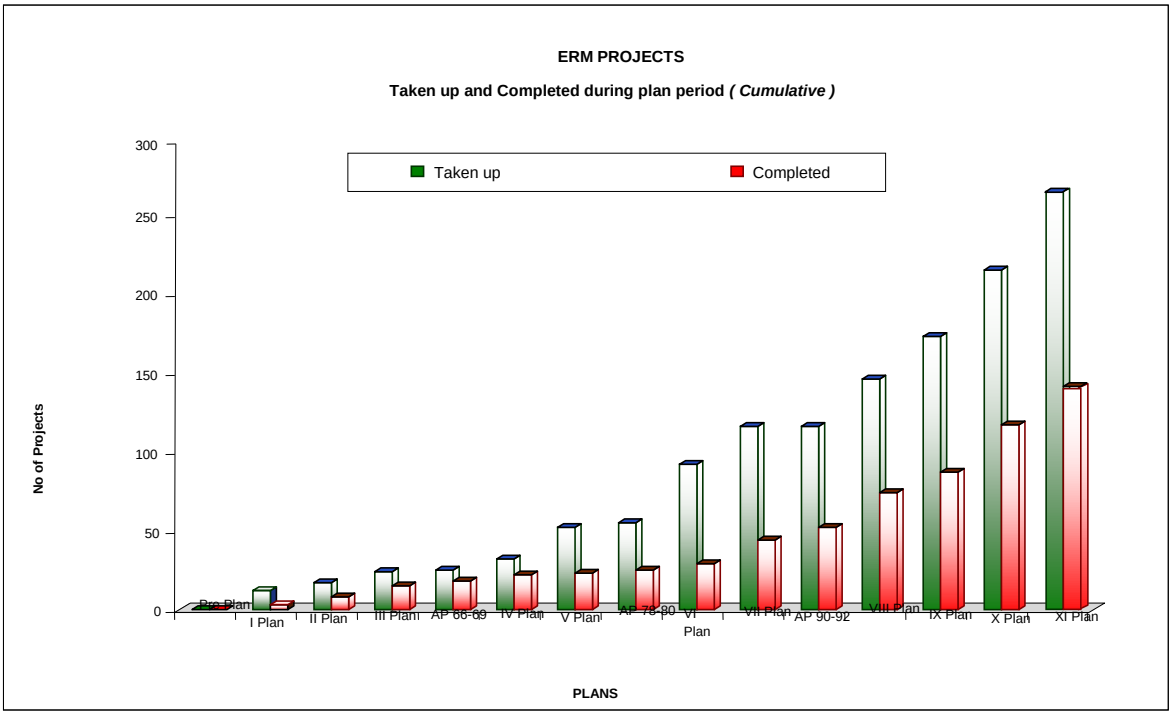


Fig 2.4 Modernization of ERM Projects taken up and Completed (Cumulative)

CHAPTER-III

RIVER MANAGEMENT

3.1 Systematic Collection and Compilation of Hydrological Data

India has a total geographical area of 329 Mha having an annual precipitation of 4000 BCM with wide temporal and spatial variation. India from river basin point of view has been divided into 20 river basins. The collection of hydro-meteorological data for all the river basin in scientific manner is essential for 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 level /inflow forecasting, solving of International & Inter-State issues, river morphology studies, Reservoir siltation studies, development of inland waterways, research related activities etc.

Central Water Commission is operating a network of 878 Hydrological Observation (HO) stations 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 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

S. No.	Name of Basin	No. of Sites
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

In addition to above, it also operates 76 exclusive meteorological observations stations in carious basins in the country.

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 Organization at CWC headquarter at Delhi maintains hydrological data pertaining to all rivers of India. The data is provided to the bonafide users on request following a set procedure and guidelines for release of data by concerned field Chief Engineer of CWC. Computerized data is now available for all basins after the implementation of the Hydrology Project Phase-I. The users of the data include Central/State Government offices, Public Sector Undertaking and Institutions/Societies working under the direct control of Central/State Governments and IIT's and Research Institutions/Scholars.

Five Regional Data 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.

During the year 2014-15, hydro-meteorological data at all 954 sites has been observed. A few sites have been upgraded with modern hydrological equipment such as Acoustic Doppler Current Profiler (ADCP). Water quality monitoring has been strengthened by providing sophisticated water quality analysis equipments in the laboratories.

To expand and strengthen the above activities, provision has been made to upgrade the existing 100 Hydrological Observation Stations, upgrade 23 water quality laboratories and opening of 800 new sites under component "Hydrological Observations Monitoring

System" of the 12th Five Year Plan Scheme, namely, Development of Water Resources Information System. An outlay of Rs. 1024 Crore has been kept for the purpose. This will help in addressing the data requirement of the country more precisely and in better scientific manner. Till now, Central Water Commission has opened 177 new sites. However, measurement of few parameter with reduced frequency is being done at these sites due to paucity of required manpower. Central Water Commission has also upgraded 100 existing sites as envisaged in the Plan.

3.1.1 Hydrology Project

Hydrology Project, Phase-I(HP-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, River Development & Ganga Rejuvenation. The project was implemented during September, 1995 to December, 2003.

Under HP-I, an Integrated Hydrological Information System (HIS) providing reliable, comprehensive and timely hydrological and meteorological data relating to 56 parameters was established. A total of 916 river gauge stations, 7912 observation wells and 436 hydro meteorological stations, operated by various central and state agencies, collecting data on qualitative and quantitative aspects of both surface water and ground water were covered by the system. 380 Data Centers and 31 Data Storage Centers equipped with specialized hardware and software have also 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 also successfully computerized valuable historic data relating to rainfall and river discharge.

Hydrology Project, Phase-II (HP-II), a follow up of Hydrology Project-I, was launched, thereafter, 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 and Pondicherry and two new Central agencies viz., Central Pollution Control Board and Bhakra Beas Management

Board have been included in the Phase-II of the project. The project was approved by the Government of India in the month of May, 2006. As per Revised Cost Table 2013, the estimated cost of CWC component of HP-II was Rs. 26.73 Crore. The original completion period of HP-II was June, 2012, which was extended up to May, 2014 by the World Bank. The project has since been completed.

CWC component of Hydrology Project-II: Central Water Commission's component for HP-II consists of two major components, namely, institutional strengthening and vertical extensions. The details are given below:

I. Institutional Strengthening

This component includes consolidation of the gain made under HP-I by way of strengthening of capacities through training; upgradation/ replacement of hardware/ software acquired during HP-I; maintenance of website; data dissemination and knowledge sharing – workshops / seminars tours etc. Upgradation of the Data Storage Centre Software (WISDOM) was also envisaged to obviate the issues related to hardware, software and licence.

The progress made under this component by CWC is as given below:

- **Strengthening of NWA, Pune:** National Water Academy, Pune has been entrusted to arrange various training courses for the participating agencies involved under horizontal and vertical extension component of the project. Following activities were carried out by NWA under this component of the project.

    a. Trainings: Since the beginning of the project, a total of 57 training programmes have been organised under which 1342 officers have been trained till March 2015. 9 International training courses were also arranged at UNESCO-IHE, Delft, The Netherland on different subject in the field of water resources. So far, a total of 19 officers from CWC have been trained in the different courses.

    b. Construction of facilities: The works for construction of 2 Lecture Halls, one Computer Lab and extension of Krishna Hostel have been completed. Godavari Hostel has also been upgraded by installing TV, AC etc in each room.

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

- **Upgradation of National River Water Quality Laboratory at New Delhi:** An Atomic Absorption Spectrophotometer has been installed in National River Water Quality Laboratory, New Delhi for analysis of trace and toxic metals.

- **Modernization of Hydrological Observation Stations:** Acoustic Doppler Current Profilers (ADCP) has been procured at 15 locations for discharge measurement on large rivers. These stations include Varanasi, Rishikesh, Shahzadpur, Allahabad (Chhatnag) and Mirzapur on river Ganga; Billingundulu on River Cauvery; Wadenpalli on River Krishna; Garudeshwar, Barmanghat, Hoshangabad and Handia on River Narmada; Bhomoraguri, Pandu and Pancharatna on river Brahmaputra; and A.P. Ghat on river Barak.

- **Online Surface Water Information System (eSWIS):** 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. An Online Surface Water Information System (eSWIS) to upgrade the functionality of the existing suite of HIS software packages namely, SWDES (Surface Water Data Entry System), HYMOS (Hydrological Modelling Software) and WISDOM (Water Information System Data Online Management) has been developed. The new system replaces obsolete components of existing system and has improved system architecture. The new system also has web based facility for hydro-meteorological data entry, primary data validation, secondary data validation and data dissemination as well as dissemination of flood forecasts. The new HIS consists of the following components:-

    1. A Web based Data Entry system
    2. Provision for 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 software is extensively being used in CWC.

- **Real Time Water Quality Monitoring Systems:** Under the project, Real Time Water Quality Monitoring Systems (RTWQMS) has been installed at three locations viz. Agra (Jawahar Bridge) on river Yamuna, Lucknow on river Gomti and Moradabad on river Ramganga for measurement of pH, Conductivity, Temperature, Dissolved Oxygen, Bio-chemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD) parameters. The stations are operational at all three locations and real time water quality data of these station is available on web site http://cwc.rtwqms.com .

II. Vertical Extension

- **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. Therefore, development of "Hydrological Design Aids - Surface Water"(HDA-SW) including standardization of methodologies/ protocols 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 was taken up by CWC through consultancy. HDA-SW has the following three major components:

  a) Assessment of Water Resources Potential - Availability/yield assessment (HDA-Y);
  b) Estimation of Design Flood (HDA-F); and
  c) Sediment Rate Estimation(HDA-S)

  The software is under development.

3.1.2 Water Quality Monitoring

Central Water Commission is monitoring water quality at 433 key locations covering all the major river basins of India. CWC is maintaining a three tier laboratory system for analysis of the physic-chemical parameters of the water. The Level-I laboratories are located at 407 field water quality monitoring stations on major rivers of India where physical parameters such as temperature , colour , odour specific conductivity, total dissolved solids, pH and dissolved oxygen of river water are observed . There are 18 Level–II laboratories located at selected division offices throughout India to analyse 25 nos. of physico-chemical characteristics and bacteriological parameters of water. 5

Level-III/II+ laboratories are functioning at Varanasi, Delhi, Hyderabad, Coimbatore and Guwahati where 41 parameters including heavy metals / toxic parameters and pesticides are proposed to be analysed. The water quality data generated is computerized in Database system and disseminated in the form of Water Quality Year Books, Status Reports and Bulletins.

The data being so collected are put in various uses viz. planning and development of water resources projects, climate change studies, water availability studies, inter-State issues, research related activities, etc.

A report titled "*Status of Trace & Toxic Metals in Rivers of India*" has been published in May 2014. Another report titled "*Water Quality Hot Spots in Rivers of India*" is under preparation.

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 16 States viz. Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Orissa, Telangana, 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.

In view of early setting in and late withdrawal of south west monsoon and associated floods, it was decided to notify the designated flood period of all the basins to cover pre monsoon and post monsoon incidents. Accordingly, a notification was issued by CWC extending the designated flood period vide no. 3/120/2013-FFM/2638-2717 dated 03/12/2013. Accordingly the duration of flood season 2014 for various basins as given below:

Brahmaputra Basin: 1st May to 31st October 2014
All other basin up to Krishna Basin: 1st June to 31st October 2014
Basins south of Krishna basin (Pennar, Cauvery and southern Rivers): 1st June to 31st December 2014.

3.2.1 Flood Forecasting Performance during 2014 and Role of Newly Launched Website e-SWIS.

During the flood season 2014 (May to Oct.), 4772 flood forecasts (3884 level forecast and 888 inflow forecasts) were issued out of which 4667 (97.80%) forecasts were found within accuracy limit of ± 0.15 m for level forecast and ± 20% for inflow forecast.

From the flood season of 2014, the entry of hydrological data of base stations is being done by all Divisions of CWC on real time basis in the newly launched web-based software e-SWIS. This has enabled real time monitoring of the current status of the river.

The e-SWIS portal has user friendly features like map based display of latest status of Flood Forecasting sites, display of hydrograph based on past 72 hours actual observed data plus forecast, if any, etc. The eSWIS flood forecast module has inbuilt programme for generation of email/ SMS for flood alert which can be sent to various users using bulk SMS services. These utilities of flood forecast module of eSWIS has been fully utilized by Divisions of CWC as well as CWC HQ during 2014.

During the flood season of 2014 (May to October), out of 147 level forecasting sites, unprecedented flood situation (where the Highest Flood Level (HFL) attained during

the flood season exceeded their respective previous HFL) was witnessed at two flood forecasting stations, namely, Balrampur on river Rapti in Balrampur District and Elgin Bridge on Ghagra in Barabanki District of Uttar Pradesh.

High flood situations were experienced at 9 (Nine) forecasting stations where peak level had attained within 0.5m of previous HFL, viz., River Baitarni at Anandpur in Keonjhar District of Odisha; River Brahmaputra at Dibrugarh in Dibrugarh District and at Neamatighat in Jorhat District; River Buridehing at Chenimari (Khowang); River Beki at Road Bridge in Barpeta District of Assam; River Ghaghra at Ayodhya in Faizabad District of Uttar Pradesh, at Darauli and at Gangpur Siswan in Siwan District of Bihar; and River Bagmati at Benibad in Muzzafarpur District of Bihar.

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 2014, 184 daily bulletins (once daily), 33 Orange Bulletins for High Flood Situation (Twice daily) and 21 Red Bulletins (every 3 hours) were issued as per Standard Operating Procedure (SOP) issued by National Disaster Management Division of Ministry of Home Affairs (MHA) .

Apart from regular bulletins, CWC prepared various status notes for NDMA, MoWR, National Crisis Management Committee (NCMC), National Executive Council (NEC) meetings on occurrence of severe flood events.

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. In addition to this, Telephone, Mobile, SMS, FAX and E-mail are also used by the Divisional Flood Control Rooms and Central Flood Control Room under CWC, New Delhi for transmission of data and information. The Central Flood Control Room at Delhi was operated on 24x7 basis during monsoon. The forecast, water level and rainfall information were regularly uploaded on web site http://india-water.gov.in/ffs during monsoon season 2014.

3.2.4 Modernization of Flood Forecasting Services

The Central Water Commission is making a constant endeavour in updating and modernizing the forecasting services. The 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 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, one Earth Receiving Station (ERS) at New Delhi (Upper Yamuna Division) and 10 Modelling Centres at Patna (Middle Ganga Division - V) in Bihar; Jalpaiguri (Lower Brahmaputra Division) in West Bengal; Lucknow (Middle Ganga Division-I) and Varanasi (Middle Ganga Division -III) in Uttar Pradesh; Dehradun (Himalyan Ganga Division) in Uttarakhand; Gandhinagar (Mahi Division) and Surat (Tapi Division) in Gujarat; Bhusaval (UTSD) in Maharashtra; Shimla (Snow Hydrology Division) in Himachal Pradesh; and FFM Directorate in NCR, Delhi have been installed. The data reception from all the telemetry sites is being monitored by FFM Directorate, CWC, New Delhi.

The 12th Plan (2012-17) proposal for Flood Forecasting activities in CWC with an estimate cost of Rs 290.00 Crore is under consideration of Ministry. The proposal includes provisions for installation of telemetry system at remaining sites of existing Flood Forecasting Network; establishment of additional Modelling Centres and

installation of telemetry system at 410 sites for starting flood forecasting activity at 100 new forecasting stations.

The installation of telemetry at remaining 206 stations of the existing Flood Forecasting network is proposed to modernize the entire network by providing facility of sensor based automatic data collection and satellite based data transmission. Out of this, works for installation of telemetry system at 130 sites have been taken up so far. Installation of telemetry at 56 stations has been completed and installation at 09 stations is in progress. The work for remaining stations shall be taken up shortly.

Moreover, establishment of three modelling centres at Chennai, Bhopal and Lucknow have also been proposed during XIIth Plan. Out of this, establishment of Modelling Centre at Chennai has been completed.

The data in respect of all above stations will be received at ERS Delhi (installed under 11th plan) and subsequently shall be sent to respective Modelling Centres.

3.2.5 Mathematical Modeling for Flood Forecasting

The mathematical models for Inflow forecasting of Hathnur & Ukai Reservoir in Tapi River and Madhuban Reservoir in Dhamanganga River in Tapi basin have been developed by CWC. These models have been tested and validated for the Monsoon Season 2014. It is planned to issue inflow forecast for these reservoirs through models in ensuing monsoon.

Development of Flood Forecasting Models using MIKE11 for Golakganj on the river Sankosh, Dhubri on the river Brahmaputra and extension of model from Delhi Rly Bridge to Etawah on the river Yamuna is in progress.

Development of Rainfall Rainfall Runoff based Flood Forecasting Models for formulation of 3 day advance level forecast using quantitative precipitation forecast (QPF) provided by IMD, for few basins in the Himalayas is being taken up from the next monsoon season.

Performance of already developed / under trial Flood Forecasting models based on MIKE11, which are used by field offices of CWC, is being monitored & examined. The work of further refinement based on current data, if needed is also being done. The difficulties encountered during real time operation are also being attended.

3.2.7 Flood Damage Statistics

Central Water Commission compiles annual flood damage data based on data received from State Government. The damage data up to 2012 has been finalized and published. Tentative data for 2013 and 2014 is under confirmation from States.

3.2.8 Special Studies / Works during 2014-15

3.2.8.1 Study of unprecedented flood situation in Jammu and Kashmir during September 2014

There has been a catastrophic flood during September 2014 in river Jhelum due to severe rainfall in the catchment which disrupted the normal life there.

Subsequently, Ministry of Water Resources, River Development and Ganga Rejuvenation (MoWR, RD&GR) constituted a 3 Members Committee to conduct an in-depth study and analysis of the recent unprecedented floods in Jammu & Kashmir and to make suitable recommendations along with action plans to deal with such threat. The group has finalised the report and recommendations have been given to the Government of India for taking further necessary action. One of the recommendations of the Group was to develop Rainfall-Runoff based Flood Forecasting model for Jhelum river at Srinagar (Ram Munshibag).

Based on the above recommendations, CWC has developed a rainfall based Flood Forecasting model for Ram Munshibag (Srinagar) on Jhelum River utilizing available hydro-meteorological and river morphological data and integrating India Meteorological Department (IMD) real time data of rainfall as well as Quantitative Precipitation Forecast for 3 days. The model will be further calibrated during Monsoon 2015. The protocol for forecast dissemination is being finalized in consultation with the State Government. The forecast was planned to be issued from 1st June 2015. However, in view of heavy to very heavy rainfall during last week of March & first week of April due to Western Disturbances (WD), flood like situation arisen and CWC issued Flood Forecast based on developed model (Rainfall-Runoff plus Hydrodynamic) till water level receded below warning level.

3.2.8.2 Landslide dam in Nepal on Koshi River

Due to massive landslide in association with heavy rainfall near Sindhupal Chowk District in Nepal on 2nd August 2014 around 0300 Hrs, the river Bhote Kosi, a tributary of river Kosi got blocked. Height of newly formed dam composed of loose debris deposits in the left bank and fractured/fragmented rock mass in the right bank of the river was approximated to 40 m. Length of ponding water from dam to nearby settlement in the upstream was 3 Km. Average width of the river at the dam site was estimated to 100 m. Width of the deposited mass towards the flow direction was estimated 50 m.

The Government of Nepal did controlled blasting to give passage to gradual release of water from the artificial dam created due to landslide on 2/8/2014 by evening to reduce water level slightly and check further rise. A group of officers/experts including two officers from CWC visited Nepal on 2-8-2014 to review the situation and suggest measures. An analysis was carried out in CWC for dam break situation and it was found that the impact of the sudden breach of the artificial dam may result in flood propagation upto Kosi barrage taking 20 hrs and the maximum rise in river water level near Kosi barrage of the order of 30 to 50 cm. Based on the results of dam break study presented to National Crisis Management Committee (NCMC) by Chairman, CWC, the evacuation process initiated by Government of Bihar from the villages along Kosi river in India was stopped. Hourly data from the upstream of landslide site (Bahrabise), downstream of land slide site (Bhatpurwaghat) and upstream of Kosi barrage (Chhatra) in Nepal as uploaded in the Department of Hydrology & Meteorology, Government of Nepal as well as sites in India were monitored from Headquarters as well as from the concerned field division (MGD IV, Patna). Adequate dissemination of information through reporting of discharges and water levels at Bahrabise and Pachuwar Ghat as well at Chatra, Birpur, Basua, Baltara and Kursela were made by the Flood Forecasting Control Room of CWC.

The artificial lake breached with displacement of big boulder on 7th September 2014. Following the burst, the water level in the lake reduced by 18 m. The volume and intensity of water release peaked on 7th September itself and the water level has gone down significantly and many of the submerged structures have resurfaced. No damage reported due to breach of LSD.

3.2.8.3 Landslide Dam in J&K on Phuktal River

A major landslide occurred on the left bank of river Phuktal, about 20 Km. upstream of Phuktal Gompa on 31-12-2014 blocking the river Phuktal completely resulting in formation of artificial lake. The assessment of magnitude of landslide, volume of water being stored behind the land slide dam, the risk involved was assessed by NDMA expert team during February and March 2015. Dam break analysis was carried out by CWC to assess the travel time of flood wave and water level at various locations in the downstream in the event of breach.

An operation for controlled release of impounded water behind the dam was carried out by the NDMA team consisting of officers from various organisations including CWC jointly with Indian Army and Air Force during March 2015. During operation, a channel (75mX2mX2m) was created for draining out the fresh inflows and gradual depletion of impounded water before breach. As a complementary measure to channel creation, an Automatic Water Level Recorder (AWLR) was also installed at Phuktal Gompa by CWC to monitor the river water level by State Government officials and alarming people in the downstream in case of abnormal rise in water level due to breach.

As planned, the channel widened & deepened gradually to allow more water to flow. This was reflected in the gradual increase in water level at Phuktal from 10 cm at the time of channel creation (12-16 March 2015) to 85 cm on 6th may 2015. Ultimately, the dam breached early morning on 7th May 2015. There was no casualty due to continuous monitoring and early warning system in place based on dam break study of CWC. The flooding pattern in terms of rise in water level and travel time fairly matched with the dam break study of CWC. Damage to AWLR, few buildings and dozens of small and low height bridges was inevitable.

3.2.9 Future Activities

Common Alerting Protocol (CAP) is an XML-based data format for exchanging public warnings and emergencies between various alerting technologies. CAP allows a warning message to be consistently disseminated simultaneously over many warning

systems to many applications. CAP increases warning effectiveness and simplifies the task of activating a warning for responsible officials. CWC is working with Google to disseminate the flood warning through CAP. This service is likely to be made functional from Monsoon 2015.

Development of Rainfall-Runoff in conjunction with Hydrodynamic Routing Concept based model for flood forecasting in Hilly reaches of rivers has been undertaken in CWC. The model will enable CWC to issue advance flood advisories by using 3/5 days rainfall forecast issued by IMD followed by more reliable forecast based on actual observed hourly rainfall in the catchment. Such models for Jhelum and Alaknanda rivers are ready to be used during 2015.

3.3 Flood Management Programme

The "Flood Management Programme (FMP)" was initiated by the Government of India in XI Plan. During this plan period (2007-12), 420 nos of schemes of various States were funded under FMP and an amount of Rs. 3566.00 crore released to the State Governments.

The Government of India has now approved the continuation of "Flood Management Programme" with total estimated cost amounting to Rs. 10,000 core during XII Plan period (2012-17). The above State Sector scheme under Central Plan envisages provision for central assistance to the State Governments for taking up works related to river management, flood control, anti erosion drainage development, flood proofing, restoration of damaged flood management works, anti sea erosion and catchment treatment etc.

During XII plan period (2012-17) the Inter Ministerial Committee of MoWR for Flood Management Programme (IMC-FMP) has approved 97 schemes of various states having estimated cost of Rs. 4412.58 Crore for funding under FMP. Central Water Commission coordinates the release of funds for scheme under FMP in Ganga and Brahmaputra basin areas. The details of fund released during 2014-15 to States for areas other than Ganga and Brahmaputra basins are given in Table 3.2.

Table 3.2

State-wise fund released under Flood Management Programme during 2014-15			
Sl No.	Name of State	Details of Funds released during 2014-15	
		Number of Schemes	Amount (Rs. in Crore)
1	HP	2	112.79
2	J&K	6	15.16
3	Kerala	3	55.22
4	Uttar Pardesh	1	6.14
Total		8	189.31

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 Studies of three rivers namely, Ghaghra, Satluj and Gandak rivers were completed during 10th Plan period.

A provision of Rs. 15.60 Crores has been sanctioned by MoWR for the 12th Plan under the Plan Scheme "R&D Programme in Water Sector" for the works related to morphological studies.

Consultancy works for morphological studies of 14 rivers by Remote Sensing Technique have been awarded to IITs/NIT.

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:

3.5.1 External Assistance: Climate Resilient Coastal Protection and Management Project (CRCPMP)

During year 2014, an agreement has been signed by the Government of India for Technical Assistance (TA) programme namely TA 8652-IND: Climate Resilient Coastal Protection and Management Project (CRCP&MP) to support mainstreaming of climate change consideration into coastal protection and management at the national level and in the two focal States (of Karnataka and Maharashtra) where the Sustainable Coastal Protection and Management Investment Programme (SCP&MIP) is already operational under external assistance from ADB.

This TA will be financed by grant amounting to two million USD ($) from Global Environment Facility (GEF) & administered by Asian Development Bank (ADB). The Ministry of Water Resources, River Development and Ganga Rejuvenation (MoWR, RD&GR) is the Executing Agency and Flood Management Organization (FMO) in Central Water Commission (CWC) under MoWR, RD&GR is designated as Nodal Office for the same. During March, 2015 the ADB has engaged Project consultants for supporting the implementation of TA which is scheduled to complete by Mid-2017.

3.5.2 Shoreline Change Atlas of the Indian Coast:

Shoreline Change Atlas of the Indian coast has been prepared by Space Application Centre, Ahmadabad in association with the Central Water Commission. The final version of the Shore line Change Atlas of the Indian Coast was published in May, 2014. The shoreline change maps under this Atlas depict changes mapped on 1:25,000 scale using satellite images of 1989-91 and 2004-06 time frame and status of coastal protection measures taken up by maritime States and Union Territories. Under this Atlas, these maps depict areas under erosion, accretion as well as stable coast. This Atlas of the

Indian coast shows that around 45.5% of the total coastline is under erosion, around 35.7% of coastline is under accretion and rest is under stable category.

3.6 River Management Activities and Works Related to Border Areas

The Government of India has approved the continuation of "River Management Activities and Works related to Border Areas (RMBA)" a Central sector scheme under Central Plan amounting to Rs. 740.00 core during XII Plan period (2012-17) for taking up following continuing and new activities:

Sl. No.	Activity	Amount (Rs. in Crore)
1	Hydrological observations and flood forecasting on common border rivers with neighbouring countries	82.16
2	Investigation of WR projects in neighbouring countries	115.74
3	Pre-construction activities for WR projects on common border rivers	100.00
4	Grant in aid to states for bank protection /anti erosion works on common border rivers and Union Territories for flood management /anti sea erosion measurers	397.10
5	Activities of Ganga Flood Control Commission (GFCC)	45.00
	Total	**740.00**

3.6.1 Hydro meteorological observations on common border rivers with neighbouring countries

The hydro-meteorological observations at 16 sites in Mahakali Basin for Pancheshwar Multipurpose project are continuing.

3.6.2 Investigation of WR projects in neighbouring countries

M/s WAPCOS Ltd. has been entrusted to carry out the work of preparation of Detailed Project Report (DPR) and CEIA studies of Pancheshwar Multipurpose Project on river.

3.6.2 Grant-in-Aid to States for bank protection /anti erosion works on common border rivers and Union Territories for flood management /anti sea erosion measurers

The details of the proposal for bank protection /anti erosion works on common border rivers between India and Bangladesh received in Central Water Commission from West Bengal Government for release of Grants-in-Aid under the programme is as given below-

Sl. No.	Particular of the scheme	Estimated cost	Fund released	Cost of completed work	Fund Utilized	Amount recommended for release during 2014-15	Status
1	Protection of IBB Road Fencing Bridge & Gate near village Mahismari	505.36	237.5	448.02	237.5	210.52	Completed in April 2013
2	Bank protection work at Jhaukuthi area	394.6	185.5	369.63	185.5	184.13	Completed in January 2013
3	Protection of IBB Road and Fencing at Kayatribari	100.15	47.5	87.29	47.5	**39.79**	Completed in February 2013
	Total	**1000.11**	**470.5**	**904.94**	**470.5**	**434.44**	

The scheme "Flood protection work in Yanam region of UT of Puducherry" was also funded under the Plan Scheme "River Management Activities and Works related to Border Areas". The scheme was initially included for funding under the "Flood Management Programme" and first instalment of Rs. 7.50 crores was released during XIth plan. Subsequently, in view of the Court direction, the scheme was included for funding under RMBA scheme in 2014 and the second

instalment amounting to Rs. 13.2563 crores was released. In total, an amount of Rs. 20.7563 crores has been released to this scheme so far.

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 utilization is a multi-level process involving Central and State Governments, Non-Governmental Organizations 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 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 "National Water Policy – 2012" was adopted by the National Water Resources Council in its 6th meeting held in December 2012 and was later released during India Water Week, 2013 in April 2013. A Committee was constituted by the MoWR for suggesting roadmap for implementation of National Water Policy - 2012 under the Chairmanship of Dr. S.R. Hashim, Former Chairman, UPSC & Former Member, Planning Commission. The Committee has submitted its report in September, 2013.

National Water Planning Directorate has been closely associated with the process of preparation of the roadmap for implementation of the policy.

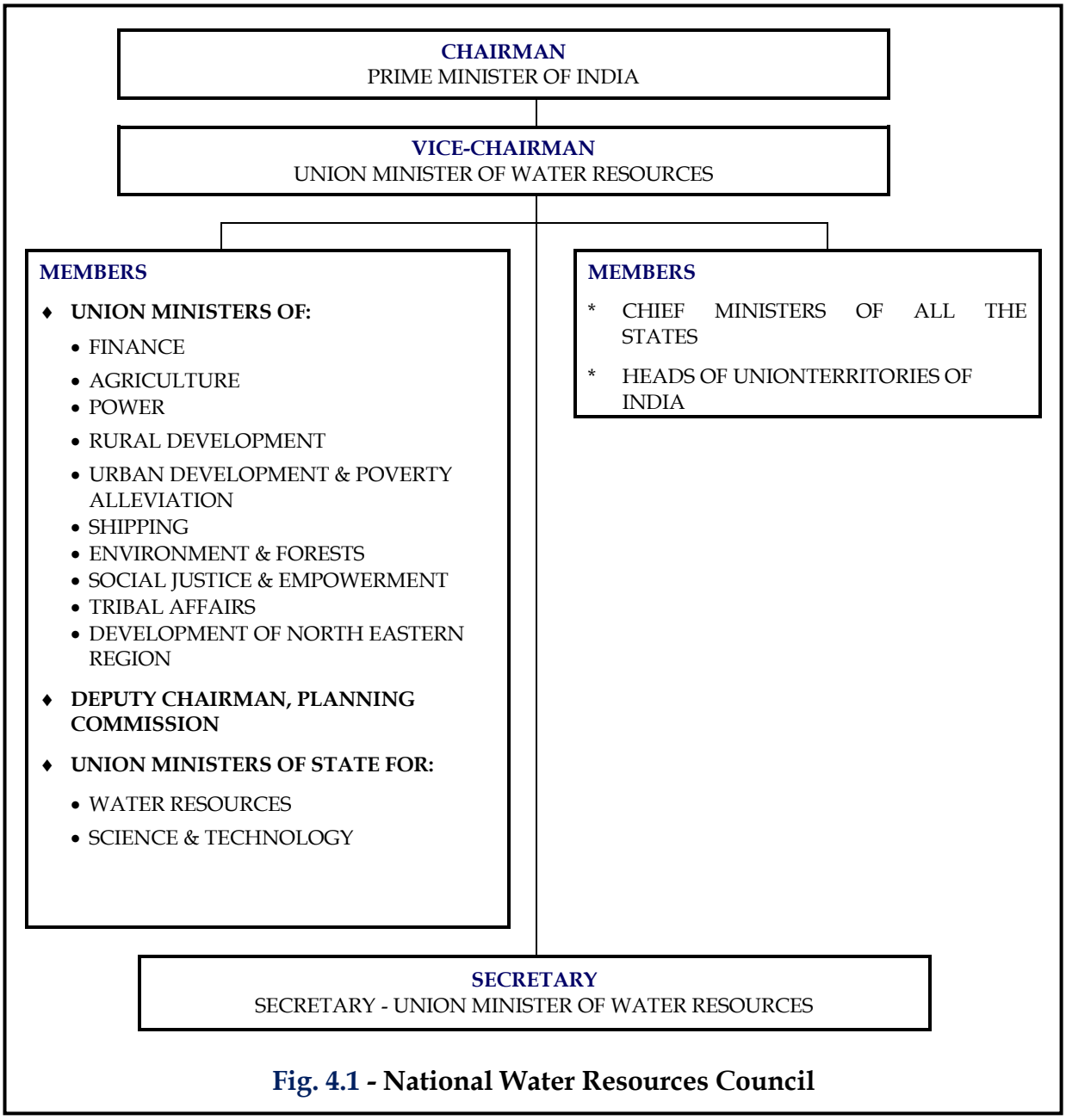


Fig. 4.1 - National Water Resources Council

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. The roadmap for implementation of the National Water Policy – 2012 prepared by the Committee constituted by MoWR, RD&GR is likely to be discussed in the next meeting of the National Water Board.

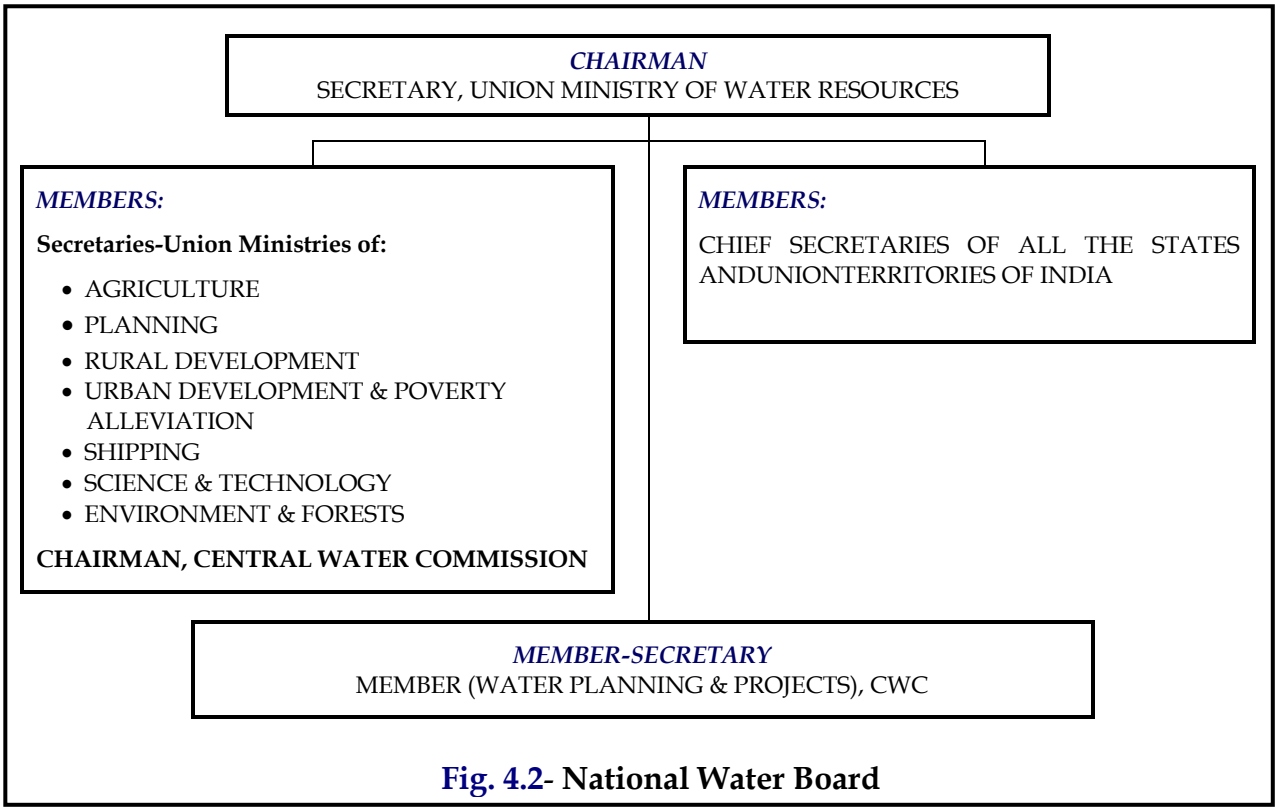


Fig. 4.2- National Water Board

4.5 Interaction with NWDA on Inter–Basin Transfer of Water

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 60 meetings of the Governing Body have been held.

4.6 Basin Planning and Related Issues

4.6.1 Reassessment of Basin-wise 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.

In June, 2010 Central Water Commission (CWC) and National Remote Sensing Centre (NRSC) jointly initiated a demonstrative pilot studies in Godavari and Brahmani-Baitarani river basins wherein remote sensing based geo-spatial inputs were used to estimate basin-level mean annual water resources. The pilot study in the Godavari and Brahmani-Baitarani Basin was completed in June, 2013.

For upscaling of the studies in other basins of India, a proposal was prepared by CWC and submitted to MoWR,RD&GR in 2013. As per advise of Ministry, the study namely, "Reassessment study for water availability in India using space inputs" was planned to be conducted through field offices of CWC with technical support provided by National Remote Sensing Centre (NRSC). The study was to be completed in a period of one year.

MoWR, RD & GR vide their letter dated 30.01.2015 has conveyed the approval for the study with a total estimated cost of Rs. 6,43,87,386/- including payment of Rs. 38,87,386/- or actual, whichever is lower to NRSC. The process of procurement for the requisite software and hardware has been initiated.

4.6.2 Indo-Australia Cooperation for Preparation of IWRM Plan

In pursuance to the Memorandum of Understanding (MoU) signed between Government of India and Government of Australia in November 2009, a Joint Working Group (JWG) comprising of members from the two countries was constituted. CWC was 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 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 was selected for the case study. The work was proposed to be carried out in association with concerned State Governments and experts of Australia.

The 2nd meeting of Indo-Australia Joint Working Group (JWG) was held in Australia during 29th April to 3rd May, 2013. During the meeting, a detailed action plan was agreed between India and Australia for the preparation of Integrated Water Resources Management (IWRM) Plan for Brahmani-Baitarani River Basin. The IWRM Plan was to be jointly prepared by India and Australia by involving all the stakeholders, using Australian modelling platform/software i.e. eWater Source. After preparation of Integrated Water Resources Management (IWRM) Plan for Brahmani-Baitarni basin, the same was proposed to be replicated in other basins of the country. The data received so far are being analysed jointly by CWC/State Government officials and Australian Experts.

As the MoU signed in November, 2009 was to expire in November, 2014, both Government of India and Australia renewed the Memorandum of Understanding (MOU) in September, 2014 for a further period of 5 years.

Based on the data available in CWC and made available by the State Governments and other agencies, the officials of CSIRO, Australia developed a prototype model for the Brahmani Basin which was discussed in a workshop held at New Delhi on 7th & 8th January, 2015 and the same was also presented in India Water Week 2015.

The detailed action plan for the remaining period of the study was discussed in the 3rd meeting of JWG held at New Delhi on 19.01.2015. During the meeting, emphasis was made on the need for intensive training of the Indian officials on the eWater software and was decided that the training of the officials of State and Central Government may be done more frequently and the prototype of Brahmani Basin developed by CSIRO officials may be used for the training purposes. The project for preparation of Integrated Water Resources Management (IWRM) Plan for Brahmani-Baitarani River Basin is likely to continue upto June, 2016.

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 6th April 2011.

The Mission, duly approved by the Government, has set five goals to achieve the above objective, which are:

1. Comprehensive water data base in public domain and assessment of the impact of climate change on water resource

2. Promotion of citizen and state actions for water conservation, augmentation and preservation
3. Focused attention on vulnerable areas including over-exploited areas
4. Increasing water use efficiency by 20%
5. Promotion of basin level integrated water resources management

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).

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 model has since been developed and the forecasting activity has been started from April 2012. Refinements of models are under progress as per observed data received from field offices of CWC.

MoWR,RD&GR has established six Chairs in Academic institutes, namely, 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 for each of the Institute separately under the chairmanship of Chairman, CWC which has to meet once in a year.

MoWR,RD&GR/CWC has entered into an agreement to undertake a study on "Operational Research to Support Mainstreaming of Integrated Flood Management under Climate Change"" through technical assistance with the Asian Development Bank (ADB) in order to meet the objective of strengthening the protection and resilience of flood prone areas in India. A technical group under CE (P& D), CWC with Director (CC) and Director (FFM) is working closely on the study.

4.8 Integrated Water Resources Management

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 by CWC and the same have been circulated to all State Govts/UTs, Field Offices of CWC and other Union Ministries for comments/observations. The guidelines were discussed in a workshop on IWRM organized by World Bank in Feb, 2015. The guidelines are likely to be finalized soon.

4.9 Joint Operation Committee of Rihand Reservoir

Ministry of Water Resources set up a Joint Operation Committee (JOC) for Rihand Reservoir vide their O.M. No. 54/7/92-BM/1172 dated 30.10.1992. The Committee consists of members from Uttar Pradesh Jal Vidyut Nigam Limited (UPJVNL), Uttar Pradesh Power Corporation Limited (UPPCL), WRD-Bihar, and CEA. Member (WP&P), CWC, New Delhi is the Chairman of the Committee. So far 26 meetings of JOC have taken place. The last meeting (27th meeting) was held in New Delhi on 13th October 2014 in which the actual releases made from Rihand reservoir during 2013-14 were discussed and the operation plan for 2014-15 was finalized.

4.10 Revision /Drafting of various water related Acts /Laws

The Committee constituted by MoWR under the Chairmanship of Justice (Retd) T. S. Doabia to study the activities that are required for optimal development of a river basin and changes required in the existing River Board Act, 1956 for achievement of optimal development of a river basin has submitted its report to MoWR. The Committee has proposed a draft "River Basin Management Bill" which would replace the existing River Boards Act, 1956.

The Ministry of Water Resources has also constituted a Drafting Committee under the Chairmanship of Dr Y. K. Alagh to draft National Water Framework Law. The Committee has submitted its report to MoWR in May, 2013. National Water Planning

Directorate of CWC was closely associated with the Committee in preparation of the draft Bill.

National Water Planning Directorate of CWC has also provided regular inputs for preparation of the Draft Brahmaputra River Valley Authority Bill, 2013 which is under finalization.

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

5.2.1 Details of Design Organisations of CWC

The following three design organisations 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) Organisation
2. Design (North-West & South) Organisation

3. Design (East & North-East) Organisation

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

Additionally, Narmada Basin Project Organization with four specialized Directorates is responsible for providing detailed design consultancy services for the projects of Sardar Sarovar Narmada Nigam Ltd. (SSNNL), Government of Gujarat and Narmada Valley Development Authority (NVDA), Government of Madhya Pradesh. The details of activities assigned to various Cell / Directorate under Narmada Basin Project Organisation is as under:

A. Sardar Sarovar Power House Design Directorate (Navagam Design Cell)

Navagam Design Cell (Now, Sardar Sarovar Power House Design (SSPH) Directorate) was created in CWC under Member (D&R), CWC exclusively for designs of Navagam Dam Project and its appurtenant works. The project envisages construction of 1210m long and 163m high (above deepest foundation) concrete gravity dam across the main Narmada River. The Unit-III of the project involves mainly works in regard to the Canal Head Power House (CHPH), underground River Bed Power House (RBPH) and Garudeshwar weir. The planning, civil design and preparation of construction of drawings for CHPH and RBPH of Sardar Sarovar dam have been completed. All the five units of 50 MW each of CHPH and six units of 200 MW each of RBPH have been commissioned. Presently the Directorate is involved in design and issue of drawings for the construction of Garudeshwar Weir project.

The proposal for approval by Sardar Sarovar Narmada Nigam Ltd. (SSNNL) for continuation of Navagam Design Cell (Now SSPH Dte.) for consultancy works of Narmada Basin Projects for the period from 01-04-2015 to 31-03-2017 is under consideration of Government of Gujarat.

In addition to above work, this directorate is also entrusted to provide detailed design consultancy services for Rani Avanti Bai Lodhi Sagar Project (M.P), Chinki Multipurpose Project (M.P), Halon Irrigation Project (MP) and Man Project. (M.P)

B. Narmada Design Cell

The Memorandum of Understanding (MoU) between Central Water Commission and Narmada Valley Development Authority (NVDA), Government of Madhya Pradesh for design and consultancy services of Narmada Basin Projects was signed on 18-06-2004 initially for a period of two years w.e.f. 01-03-2004 to 28-02-2006 with the provision for further extension with mutual consent between CWC and NVDA. Subsequently, MoU have been renewed/signed in spells of two years. The revised estimate for the period of two years w.e.f. 01.03.2015 to 29.02.2016 has already been submitted to NVDA. The design consultancy work on dams and head works, hydro-mechanical design aspects, canal components of different water resources projects of Madhya Pradesh under Narmada Valley Development Authority on river are being carried out by three Directorates under the NBP Unit viz. ND&HW, NHMD and NCD.

I. Narmada Dam and Head Works (ND&HW) Directorate:

Narmada Dam and Head Work Design Directorate is responsible for, providing design consultancy services such as finalising the layout studies, detailed designs and drawings along with specifications for dam and headwork components of Narmada projects being executed by NVDA. The Directorate is also involved in preparation of guidelines for initial commissioning, testing and operation of completed projects.

II. Narmada Hydro Mechanical Design (NHMD) Directorate:

The NHMD. Directorate, CWC at New Delhi has been providing design consultancy (primarily offering design, drawings, technical specifications as well as scrutinizing & vetting of construction drawings & design) in respect of Hydro Mechanical component of the projects in Narmada Basin executed by NVDA.

III. Narmada Canal Design (NCD) Directorate:

Narmada Canal Design Directorate is responsible for providing design consultancy services for above said Narmada Projects being executed by NVDA, which broadly covers planning and preparation of detailed design/drawings for cross drainage works viz. drainage siphon, drainage culvert and super passage head regulator, cross regulator, canal escape, aqueduct etc., scrutiny and vetting of design and drawings of NVDA Project and specific problems of canals of Narmada Valley.

5.2.2 Design Consultancy carried out by Design Organisations

Design consultancy work in respect of 50 projects has been carried out in the design organisations of D&R Wing during the year 2014-15 as under:

Sl. No.	Category	No. of Projects
1.	Projects at construction stage.	37
2.	Projects at investigation and planning stage (for which detailed project reports are being prepared)	7
3.	Projects with special problems	6
	Total	**50**

This includes 4 foreign projects, 1 in Afghanistan and 2 in Bhutan and 1 in Nepal. The list of above National & International Projects is at Annexure 5.1.

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

1. Arjun Sahayak Pariyojana, Uttar Pradesh

This project envisages diversion of surplus water available at Lahchura dam through feeder canal to Arjun Dam and then from Arjun Dam to Kabrai Dam and Chandrawal Dam to augment inflows into three reservoirs, namely, Arjun, Kabrai and Chandrawal. The construction stage design and drawing for the earthen dam, head sluice outlet and its entrance block of feeder canal from Arjun Dam and Kabrai Main Canal have been prepared. So far 28 nos. of drawings have been issued to project authorities.

2. Khetri Iron Ore Tailings Dam, Rajasthan

The raising of Khetri Tailings Dam is done by project authorities in stages. So far the dam has been raised in stages from upstream side based on the drawings prepared on the basis of data supplied by project authorities. The project authorities have now proposed to further raise the Tailings Dam from upstream side and also to construct a spillway on west side of Khetri Tailings Dam. For preparation of drawings in respect of further raising of dam from upstream side, some information/data has been sought from the project authorities. The further work of preparation of construction drawings shall be taken up only after required details are received from project authorities.

3. Icha Dam under Subarnarekha M.P.P., Jharkhand

On the request from State Government, the consultancy works for Icha Dam under Subarnarekha Multipurpose Project (Jharkhand) have been taken up by CWC. All the specification drawings have been issued. It was intimated by the project authorities that they are finalizing the agency for execution of the project. Construction stage drawings of over flow and non-over flow sections are under preparation. In June, 2014, a CWC team led by Chief Engineer, Designs (N&W) inspected the project. During inspection, project officers were requested to provide various data for taking up further design and drawing works pertaining to earthen dam/ embankments in this unit.

4. Kalisindh Dam Project, Rajasthan

Overall 53 construction drawings have been issued to the project authorities. During this period 4 Nos. of Retaining Wall drawings, 3 Nos. of Elevator cum Staircase drawings and 3 Nos. design and 34 nos. drawings of Fish Ladder submitted by project authorities have been examined and comments thereon have been sent. After receipt of reply, the drawings were finalized and issued.

5. Kharkai Barrage under Subarnarekha M.P.P. , Jharkhand

Construction stage design & drawings work have been taken up during year 2014 and 24 construction stage drawings have been issued so far and remaining drawings are under progress. Scrutiny of construction stage drawings of hydro-mechnical equipments are also under progress.

6. Lakhwar Multi Purpose Project, Uttarakhand

The MoU for technical consultancy services for design and engineering of civil and mechanical works of Lakhwar Multipurpose Project-(3x100 MW), Uttarakhand has been signed between CWC and UJVNL on 20/09/2013. This project has been declared as a National Project and design consultancy will be provided by Design (N&W) Unit.

7. Lhasi Medium Irrigation Project, Rajasthan

Major revisions/modifications in 8 Nos. of construction drawings related to spillway in respect of gate arrangement & protection works in immediate downstream of spillway bucket have been finalized.

8. Salma Dam 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 related to various hydro civil & mechanical components of the project, 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 is in advance stage of construction with the service bay being raised up to the crane beam level. The vetting of construction stage design and drawing of WAPCOS is being rendered in time bound manner.

During the period up to March, 2015, 4 Nos. of drawings in respect of spillway bridge and 6 Nos. of Drawings related to protection works for Right abutment/flank of Salma dam have been vetted. The two proposals for closure of diversion tunnels and filling of reservoir, in and after detailed study of guidelines in practice were examined and recommendations were communicated to WAPCOS in October, 2014.

9. Opa Barrage Project, Goa

Opa Barrage Project on river Khandepar in the State of Goa is being executed by Water Resources Department, Goa. Civil designs of this project have been provided by CDO Nasik, Maharashtra. Consultancy in respect of hydro-mechanical equipment have been provided by CWC.

10. Tapovan Vishnugad Project – NTPC, Uttarakhand

The Tapovan Vishnugad Project is situated on river Dhauliganga / Alaknanda in the District of Chamoli about 280 Km from the nearest rail head Rishikesh. The project envisages construction of an underground Power House with installed capacity 4x130 MW. The project consists of Barrage, Surface Desilting Basin, Intake Structure, Head Race Tunnel and Penstock. Silt Flushing Tunnel is envisaged to flush off accumulated

silt back into river Dhauliganga. Project consists of 11.7 Km long Head Race Tunnel which is being constructed by conventional "Drill & Blast Method" as well as with the help of Tunnel Boring Machine. The detailed design of the above mentioned structures, releasing construction drawings as per requirement of project authorities and assistance for solution to site specific problems are being provided. 37 Nos. construction drawings and 21 Nos. revised drawings have been issued during the period.

11. Loharinag Pala HEP (600MW)- Uttarkashi, Uttarakhand

Loharinag Pala Hydro Project which was under construction on river Bhagirathi, has been discontinued by Ministry of Power (MoP), GoI in December, 2010 as per the direction of National Ganga River Basin Authority. CWC has issued 1 No. specification drawing during this period to project authorities for tendering/award of the safety measures works in the project area to mitigate the hazards associated with leaving the project incomplete.

12. Punatsangchhu-I H.E. Project, Bhutan

Punatsangchhu-I H.E. Project which intercepting total catchment area of 6390 sq. km. envisages construction of a concrete gravity type dam, 130m high above the deepest foundation and 240.0 m long at the top. The overall length of the spillway section of the dam is 120.0 m comprising of seven nos. of sluice spillway bays, each of 8 m width with crest elevation at El.1166.0 m to pass simultaneously Probable Maximum Flood of 11500 cumec + GLOF of 4300 cumec. The length of the concrete non-overflow section on both sides of dam would be about 120.0 m. The dam would provide a gross pondage of 12.49 MCM and live pondage of 5.00 MCM between MDDL 1195m and FRL 1202m to enable the power station envisaged under the project, to cater to diurnal variations in power requirements. The project has an installed capacity of 1200 MW and construction of the project is underway. 73 nos. of construction drawings (original & revised) have been issued during the year 2014-15.

13. Punatsangchhu-II H.E. Project, Bhutan

The Punatsangchhu-II H.E. Project envisages construction of 86m high concrete gravity dam with an installed capacity of 1020 MW. The dam is located 29km downstream of the Wangdue Bridge and 3 km downstream of TRT outfall of PHEP-I on Wangdue Tshirang National Highway. The dam comprises of seven sluice blocks and five non-overflow blocks. The length of the dam is 213.00m. The top of dam is at El.846.00m with FRL at El. 843.00m and MDDL at El.825.00m. Seven sluices of gate size 8m (w) x 13.2m (H) have been provided at EL.797.00m for discharging simultaneously PMF of 11723

cumec and GLOF of 4300 cumec. The project has a catchment area of 6835 sq. km. The gross storage capacity of the reservoir formed by dam construction is 7.0 MCM and the live storage capacity is 4.64 MCM. 78 nos. of construction drawings (original & revised) have been issued during the year 2014-15.

14. Par-Tapi-Narmada Link Project (Consists 6 nos. proposed Dams in project), Gujarat / Maharashtra

CWC is rendering consultancy for preparation of DPR for the proposed Par- Tapi-Narmada Link Project. It envisages transfer of surplus water from west flowing rivers between Par and Tapi to water deficit areas in North Gujarat. The six dams proposed in the scheme are i) Jheri, ii) Paikhed, iii) Chasmandva, iv) Chikkar, v) Dabdar and vi) Kelwan Dam on the rivers between Par and Tapi and 400 Km long conveyance system including two tunnels of total length of about 5.5 Km. connecting these reservoirs and carrying water to their target command areas. Total 73 Nos DPR stage drawings have been issued so far.

HCD (N&W) Directorate is involved in the preparation of Design Chapter and Drawings for the hydel civil designs aspects of 5 Power Houses and Tunnel. Link Tunnel drawings are under progress.

15. Saptakosi & Sunkosi Multipurpose Project, Nepal

The Sapta Kosi High Dam Multipurpose Project, as per the preliminary studies carried out, envisages construction of a 269 m high dam to divert river waters through a dam toe power house with an installed capacity of 3000 MW (at 50% load factor) and irrigation of 15.22 lakh Ha. Gross Command Area through construction of a barrage 1 Km downstream of the dam. A Joint Project Office has already been set up in Nepal for investigation of the project. Field investigation studies and preparation of DPR for Sapta Kosi High Dam Multipurpose project & Sun Kosi Storage cum Diversion Scheme are to be taken up jointly by Government of India and HMG Nepal.

DPR stage design engineering for this project is being carried out by Central Water Commission.

HCD(N&W) Dte. is involved in the preparation of DPR stage drawings and design chapter for hydel civil aspects. Two drawings of layout plan and L- section have been completed.

16. Ujh Multipurpose Project, J&K:

Ujh Multi-Purpose Dam Project proposes a 119 m high concrete faced rockfill dam (CFRD), 2.5 Km. long head race tunnel (HRT), diversion tunnel and a surface power house. As per the power potential studies, finalized by CEA, the installed capacity is 186 MW through 3 units of 62 MW each. Design discharge per unit is 51.00 cumecs.

CWC is rendering design consultancy services for preparation of DPR chapter & drawings of Ujh Multipurpose Project. All the 37 drawings and design chapter prepared by this unit have been incorporated in the DPR prepared by IBO, CWC, Chandigarh.

Drawings and design chapters related to Ujh Multipurpose Project of 26 MW have also been completed & submitted to IBO, CWC. All 15 nos. drawings have been issued.

17. 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 in January, 2005. But, since start, the project has been mired in controversies.

In May 2008, NHPC at the instance of Government of Assam constituted an Expert Committee, with experts drawn from Guwahati University, Dibrugarh University and IIT Guwahati to assess the downstream impact of the project. The Committee in its report submitted in June, 2010 raised issues related to downstream impact and safety of the dam.

To solve the matters, Planning Commission constituted a Technical Expert Committee (TEC), comprising of Dr. C.D. Thatte and Dr. M.S. Reddy. As proposed by TEC, the Ministry of Power constituted Dam Design Review Panel (DDRP) in December, 2012 under the chairmanship of Chairman, CWC with members drawn from CWC, CEA, GSI, CWPRS, CSMRS, IIT-Roorkee and NHPC to address the issues raised by TEC on dam design.

The DDRP undertook a comprehensive review of the dam design issues raised in TEC report and proposed major modifications in (i) Cut off walls; and (ii) Energy Dissipation Arrangement. The DDRP submitted its report in June, 2013 which was accepted by the Ministry of Power.

After the submission of DDRP report, a seminar was organised by NHPC on 31.10.2013 at Guwahati to apprise all concerned about the changes that have been made in the dam design to allay their apprehensions on dam safety. This seminar was chaired by Chairman, CWC. In this seminar, CWC officers made detailed presentations on the changes made to the dam design to address the issues raised by TEC.

Subsequently, a Tripartite meeting between protesting groups of Assam, Government of Assam and Government of India & NHPC to deliberate key issues was held on December 6, 2013 at Guwahati under the chairmanship of Hon'ble Minister of Power, Government of Assam. During the meeting it was decided that the issues relating to dam safety be first resolved at expert to expert level meetings. Accordingly, two meetings have been held with the Expert Group members.

The first meeting was held on December 23, 2013 and the second on June 2, 2014 under the chairmanship of Chairman, CWC. In between all the studies and clarifications sought by Expert Group members were provided to them. CWC undertook 3D Dynamic analysis of the Non-Overflow Dam block for a hypothetical earthquake event corresponding to a PGA of 0.5g. This study went on to prove the safety of the dam for such a large earthquake conclusively which put to rest the major concern of the expert group. Accordingly, in June 2, 2014 meeting it was decided that now the issues of dam design and downstream impact of Subansiri H.E. Project be discussed at an open platform with wide participation.

18. Garudeshwar Weir Project

Garudeshwar Weir, proposed to be constructed across Narmada river 12.10 KM downstream of Sardar Sarovar dam has 389m long rock fill dam on left bank, 1137m long proposed concrete gravity type weir comprising a total of 38 blocks (29 OF and 9 NoF). The purpose of constructing the weir is to create reservoir pool on the downstream of Sardar Sarovar dam for enhancing power generation capacity of Sardar Sarovar Power House using turbine in pumping mode during lean power demand and

generation mode during peak demand. 27 Nos. construction drawings for the project have been issued by CWC till March, 2015

5.2.3 Technical Examination of Project by Design Organisations

The technical appraisal of DPR/PFR of irrigation and multipurpose projects in respect of hydropower component, gravity dam component, embankment, hydro mechanical structures such as gates, hoists etc., barrages and different components of canal are carried out in the design organization of D&R Wing. The comments/clearances of each component of the projects are issued to appraisal unit of CWC after technical examination of DPRs.

The civil components in DPR of Hydro-Electric Projects are also technically examined in D&R Wing. Other aspects of Hydro Electric Projects are appraised in Central Electricity Authority. Techno-Economic Clearance to the projects is also accorded by Central Electricity Authority.

DPRs of various projects as mentioned below were submitted by the project authorities for technical examination. A list of 59 projects for which technical examination has been completed or under examination is as follows:

Irrigation Project:

1. Kanhar Irrigation, U.P
2. Swan River flood management project , H.P.
3. Kosi- Mechi interstate Link Project, Bihar
4. Burhi Gandak Noon –Baya Link Project, Bihar
5. Arpa Bhaisajhar Barrage Project, Chhattisgarh
6. Badaun Lift Canal irrigation Project, U.P.
7. Baur and Haripura dam", Uttarakhand (Project Report on "Strenthing, renovation and modernization of existing Dam)
8. Yettinahole Project (Karnataka)
9. Sulwade Lift Irrigation Project (Maharashtra)
10. Dr. Amebedkar Pranahita Chevella Sujal Sarvanthi Project (Telengana)
11. Lowar Tapi Project (Maharashtra)
12. Vamsadhara Irrigation Project Phase-II (Andhra Pradesh)
13. Shiggaon Lift Irrigation Scheme (Karnataka)

14. Pench Diversion Project (M.P.)
15. Donimalai Project (Karnataka)
16. Damanganga Pinjal Link Project (M.P & Maharashtra)

Multi Purpose Project:

1. Ujh Multi Purpose Project, J&K
2. Lakhwar Multi Purpose Project, U.P.
3. Mohanpura Multi Purpose Project (M.P.)
4. Bina Complex Irrigation and Multi Purpose Project (M.P.)
5. Kulsi Multi Purpose Project, Assam
6. Chinki Multi Purpose Project

Hydro-Electric Project:

1. Seli H.E. Project (4x100MW)
2. Dagmara H.E. Project (17x7.66MW)
3. Ratle H.E. Project (4x195+30 MW), Jammu & Kashmir)
4. Tiuni Plasu H.E. Project (3x24=72MW), Uttarakhand
5. Miyar H.E. Project (3x40=120 MW), Himachal Pradesh
6. Chango Yangthang H.E. Project (3x46.67MW), Himachal Pradesh
7. Arun–3 H.E. Project (4x225 MW) Nepal.
8. New Ganderbal H.E. Project, J&K
9. Bowala Nandprayag H.E. Project, Uttarakhand
10. Kiru H.E. Project 660MW (4x165MW)
11. Nakthan H.E. Project (520MW), Himachal Pradesh.
12. Sachkhas H.E. Project, Himachal Pradesh
13. Kwar H.E. Project, J&K
14. Sawalkote H.E. Project, J&K
15. Chhatru H.E.Project, Himachal Pradesh
16. Thana Plaun H.E. Project, Himachal Pradesh
17. Reoli Dugli H.E. Project, Himachal Pradesh
18. Dugar H.E. Project, Himachal Pradesh
19. Kirthai-I, H.E. Project, J&K
20. Chirgaon Majhgaon H.E. Project,), Himachal Pradesh

21. Tato-I H.E. Project, Arunachal Pradesh
22. Heo H.E. Project, Arunachal Pradesh
23. Sankosh H.E. Project, Bhutan
24. Kynshi-I H.E. Project, Meghalaya
25. Lower Kopili H.E. Project, Assam
26. Attunli H.E. Project, Arunachal Pradesh
27. Noa-Dehing H.E. Project, Arunachal Pradesh
28. Umngot H.E. Project, Meghalaya
29. Kamala H.E.Project (Arunachal Pradesh)
30. Mawphu H. E. Project (Meghalaya)
31. Subhansari Lower H.E.Project (Arunachal Pradesh)
32. Luhri H.E.Project (Himachal Pradesh)
33. RCE of Chamera H.E.Project Stage-III (Himachal Pradesh)
34. RCE of Turial H.E.Project (Mizoram)
35. RCE of Lower Subhansari H.E.Project (Arunachal Pradesh)
36. Bansujara Dam Project
37. Sher – Shakkar – Machchrewa Complex Project

5.3 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 irrigation, multipurpose and hydropower 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 Reports (PFR) or Feasibility Project Reports (FPR) stage are made available in the form of

i. Water availability/Yield studies
ii. Design flood studies
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.

The details of works carried out by HSO is given below:

(a) Technical Examination of DPRs / Design Flood Review Studies

During the year 2014-15, HSO has dealt with 72 projects from hydrological point of view which includes 32 projects for consultancy / design flood review studies under DRIP and 40 projects for technical examination / study of hydrology.

(b) 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.

(c) Development of Hydrological Design Aids (HDA) under Hydrology Project-II

Development of Hydrological Design Aids (HDA) has been taken up under Hydrology Project-II to streamline and standardize the current hydrological design practices. The work of development of HDA is being carried out by Central Water Commission through Consulting Engineers Services (India) Pvt. Ltd. The duration of the study is 37 months. The HAD (SW) has following three major components as listed below.

1. Assessment of Water Resources Potential - Availability/Yield (HDA-Y)
2. Estimation of Design Flood (HDA-F) and
3. Sedimentation Rate Estimation (HAD-S)

The final report of Sedimentation Rate Estimation (HAD-S) has been submitted by the consultant.

(d) 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 consultant. Following 05 Nos Final Reports of PMP Atlases were accepted in the Meetings of Technical and Advisory Review Committee (TARC) for preparation of PMP Atlases held on 13.03.2015 chaired by Member (D&R):

i) Godavari basin;
ii) Brahmaputra basin;
iii) West Flowing Rivers of Western Ghats;
iv) Mahanadi and adjoining east flowing rivers and
v) Narmada, Tapi, Sabarmati, Banas,and Luni river basins and rivers of Saurashtra and Kutch region including Mahi.

The work for Ganga River Basin and Cauvery River Basin is in progress. The scheduled date for completion of the work and submission of the final reports is respect of these two basins has been extended from 21.10.2013 to 30.06.2015.

(e) Trainings/Workshop/ Seminar

The technical expertise available/developed in HSO is disseminated to other State and Central agencies associated with water resource planning through workshops and training programs where the faculty is drawn from HSO and other concerned organisation. Necessary resource persons are also deputed to National Water Academy, Pune for organizing the workshops/training programmes.

(f) Study of Salinity Ingress Problem in Coastal Areas of Coastal States / UTs

PMO requested MOWR/CWC to study the salinity ingress problem in coastal areas of coastal states/ UTs of the country and to suggest necessary remedial measures. In this regard, a Technical Committee has been constituted under the chairmanship of Chairman, Central Water Commission with the members from specialised organizations of Government of India, State Government and UTs. Two meetings of the committee have been held on 30th September and 27th November, 2014. Central Water Commission is studying the problem in consultation with concerned States and Union Territories. Certain information about the issue has been sought from concerned States and Union Territories and the same has been received from Gujarat, Maharashtra, Karnataka, Kerala, and West Bengal. Information from remaining States namely, Andhra Pradesh, Goa, Tamil Nadu and Odisha have not been received and close interaction with the States Authorities has been undertaken to expedite the information for preparation of a consolidated report on salinity problem in costal states/ UTs.

(g) Technical Co-ordination

CWC is represented on a large number of committees under many organizations relating to Hydrology. HSO interacts with organizations such as National Institute of Hydrology, Indian National Committee on Hydrology, Bureau of Indian Standards (BIS), Indian National Committee on Irrigation & Drainage, India Meteorological Department, World Meteorological Organisation etc. Some Committees related to Hydrology which are dealt in HSO are as under:

(i) Environmental Appraisal Committee (EAC) for River Valley & Hydroelectric Projects in MoEF

(ii) Yamuna Standing Committee

(iii) Consultancy Monitoring Committee for the water availability, Reservoir Sedimentation, River Morphology and Environmental Studies for Arbitration case of Kishenganga HEP.

(iv) National Institute of Hydrology Society

(v) Governing Body of National Institute of Hydrology

(vi) Technical Advisory Committee of National Institute of Hydrology

(vii) Working Group of National Institute of Hydrology

(viii) World Metrological Organization

(ix) Hydrometry Sectional Committee (WRD-1) of Bureau of Indian Standards (BIS)

(x) Reservoir & Lakes Sectional Committee (WRD-10) of Bureau of Indian Standards (BIS)

(xi) Task Force to Ascertain preparedness of the Identified States for making adequate water available to the agriculture sector to support Pulses and Oilseed Villages

(xii) Task Force to Ascertain preparedness of the States for making adequate water available to the agriculture sector to support Green Revolution in the Eastern belt.

(xiii) Committee on Re-assessment of water availability in India

(xiv) Review Committee for the development of Hydrological Design Aids(SW) under HP-II

5.4 Dam Safety Aspects

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

- Maintenance of National Register of Large Dams.
- Convening meeting of National Committee on dam safety and National Committee on Seismic Design Parameters.

- 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

5.4.1 National Register of Large Dams

The National Register of Large Dams (NRLD) is maintained by CWC. As per the latest information compiled during April 2015 there are 5170 nos (As per available record) large dams in the country. Out of which, 4857 nos. are completed Large Dams and there are 313 large Dams are under construction.

The regular updation of NRLD is carried out from time to time as per information received from the States/ Dam owners. NRLD is now available at CWC Website .The compilation of NRLD is expected to prove useful/handy to all engineers, planners and policy makers associated with water resources sectors.

5.4.2 National Committee of Dam Safety (NCDS)

The Government of India, Ministry of Irrigation constituted a Standing Committee in 1982 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:

a) Monitor the follow-up action on the report on Dam safety Procedures both at the Centre and at the State level,
b) Oversee dam safety activities in various states and suggest improvements/remedial measures to bring dam safety practices in line with state-of the art practices consistent with Indian conditions, and
c) Act as a forum for exchange of views on techniques adopted for remedial measures to relieve distress in dams.

The National Committee of Dam Safety was reconstituted in 2002 and consists of 20 members drawn from 16 States and various other organizations viz. MoWR. The 34th

meeting of NCDS was held on 23/03/2015. Further, the States like Himachal Pradesh, Meghalaya and Telangana have also been included.

5.4.3 Dam Rehabilitation & Improvement Project (DRIP)

Ministry of Water Resources, Government of India has taken up 'Dam Rehabilitation and Improvement Project (DRIP)' with funding assistance from the World Bank. DRIP involves rehabilitation of about 223 large dams in four states i.e. Madhya Pradesh, Orissa, Kerala and Tamil Nadu at an estimated cost of Rs. 2100 crore. In addition, DRIP also involves institutional strengthening (for dam safety) of all participating states as well as at central level in Central Water Commission. Karnataka has recently joined the DRIP for rehabilitation of their 27 dams. Uttarakhand Jal Vidyut Nigam Limited and Damodar Valley Corporation have also been identified to join DRIP shortly.

Project has become effective from 18th April 2012, and will be implemented over a period of six-years. The main implementation agencies for DRIP are the owners of dams – i.e. Water Resources Departments and State Electricity Boards in the participating States. Overall responsibility for project oversight and coordination rests with the Central Project Management Unit (CPMU) created in Central Water Commission at New Delhi.

The progress made under DRIP till date is highlighted as below:

- Central Water Commission has hired the services of an Engineering and Management Consultant (M/s EGIS EAU, France), and consultant has been mobilized since 24th December 2013.
- So far, design flood reviews of 214DRIP dams have been completed.
- Dam Safety Review Panels have inspected 229DRIP dams.
- Project Screening Templates in respect of 126 dams have been prepared by the Project authorities and are at different stages of approval process. World Bank has so far approved 124 project screening templates.
- Project authorities have prepared about 70 tender documents which covers the works of dam rehabilitation as well as works of basic facilities, and works have been awarded for 30 tenders, while some more have been invited and expected to be awarded shortly.

- Training programs with focus on DRIP implementation were initiated well in advance for building up in-house technical capabilities of participating states. Thirty two trainings have been conducted, wherein about 1015 officials have been trained on different aspects of DRIP implementation.
- So far ten meetings of Technical Committee for DRIP have been held. World Bank has also completed five of its Review Missions, wherein road blocks as well as way forward in project implementation have been discussed.
- First National Dam Safety Conference was organized at IIT , Madras during 24-25th March 2015 by Central Water Commission in association with Water Resources Department, Tamil Nadu and IIT Madras.

The project has a very good progress in terms of physical indicator such as review of design flood for the DRIP dams, inspection by Dam Safety Review Panel, evaluation of project screening template, preparation of tender documents, capacity development of the officers/staffs of Dam Safety Organizations by organizing various dam safety related trainings, site visit etc.

Total expenditure incurred under DRIP up to March 2015 is Rs. 108.83 Crores. The financial progress has been slow owing to complex project preparation requirements of the project. Project is now gearing up and it is expected that financial progress will improve subsequently.

5.4.4 Consultancy Services on Instrumentation in Hydraulic Structures

During the year 2014-15, Detailed Project Report / Compliance report of 5 river valley projects in various states, namely, Arunachal Pradesh, Jammu & Kashmir Meghalaya & Manipur have been examined with respect to instrumentation aspects. Out of this, 2 Detailed Project Report have been cleared. Observations on 3 Detailed Project Report have been given to the concerned project authorities, compliance of which is awaited.

During the year, consultancy services towards planning and preparation of instrumentation specification/ construction drawings/preparation of instrumentation chapter for DPR purpose have been provided for Punatsangchhu-II Hydroelectric Project, Bhutan.

5.4.5 Seismic and Foundation Aspects

Detailed Project Reports of 16 nos. of river valley projects in various states namely, Arunachal Pradesh, Jammu Kashmir and Meghalaya & Country of Bhutan were examined with respect to geological investigations related to foundation engineering and Seismic aspects. Four numbers of DPR's have been cleared and compliance from the project authorities is awaited for the remaining projects.

5.4.6 National Committee on Seismic Design Parameters

The National Committee on Seismic Design Parameters (NCSDP) was constituted through MoWR Order dated 21st October, 1991 with the objective to recommend the Seismic Design Parameters 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 Government organizations as its Members. Director FE&SA, CWC is the Member Secretary of the NCSDP.

During 2014-15, two meetings (27th & 28th) of NCSDP were held. In the 27th meeting, held on 23rd June, 2014, wherein the site specific seismic study reports of 6 projects were discussed and 4 projects were cleared by the Committee. The 28th meeting of NCSDP was held on 9th January, 2015, wherein the site specific seismic study reports of 14 projects were discussed and 12 projects were cleared by the Committee.

5.4.7 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.

Both these studies help to ensure better safety of the dam and to plan out better safeguard for the lives of people & property downstream.

During the year 2014-15, the GLOF study of Reoli Dugli H E Project Himachal Pradesh, Oju H E Project Arunachal Pradesh and Dugar H E Project Himachal Pradesh, have been examined and cleared. Further, Dam Break Study report in respect of Morand and Ganjal Complex Project in Narmada Basin of Madhya Pradesh was examined and cleared.

5.5 Other Important Activity carried out by D&R Wing

i. An Expert Body was constituted by Ministry of Environment and Forest to study the role of hydropower projects in Uttarakhand on flood of 2013 as per directions of the Hon'ble Supreme Court of India. Member (D&R) was nominated as member of this Expert Body. Designs (N&W) Organisation provided significant technical inputs to Expert Body for preparation of a report jointly by CWC and Central Electricity Authority.

ii. CWC prepared guidelines and terms of reference for carrying out numerical model studies for reservoir sedimentation of hydropower projects.

iii. CWC is actively involved in the Committee for formulation of guidelines on planning of structures of Hydro-Electric Projects on sediment management considerations.

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 2014-15, Central Water Commission have monitored the live storage of 85 important reservoirs of the country having total live storage capacity at FRL of 155.046 BCM which is about 61 % of the live storage capacity created in the country as per the assessment carried out in 2010. The status is given in Table 6.1.

Table 6.1
Storage Status of Current Year vis-a-vis Previous Year

Description		Water Year			
		2013-14		2014-15	
Number of Reservoirs			85		85
Total Designed live Storage Capacity at FRL (in BCM)			155.046		155.046
Actual Storage	In BCM	Start of the Water Year (as on 1st June, 2014)	32.178	Start of the Water Year (as on 5th June, 2014)	42.148
	In % of Storage at FRL		21		27
	In % of 10 years Avg. Storage		125		157
	In BCM	End of Monsoon Period (as on 30th September, 2014)	133.352	End of Monsoon Period (as on 1st October, 2014)	121.396
	In % of Storage at FRL		86.03		78
	In % of 10 years Avg. Storage		118		102
	In BCM	As on 31st December, 2014	105.935	As on 1st January, 2015	89.487
	In % of Storage at FRL		68.60		58.00
	In % of 10 years Avg. Storage		122.30		100

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 preparation of reservoir bulletin, a sub scheme under the scheme DWRIS namely "Telemetry Based Reservoir Monitoring System" with the estimated cost of `15.00 Crore has been framed and the same has been approved. The scheme is proposed to be executed during the XIIth Five Year Plan.

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.

6.3 Assessment 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 253.388 BCM, the live storage capacity of dams under construction is 50.959 BCM and the live storage capacity of dams under consideration for construction is 104 BCM.

The basin wise identification of completed dams and under construction dams has also been carried out and final report has been sent to Ministry of Water Resources. The assessment of live storage capacity created in the country is continuous process in the CWC

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 85 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. The panel has been reconstituted by the ICAR on 21.05.2013. The first meeting of the reconstituted ICAR-CWC joint panel was held on 10th November, 2014 under the chairmanship of Shri A. B. Pandya, Chairman, CWC at New Delhi.

6.5 Reservoir Sedimentation-Capacity survey of Reservoirs

6.5.1 Hydrographic Survey/Capacity Survey

Capacity Survey of reservoirs has been a continuing scheme, known as hydrographic survey of major reservoirs, initiated during the VIII plan and continued in subsequent Plans. Up to the end of XI plan, the capacity survey work of 36 reservoirs has been completed.

During XII plan, the capacity survey work of 25 reservoirs has been targeted. Process for taking up Capacity Survey of 3 reservoirs out of these 25 reservoirs has been initiated.

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.

The details of important studies carried out during 2014-15 is as under :

i.) One in-house study i.e. Satellite Monitoring of AIBP funded project on Bhuvan Portal i.e. Bariyarpur command area under Bariyarpur Left Bank Canal Irrigation Project was taken up on pilot basis during 2014-15. The study has been completed using Cartosat-1 high resolution (2.5 m) satellite data and Report on "Assessment of Irrigation Potential created in AIBP funded Bariyarpur Left Canal Irrigation Project, Madhya Pradesh using High Resolution Cartosat Satellite Data" was finalized and circulated in Aug' 2014, based on the satellite derived irrigation infrastructure status, it is concluded that the irrigation potential to be developed as proposed under AIBP i.e. 43808 ha has been achieved by 87% i.e. 38073 ha as against irrigation potential indicated by project authority to have been created 42340 ha.

ii.) Two in-house study for Satellite Monitoring of AIBP funded project i.e. Dudhganga Dam command area under Dudhganga Irrigation Project (Major) and Bawanthadi Dam Command area under Bawanthadi Irrigation Project were taken up during 2014-15. The study has been completed using Cartosat-1 high resolution (2.5 m) satellite data and Google Earth. Study Report is under preparation.

iii.) Satellite Remote Sensing based Reservoir Sedimentation assessment study (In-house) of 2 reservoir i.e. Gandhisagar (Madhya Pradesh State) and Ghatprabha (Karnataka State) has been initiated. Feasibility assessment has been completed in Dec'14. Satellite Data has been procured and data analysis is under progress.

iv.) The work 'Sedimentation assessment 30 reservoirs using Remote Sensing through outside agencies' has been awarded to MERI, Nasik for an estimated cost of Rs.60.70 lakh.

6.6 Project Performance Evaluation

Performance Overview and Management Improvement Organization (PO & MIO), Central Water Commission is undertaking Post Project Performance Evaluation and Water Use Efficiency studies of completed major/medium irrigation projects in the country. It is also involved in benchmarking of completed irrigation projects and implementation of water Audit and Water conservations in the States.

A) Post Project Performance Evaluation study of Completed Irrigation Projects:

The study includes i) Evaluation of system performance, ii) Agro-economic, iii) Socio-Economic and iv) Environmental impacts of project along with economic analysis with the central objective of identifying deficiencies and recommending corrective measures for improving the performance of projects for achieving the envisaged objectives and targeted benefits.

There is a Technical Advisory Committee (TAC) under the chairmanship of Member (WP&P), CWC for guiding, supervising and approving the studies. During 2014-15, the Post Project Performance Evaluation studies of following six major/medium irrigation projects are ongoing.

i. Krishnagiri Medium Irrigation Project, Tamilnadu,
ii. Giri Medium Irrigation Project, Himachal Pradesh,
iii. Jayakwadi Stage-I Irrigation Project, Maharashtra,
iv. Salandi Irrigation Project, Odisha,
v. Bhimsagar Irrigation Project, Rajasthan,
vi. Som-Kamla-Amba Irrigation Project, Rajasthan.

During 2014-15, the following five new proposals (2 in Uttar Pradesh and 3 in West Bengal) for conducting Post Performance Evaluation studies are in under process of approval.

(i) Gunta Nala Dam Project, Uttar Pradesh
(ii) Maudha Dam Project, Uttar Pradesh
(iii) Mayurakshi Reservoir Project, West Bengal
(iv) Kumari Irrigation Scheme, West Bengal
(v) Saharajori irrigation Scheme, West Bengal

An amount of Rs. 30.89 lakhs towards 2nd installment against the Post Project Performance Evaluation studies of (i) Krishnagiri medium irrigation project, Tamil Nadu (ii) Giri medium irrigation project, Himachal Pradesh and (iii) Jayakwadi stage-I irrigation project, Maharashtra was released.

B) 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. Delivery System/Conveyance Efficiency
iii. On Farm Application efficiency
iv. Drainage Efficiency
v. Irrigation Potential created and utilized

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

During 2014-15, the Water Use Efficiency studies of following five major/medium irrigation projects are ongoing.

(i) Dekadong Irrigation Project, Assam.
(ii) Kaldiya Irrigation Project, Assam.
(iii) Singda dam Irrigation Project, Manipur.
(iv) Sekmai Barrage Irrigation Project, Manipur.
(v) Imphal Barrage Irrigation Project, Manipur.

During 2014-15, the following five new proposals for conducting water use efficiency studies are under process of approval.

(i) Mahanadi Delta Stage-I
(ii) Baitarani Irrigation System
(iii) Bahuda Irrigation Project
(iv) Baghua Stage-I Irrigation Project
(v) Guntur Channel Irrigation

6.8 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 Governments are reportedly carrying out Water Audit of irrigation projects. Water audit is also now being resorted to by municipalities/Industries.

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 MoWR,RD&GR on Irrigation, Flood Control and Multipurpose Projects headed by Secretary, MoWR, RD & GR considers projects for acceptance and thereafter recommends the same for investment clearance. 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 and Brahmaputra Basin) are also appraised as and when referred by State Governments.

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 preliminary report of the project is examined in CWC 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 Government 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. After acceptance by the Advisory Committee and according investment clearance by Planning Commission, the project may be taken up by the project authorities.

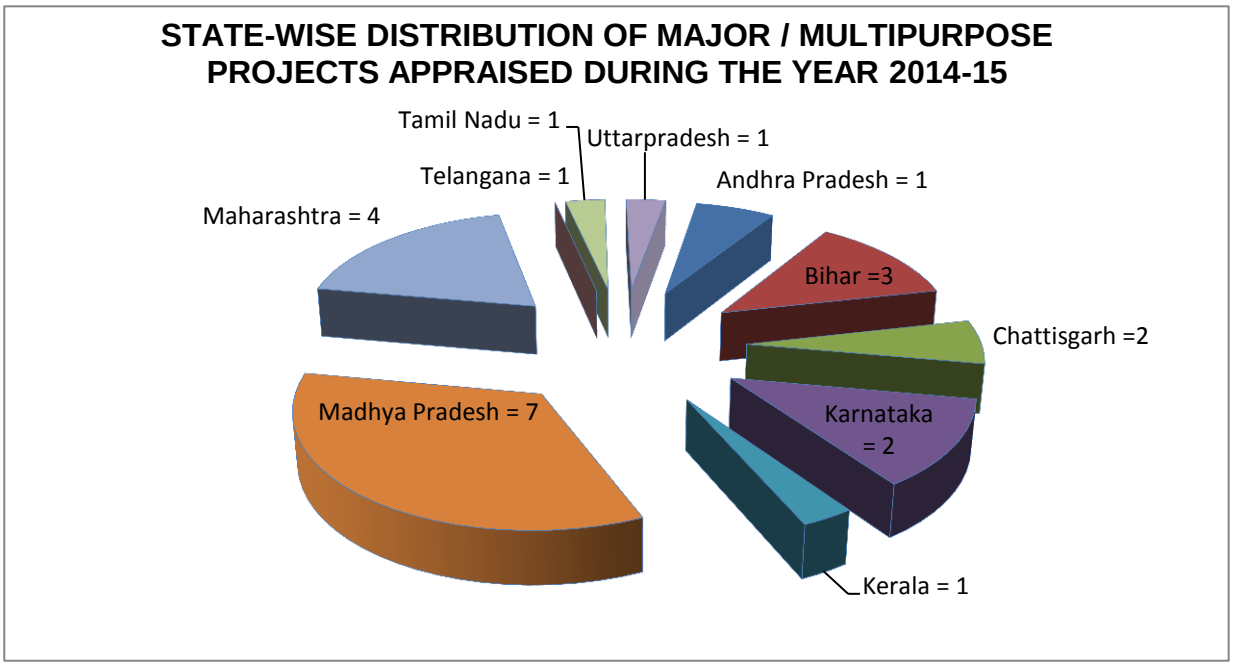


Fig. 7.1

During the year 2014-15, 37 major / multipurpose projects (24 new & 13 revised) have been appraised up to March, 2015. Out of that, 2 major / multipurpose projects (revised) have been accepted by the Advisory Committee of MoWR, RD & GR. Apart from the above, "In principle consent of CWC" for DPR preparation has been given in respect of 1 Major Irrigation Projects. A Pie Chart showing state-wise distribution of

major irrigation / multipurpose projects under appraisal during 2014-15 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. During the year 2014-15, 29 medium projects (21 new & 8 revised) have been appraised in field units of CWC. Out of that, 2 medium projects (2 revised) have been accepted by the Advisory Committee of MoWR. Necessary assistance was provided by CWC to the concerned regional offices for processing the projects for acceptance by the Advisory Committee.

7.4 Interaction with State/Project Authorities

To expedite the appraisal process, Central Water Commission interacts frequently with State Government Engineers and interstate/review meetings are convened to resolve issues having a bearing on project clearance. During the year 2014-15, meetings with following State Governments were convened by CWC wherein issues related to projects were resolved:

i)	Bihar	5th August, 2014 at Patna
		12th March, 2015 at New Delhi
ii)	Telengana	21st October, 2014 at New Delhi
iii)	Madhya Pradesh	24th November, 2014 at New Delhi and
		10-13th February, 2015 at Bhopal

7.5 Meeting of the Advisory Committee

During year 2014-15 the Advisory Committee of MoWR, RD & GR, under the Chairmanship of Secretary (WR) accepted 16 projects comprising 4 Major & Medium Irrigation / Multipurpose projects and 12 Flood Control schemes in one meeting. The list of major & medium irrigation / multipurpose projects and flood control schemes accepted by the Advisory Committee of MoWR is enclosed as **Annexure-7.1** and **Annexure-7.2** respectively.

The irrigation projects accepted during 2014-15 envisages annual irrigation benefits to 2,30,417 hectare in the States of Madhya Pradesh, Odisha and Uttar Pradesh. The Flood Control Scheme, accepted during 2014-15 envisages protection to the population of about 18,77,968 persons & 270 houses and area of about 1,07, 687 hectares in the states of Assam, Bihar, Kerala, Uttar Pradesh and Uttarakhand. Pie Chart showing State-wise distribution of 4 Nos. major & medium irrigation / multipurpose projects accepted by the Advisory Committee during the current year is enclosed as **Fig. 7.2**

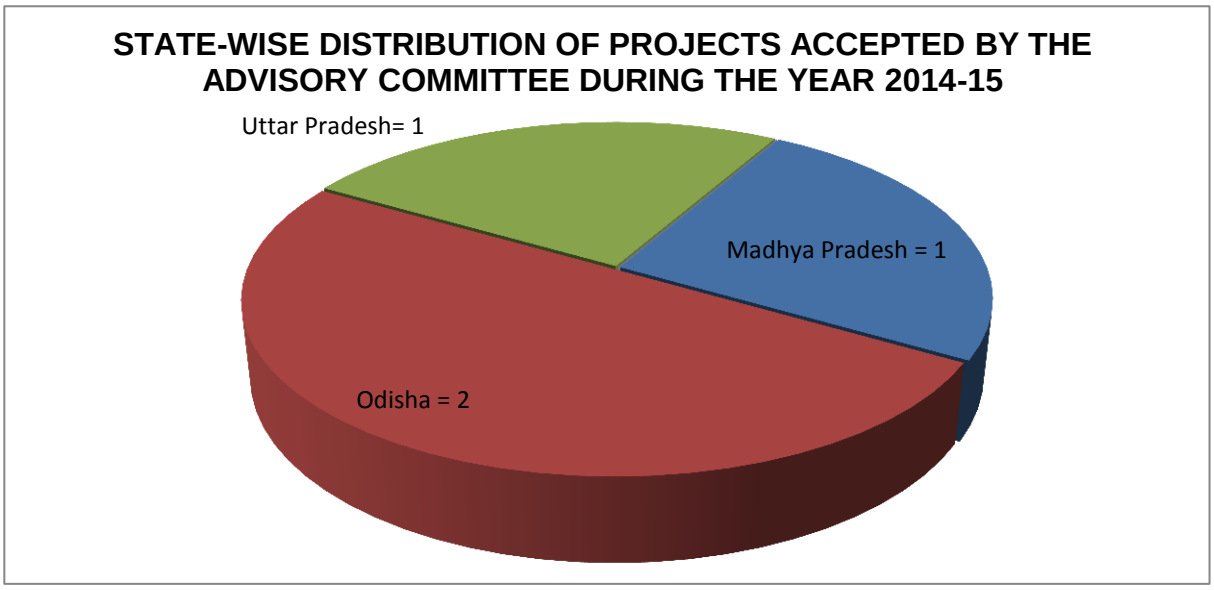


Fig. 7.2

7.6 Appraisal of Hydro-Electric Projects

Apart from the appraisal of Irrigation and Flood Control projects, civil components of hydro-electric projects are also appraised by Central Water Commission. The said activity is coordinated by PAO, CWC. The appraisal of civil aspects including appraisal of cost estimates for 6 HE projects have been completed during the current year. Other aspects of Hydro-Electric Projects are appraised in CEA and TEC to the project is also accorded by the CEA. During 2014-15, CEA has accorded TEC to 5 Nos. Hydro-Electric Projects having total installed capacity of 1929 MW.

The list of H.E Project accepted by TEC is enclosed at **Annexure- 7.3**

7.7 National Projects

Government of India is implementing scheme of National Projects since XI Plan with a view to expedite completion of identified National Projects for the benefit of the people. As per present guidelines, financial assistance of 75% and 90% of cost of balance works of irrigation and drinking water component of the projects is provided as Central Grant to projects in Non-Special Category States and Special Category States respectively. Central Government has declared 16 water resources projects as National Project so far. The list of projects is at Annexure 7.4.

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.

Ministry of Water Resources, had issued guidelines for implementation of scheme of National Projects in February 2009. Later, Ministry of Water Resources had issued modification in the guidelines on 28.09.2012 to include extension, renovation and modernization projects envisaging restoration of lost potential of 2 lakh hectare or more under the category of National Project subject to conditions.

The Government of India declared 14 projects as National Projects in February 2008. The Cabinet Committee on Infrastructure approved inclusion of Saryu Nahar Pariyojna in the scheme of National Project on 3rd August, 2012. Later, Government of India also declared Polavaram Irrigation Project as a National Project in its Gazette published on 01.03.2014.

Out of 16 included in the scheme of National Projects, Five projects, namely, Gosikhurd Project of Maharashtra, Shahpur Kandi Project of Punjab, Teesta Barrage Project of West Bengal, Saryu Nahar Pariyojna of Uttar Pradesh and Indirasagar Polavaram Irrigation Project of Andhra Pradesh have started receiving fund under the scheme of National Projects. Goshikhurd and Shahpur Kandi projects have been provided grant amounting to Rs. 2987.94 crore and Rs. 26.04 crore, respectively, up to March, 2015. For Gosikhurd project, a proposal for release of Central Grant of Rs. 225.19 crore for the year 2014-15 was recommended to MoWR,RD&GR vide CWC letter dated 21.08.2014. Teesta Barrage Project started receiving funds under the scheme of National Project during 2010-11 and grant amounting to Rs. 178.20 crore has been provided for the project till March 2015. Saryu Nahar Pariyojana started receiving funding under the scheme of National Project during 2012-13 and an amount of Rs. 659.58 crore has been released. The Indirasagar Polavaram Irrigation Project started receiving funding under the scheme of National Project during 2014-15 and an amount of Rs. 250.00 crore has been released.

The proposal for continuation of AIBP and scheme of National Project in XII Plan has been approved by CCEA on 12.09.2013 and as per present approval, 75% and 90% cost of the balance of works of Irrigation and Drinking Water Component would be provided as Central Assistance for Projects of Non-Special Category States and for ongoing Projects/ Projects of Special Category States respectively. An Outlay of Rs. 8150 crore is proposed for national projects under the ambit of AIBP.

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.

Nine meetings of High Powered Steering Committee for implementation of National projects have been held so far. The last meeting was held on 26th September, 2014

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

Government of India has approved two schemes on Repair, Renovation and Restoration of water bodies (i) with external assistance with an outlay of Rs. 1500 crore and (ii) with domestic support with an outlay of Rs. 1,250 crore for implementation during XI Plan Period.

Under the scheme with domestic support, a total of 3341 water bodies were taken up for restoration in 12 States, out of which, 2145 water bodies have been completed till date. A total central grant amounting to Rs. 917.259 crore has been released till date to the States for the completion of works on these water bodies.

Under the scheme with External Assistance, 10887 water bodies were taken up for restoration in the States of Andhra Pradesh (3000), Karnataka (1224), Odisha (900) and Tamil Nadu (5763).

The scheme for continuation of RRR of Water Bodies for XII Plan envisages to provide Central Assistance for the restoration of about 10,000 water bodies with an earmarked Central Share outlay of Rs. 6235 crore which includes Rs 250 crore for the spill over works in respect of water bodies taken up during XI Plan. Out of 10,000 water bodies, 9000 water bodies are in rural areas and balance 1000 water bodies in urban areas would be covered. The proposal of water bodies where the Integrated Water Management Programme (IWMP) is implemented/propose to be implemented would be considered for inclusion under the XII Plan scheme of RRR of water bodies.

Empowered Committee (EC) of MoWR,RD&GR in its 3 meetings (24.06.2014, 22.08.2014 and 17.12.2014) held during 2014-15 has cleared a total of 1057 water bodies costing Rs 830.65 crore located in 8 States [Odisha (760), Uttar Pradesh (8), Meghalaya (9), Uttarakhand (5), Madhya Pradesh (134), Tamil Nadu (105), Rajasthan (32) and Manipur (4)] for inclusion under the XII Plan scheme of RRR of water bodies.

Details of Projects approved by Empowered Committee for inclusion under RRR during 2014-15

Sl No	State	No. of Water Bodies	Estimated Cost (Rs. in crore)
1	Odisha	760	361.52
2	Uttar Pradesh	8	37.08
3	Meghalaya	9	11.43
4	Uttarakhand	5	12.52
5.	Madhya Pradesh	134	198.31
6.	Tamil Nadu	105	54.68
7	Rajasthan	32	89.67
8	Manipur	4	65.44
	Total	**1057**	**830.65**

Funds Released to States during 2014-15 under the XII Plan Scheme of RRR of Water Bodies

(Rs. in crore)

Sl. No.	Name of State	No. of Water Bodies	Total Project Cost	CCA to be restored (ha)	Committed Central Share	Fund released during 2014-15	Total funds released
1	Orissa	760	361.52	60026	282.73	52.90	52.90
2	Madhya Pradesh*	125	183.24	12343	93.01	37.70	37.70
3	Meghalaya	9	11.43	1096	10.29	2.52	2.52
4	Manipur	4	65.44	1046	58.90	10.36	10.36
	Total	**898**	**621.63**	**74511**		**103.48**	**103.48**

*Although 134 water bodies costing Rs. 198.308 Crore of Madhya Pradesh have been approved by the EC, Govt of MP submitted the proposal for 125 water bodies costing Rs 183.2421 crore to MOWR, RD & GR for funding/implementation.

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 regarding 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 2014-15, a total of 47 (20 Major and 27 Medium) projects under general monitoring and 147 (80 Major, 48 Medium and 19 ERM) ongoing projects under AIBP were targeted for monitoring by CWC Field Units. Out of this, 13 Inter-State Major Projects, part of which are being monitored under AIBP by CWC field Units, will also be monitored from CWC(HQ). The CWC made monitoring visits to the projects in accordance with these targets. State-wise and project-wise list of these projects proposed for General and AIBP monitoring is given at Annexure- 8.1 & 8.2 respectively and that of 13 Interstate Major Projects is given at Annexure- 8.3. State-wise break up of numbers of these projects under AIBP is given at Annexure- 8.4.

All the projects identified for monitoring are to be visited by CWC officers once a year. Thereafter, based on the field visit to the project and discussions with the State Government Officials, a detailed Status Report is to be prepared highlighting various constraints impeding construction & suggestions for remedial measures, points needing attention of the State Government etc. to expedite progress for early completion of the project. The status of monitoring visits to the projects made by CWC during the year 2014-15 is as under:

S. No.	Item	Target	Achievement
1	General Monitoring by Regional Offices	47	12
2	AIBP Monitoring by Regional Offices	147	65
3	Inter State Projects Monitoring by HQ	13 (out of the above 147)	3

8.2 Accelerated Irrigation Benefits Programme

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

The Government has further relaxed the criteria for central assistance under the AIBP in 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.

During the 12th Plan, the AIBP guidelines has been further re-modified and implemented from October, 2013. As per the new guidelines, the pari-passu implementation of Command Area Development (CAD) works were given more emphasis for the potential utilization. The eligibility criteria for new projects was continued but the advanced stage of construction has been defined in terms of at least 50% of physical and financial progress on essential works like Head-Works, Earth Works, Land Acquisition, R&R etc. Further, funding pattern and mode of disbursement has been slightly modified. The central assistance will be in the form of central grant for new and ongoing projects which will be

(i) 90% Central Assistance (CA) of project cost (works Component) in case of special category States, and KBK region of Odissa
(ii) 75 % CA of project cost in Special Area i.e. Major/Medium projects benefiting drought prone area, desert prone area, tribal area and flood prone area in non special category states and
(iii) 25% CA of project cost in case of Non-special category States except for (ii) above. Could be enhanced upto 50% for new projects subject to condition that the States actually carry out water sector reforms

The balance funds to be arranged by the State Government from its own resources. During a financial year, the sanctioned grant will be released in two instalments.

(i) For projects receiving 25% CA :- 90% (as Ist Installment) after release of at least of 50% of State Share. And balance 10% (IInd Installment) after obtaining the UC of minimum of 50% of CA released earlier and
(ii) For projects receiving higher than 50 % CA: - 50% (Ist Installment) after the State releases its full Share and balance 50% (IInd Installment) after obtaining the UC of minimum of 50% of CA released earlier.

MoU between Central and State Government has also been slightly modified with insertion of the para for the CAD works.

A grant of Rs. 1901.67 Crores has been released to 26 Major & Medium Irrigation Projects under AIBP during 2014-15 till 31.03.2015. The cumulative total Central Loan

Assistance / Grant provided to States is Rs. 53120.47 Crores under AIBP since its inception of the programme till 31.03.2015 to 297 projects.
The number of States benefited from the programme is 25 till 31.03.2015. Out of 297 projects, 143 projects have been completed and 5 projects were deferred up to 31.03.2015. **Annexure- 8.5** gives State-wise list of Major & Medium projects completed under AIBP.

As reported by the State Governments 8.077 million hectare of additional irrigation potential has been created under AIBP since the start of the scheme till March, 2014.

Central Water Commission has been assigned the responsibility to comprehensively monitor the projects receiving CLA/Grant. Presently, there are 149 (3 projects are included during 2014-15) ongoing projects under AIBP which are getting grant and are being monitored by CWC. The projects under AIBP are monitored once 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 on-going 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 2013-14. All the 50 reports have been submitted by NRSC, Hyderabad along with a Summary Report and deliverables agreed as per MOU for work awarded to NRSC for the 50 projects spread over 14 states.

It was proposed to build in-house capacity in CWC to carry out this study on regular basis each year for selected projects, which would supplement the existing monitoring mechanism, put in place a web enabled online monitoring system for all the projects being monitored at central level under General, Vigorous or AIBP Category by the end of 2nd year of the XII plan i.e. by 2013-14. Accordingly, 13 projects on pilot basis were identified for the in house practice. Processed Cartosat imageries of all the 13 projects were hosted by NRSC by 6th February 2014 (Sept-Dec. 2013) for satellite based online monitoring of AIBP projects using BHUVAN web services (SatAIBP) with online User Manual.

As per the inputs received, during meeting on SatAIBP, from CWC field units, the present Cartosat imageries hosted in Bhuvan Portal by NRSC though partially supplement the existing monitoring mechanism by providing authentic and objective data base for canal network up to distributaries, yet not suitable for identification of small minors, gaps and structures etc. due to its low resolution. CWC/MoWR should request ISRO/NRSC/DoS for high resolution imageries and to the Cost Committee for its reasonable rate, as the present cost of imageries are very high. The cost issue of high resolution imageries for use of CWC for online monitoring purpose should either be free or at an en-block discounted rate, as it is being used for monitoring of irrigation project being implemented by the State Governments in the country. This issue of need of high resolution imageries and en-block discount in cost of processed imageries for all the on-going AIBP projects also need to be taken up to an appropriate forum during the Mid Term Plan Review in view to take up the projects on a national scale covering about 10 Million Ha of Irrigation Potential spread across different States in India by XII Plan.

Four of the pilot projects were fully digitized for their executed project networks and remaining are partially digitized, under progress and persuasion for want of minor/ sub-minor-wise design lengths and corresponding designed irrigation potentials (IPs)

as well as IPs through direct outlets (Dos) from main/branch/distributaries from the project authorities/State Governments.

CWC has now decided to extend Cartosat satellite based information in implementing online monitoring of more on-going AIBP Projects using BHUVAN-AIBP portal developed exclusively for online monitoring by signing formal MoU with NRSC. Accordingly, NRSC has been requested for the updated MoU for the same so as to enable us to process for the procurement of more imagery required for the ongoing projects and new time windows for the pilot projects with more facilities in the Bhuvan portal.

CHAPTER-IX

CONSTRUCTION EQUIPMENT PLANNING AND MANAGEMENT

9.1 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.

9.2 Project Appraisal

During the year, 24 project reports of Irrigation, Power and Multipurpose projects of various states of the country were technically examined from plant planning angle. Out of these 14 projects reports were accepted with provisions worth Rs. 3196.08 Lakhs in respect of construction equipment. In respect of the remaining 10 nos. of project reports, the observations/comments were conveyed to the project authorities for compliance and further review.

9.3 Consultancy

MoUs was signed with NWDA regarding Three River inter-linking Projects viz., "Daman Ganga-Pinjal River Link Project", "Partapi-Narmada River Link Project" and "Ken-Betwa Link Project, Phase-2" for preparation of a chapter on "Construction Equipment Planning & Methods" including carrying out equipment planning, scheduling and preparation of construction programme. The work regarding same is under process.

9.4 Manpower Planning

A study were conducted on "Expenditure & Employment Statistics in Major & Medium Irrigation Project (under construction) during XIth Five Year Plan period from 2007-08 to 2009-10". Necessary data pertaining to 156 M&MI projects were collected as per format. After scrutiny, 106 projects with complete information were considered for the preparation of report. On validation, data in respect of 92 (55 major and 37 medium)

irrigation projects were found suitable for inclusion in the report. The preparation of their report is under progress.

A study was also conducted on "Employment Generation in Major &Medium Irrigation Projects for Operation & Maintenance during 2005-06 to 2009-10". Necessary data from 87 Major & Medium Irrigation projects were collected as per format from the various State Water Resources Departments/ Project Authorities.

9.5 Other Activities

- Revision of "Guide Book on use Rate Hire Charges and Transfer Value of equipment and spare parts (Third Edition) -December, 1988" is under progress in CWC.
- Various meetings with project officials from following projects took place and provision under sub Q-Spl T&P was discussed and project authorities were asked to furnish additional information/clarifications for examination of the project from plant planning angle:

  a) Sankosh-HE Project, Bhutan
  b) Heo Hydro Electric Project, Arunachal Pradesh
  c) Kynshi Hydro Electric Project, Meghalya
  d) Partapi-Narmada River Link Project
  e) Seli-Hydro Electric Project, Himachal Pradesh
  f) Tato-1 Hydro Electric Project, Arunachal Pradesh
  g) Lower Kopli Hydro Electric Project, Assam

- A Technical Committee had been constituted for "Review of existing Guideline for preparation of Project Estimates for River Valley Project including Use rate of machinery and analysis of rate for some important item of works". Director, CMC Dte is one of the members of this Committee. This office has submitted the draft chapter on "Construction Equipment Planning – Basic Consideration" for inclusion into the "Guide Book on Use Rates, Hire Charges & Transfer Value of Equipment and Spare Parts".
- Technical specification for the procurement of Hydraulic Excavator with super long arm with 0.40 cum back hoe bucket was finalized. The same was sent to Irrigation & Flood Control wing of NCT, New Delhi.

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 Final Order of Cauvery Water Dispute Tribunal(CWDT)

As per the Ministry of Water Resources Notification dated 22nd May, 2013, a Supervisory Committee has been constituted. The role of the Committee is to give effect to the implementation of the Order dated the 5th February, 2007 of the Tribunal. The Committee consists of the following, namely:

(a)	Secretary, Ministry of Water Resources, Government of India	Chairman, ex-officio
(b)	Chief Secretaries to the Governments of Karnataka, Tamil Nadu, Kerala and the Union Territory of Puducherry or his duly nominated representative	Members,ex-officio
(c)	Chairman, Central Water Commission	Member, ex-officio
(d)	Chief Engineer, IMO, Central Water Commission	Member-Secretary

Inter-State Matters(ISM) Directorate is the secretariat for Supervisory Committee. During the year 2014-15 no meeting of Supervisory Committee was held, however analysis of inflow, outflow, withdrawal and storage data of reservoirs of Cauvery basin is done in ISM Dte. The data is analyzed regularly with reference to Final Order of CWDT.

During the water year since 1st June, 2014 to 31st March, 2015, 215.699 TMC of water passed through Billigundulu Site against 187 TMC of water as per CWDT Final order.

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.

Term of Reference (ToR) for KWDT-II as follow up action on Andhra Pradesh Reorganization Act, 2014.

As per Section 89 of A.P. Reorganization Act, 2014, the terms of the Krishna Water Disputes Tribunal shall be extended with the following Terms of Reference, namely:

(*a*) shall make project-wise specific allocation, if such allocation have not been made by a Tribunal constituted under the Inter-State River Water Disputes Act, 1956;

(*b*) shall determine an operational protocol for project-wise release of water in the event of deficit flows.

Further as per the explanation available under aforesaid section, for the purposes of this section, it is clarified that the project specific awards already made by the Tribunal on or before the appointed day shall be binding on the successor States.

Accordingly draft ToR for KWDT-II were prepared and sent to MoWR, RD & GR on 16.06.2014. Draft ToR suggested determination of shares in Krishna water between States of Telangana and Andhra Pradesh in the following:

(a) 811 TMC of water allocated to erstwhile State of Andhra Pradesh.

(b) 5 TMC contribution to be made for water supply of Chennai city by erstwhile State of Andhra Pradesh.

(c) In the projects having acquired inter-state character due to A.P. reorganization Act, 2014.

(d) 6 TMC contribution towards minimum flows to be made by erstwhile State of Andhra Pradesh.

10.1.3 Monitoring of implementation of order of Supreme Court on Babhali Barrage :

In compliance to the Hon'ble Supreme Court Judgement dated 28/02/2013 in the matter of Original Suit No. 1 of 2006, State of A.P vs Maharashtra & Others on Babhali Barrage issue, MoWR,RD&GR vide O.M. dated 24th October 2013, constituted a three members Supervisory Committee with the following composition:

(a)	Member, CWC	- Chairman Ex-officio
(b)	Principal Secretary to Government(Projects), Irrigation & CAD Deptt., Government of A.P.	- Member Ex-officio
(c)	Principal Secretary, WRD, Government of Maharashtra.	- Member Ex-officio

Powers and functions of the Committee as laid down by Hon'ble Court is as follows:

i) The Committee shall supervise the operation of Babhali Barrage.

ii) The Committee shall ensure that;

a) Maharashtra maintains Babhali Barrage storage capacity of 2.74 TMC of water out of the allocation of 60 TMC given to Maharashtra for new projects under the agreement dated 6.10.1975.

b) The gates of Babhali Barrage remain lifted during the monsoon season, i.e. July 1 to October 28.

c) During the non-monsoon season i.e., from October 29 till the end of June next year, the quantity of water which Maharashtra utilizes from Babhali Barrage does not exceed 2.74 TMC of which only 0.6 TMC forms the common submergence of Pochampad Reservoir &Babhali Barrage.

d) Maharashtra does not periodically utilize 2.74 TMC from time to time.

e) Maharashtra releases 0.6 TMC of water to A.P. on 1st March every year.

During 2014-15, three meetings (2nd, 3rd and 4th) of Supervisory Committee were held on 30th June, 2014, 17th October, 2014 and 4th February, 2015. As per outcome of 2nd meeting, the gates of Babhali Barrage were opened on 1st July, 2014. In the meeting, it was also decided to calculate the water utilization based on irrigated cropped area and their NIR. In the 3rd meeting of the Committee, it was decided that Telangana will furnish their comments on NIR for the crops in command of Babhali Barrage (submitted by Maharashtra) along with suggestions on the efficiency to be adopted for computation of GIR. In the meeting, it was also decided to close the gates of Babhali Barrage on 29th October, 2014. Accordingly gates were closed in presence of representatives of CWC, Govt of Maharashtra and Government of Telangana. The 4th meeting of the Committee was held at Hyderabad on 4th February, 2015 and it came into the notice of the Committee that due to complete dryness of river upstream of the gates of Babhali Barrage, 0.6 TMC of water could not be released and it was felt by the Committee that in present circumstances, the affected States may seek clarification in this matter from the Hon'ble Supreme Court.

10.1.4 SONE RIVER WATER DISPUTES

Government of Bihar vide its letter No. P&M-4/07-152/2012-702 dated 27/11/2013 requested Ministry of Water Resources, River Development & Ganga Rejuvenation (erstwhile Ministry of Water Resources) to constitute a Tribunal under Section (3) of Inter-State River Water Dispute Act (ISRWD), 1956 to settle the water dispute between Governments of Bihar, Uttar Pradesh & Madhya Pradesh.

On receipt of the above request, the Ministry, referring to Section 4 of the ISRWD Act, 1956, conveyed vide its letter dated 16.1.2014 that the Chairman, GFCC may, in the first instance, look into the matters raised by the Government of Bihar to settle the issues. The Chairman, GFCC held two meetings with co-basin States on 29.4.2014 and 4.7.2014 and apprised the Ministry of the progress made in the matter. Thereafter, it was decided by the Ministry as conveyed vide its letter dated 3.9.2014 that Chairman, CWC may take the next meeting in the matter with the party States to settle the issue and apprise the Ministry of the outcome. In this context, an inter-state meeting was held by the Chairman, CWC with the officials of Governments of co-basin States of Bihar, Uttar

Pradesh, Chhattisgarh and Jharkhand on 16/10/2014 at New Delhi. It was decided that a Sub-Committee would be constituted under the Chairmanship of Chief Engineer(BPMO), CWC with officers from Irrigation/Water Resources Departments of Governments of Uttar Pradesh and Bihar, UPJVNL, UPPCL, GFCC, CWC and CEA as its members to study the feasibility of meeting the irrigation requirement of Bihar by modifying the operation pattern of Rihand Hydropower Project. Accordingly, the Sub-Committee was constituted vide CWC O.M. No. 6/94/2014-RO/1445-1461 dated 27.11.2014. The Terms of References of the Sub-Committee were as under:

I. To study the feasibility of meeting the irrigation requirement of Bihar by modifying the operation pattern of Rihand Hydropower Project.

II. Any other related matter.

The meeting of the Sub-Committee was held under Chairmanship of Chief Engineer(BPMO) at CWC, Sewa Bhavan, R.K. Puram New Delhi on 17-12-2014. The report of the Sub-Committee has been submitted to Chairman, CWC in the first week of March, 2015.

10.1.5 Updation of Legal Instruments on Rivers in India (Vol. III)

Legal Instruments on Rivers in India (Vol. III), "Agreements on Inter-State Rivers" was brought out in 1995 by CWC in which agreements for sharing of river waters signed upto 1994 were included.

To update this volume by including new agreements / MOUs on water sharing might have been signed between different States after 1994 and agreements signed before 1994, but not included in the existing publication due to various reasons are also to be included in the revised volume. Concerned State Governments/ Union Territories have been requested on 9th March, 2015 to furnish the hard as well as soft copy of such agreements for inclusion in the revised volume-III on "Agreements on Inter-State Rivers".

10.2 Inter-State Projects- Control Boards/ Committees

10.2.1 Bansagar Control Board

In pursuance of an inter-state agreement among the Chief Ministers of Madhya Pradesh, Uttar Pradesh and Bihar, the Bansagar Control Board was constituted vide resolution of erstwhile Ministry of Agriculture & Irrigation in January, 1976 for efficient, economical and early execution of Bansagar Dam and connected works. The headquarter 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 Department, Madhya Pradesh under the directions of the Bansagar Control Board. Execution of the canal works in respective territorial jurisdiction is being carried out by the concerned States independently and work of Power Houses is being executed by MPEB. The benefits and cost of the dam including land acquisition and rehabilitation are to be shared by Madhya Pradesh, Uttar Pradesh and Bihar in the ratio of 2:1:1(MP : UP : Bihar). The latest estimated cost of project is Rs. 1582.94 crores at 2009 price level. The total expenditure for an amount of Rs. 1696.06 crores up to March, 2015 has been incurred on the project.

The total catchment area of the Sone river is 69,281 Sq. Km of which 47,848 Sq. Km or about 69.06 % lies in Madhya Pradesh and rest in Uttar Pradesh and Bihar. The catchment area up to dam site is 18,648 sq. Km. The rainfall in the upper part of the catchment area is fairly high and river has sizeable water resources.

River Sone has immense potential for development of irrigation and power to benefit the famine and scarcity hit areas in addition to providing much needed power for exploiting the industrial potential of the area which is rich in minerals. The project will cater for the irrigation needs of large parts of chronic scarcity affected areas in Shahdol,

Sidhi, Satna and Rewa Districts of Madhya Pradesh, Mirzapur District of Uttar Pradesh and Palamau District of Jharkhand.

The project will provide annual irrigation to 2.49 lakh hectares in Madhya Pradesh. 1.5 lakh hectares in Uttar Pradesh and 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 31.03.2015 of Rs. 1696.06 Crore is as under:

Status of Contribution of Fund as on 31.03.2015

(in Crore Rs.)

Period	Total Expen-diture	Share Due			Share Received			Balance Share		
		MP	UP	Bihar	MP	UP	Bihar	MP	UP	Bihar
Up to 31.03.14	1648.40	824.20	412.10	412.10	860.57	398.26	389.56	36.38 (+)	13.84 (-)	22.54 (-)
During 2014-15	47.66	23.83	11.92	11.92	7.62	10.56	29.49	16.21 (-)	1.36 (-)	17.57 (+)
Total as on 31.03.15	1696.06	848.03	424.02	424.02	868.19	408.82	419.05	20.17 (+)	15.20 (-)	4.97 (-)

All 18 nos. spillway blocks have completed up to crest level (RL 326.4M). Non over flow blocks on either side upto top elevation at RL 347 M have been completed. All irrigation sluices, spillway bridge, saddle dams, rock fill dam upto RL 347 have been completed.

The dam at its full height has submerged 336 villages. Approximately 1.5 lakh PAPs of 54,686 families have been affected. Total 58,753.40 hectare land is coming under submergence, out of which 37,090.40 hectare is private land; 17185 hectare is revenue land and4478 hectare is forest land. The private land of 37,090.40 hectare has been fully acquired along with the property compensation. Development of residential plots in required numbers in model villages have already been done and handed over to the PAPs. R&R Programme has been implemented based on norms approved by the Executive Committee and orders issued by Government of Madhya Pradesh; Comprehensive R&R policy for the project has been finalized and implemented.

The last meeting (74th) of Executive Committee of Bansagar Control Board was held on 28.11.2013. In the meeting, it was observed that the project is almost complete and the party states requested to Executive Committee of Bansagar Control Board to consider for closer of the project and finalise the project cost and there after the project may be declared in O&M Stage. It was decided that Engineer-in-Chief of all three co-basin States would finalise the project construction cost.

10.2.2 Betwa River Board

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

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

As per Betwa River Board Act 1976, Chairman, CWC is the Chairman of Executive Committee of Betwa River Board subject to the general superintendence and control of the Board. The management affairs of the Board are vested in the Executive Committee, in accordance with rules and the directions of the Board. The Executive Committee may exercise any power and do any act which may be exercised by the Board. Chairman, Executive Committee has been delegated with emergency powers to take decision on urgent proposals, subject to ratification by the Executive Committee in its next meeting.

The Rajghat Dam with appurtenant structures has been constructed across river Betwa to provide irrigation facility 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. Now O&M stage of the project has been started. The Executive Committee desired that a model set up for the Joint River Board may be formulated on the lines of Tungabhadra Board. Accordingly a draft MoU was prepared and sent to party States for the

comments/views. The comments/views received from the party States have different opinion/views in this context. In view above difference, the MoU could not be drafted.

The dam submerges 38 villages in Uttar Pradesh and 31 villages in Madhya Pradesh. State compensation in Madhya Pradesh area is completed. In Uttar Pradesh, the District Administration, Lalitpur had paid the land compensation of 25 villages and for balance 2 villages the lands properly are being acquired through mutual negotiation by the Betwa River Board.

The reservoir (FRL371.00) filled up to 371.00M during the year 2014-15. The three units of Power House have been tested and commissioned during 1999-2000. Power generation was 785 lakh unit during 2014-15.

The 88th meeting of the Executive Committee was held on 10.06.2014. The Committee discussed/ decided the financial, technical and administrative matters of the Board.

10.2.3 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 inter-state angle. The members of Committee are from Ministry of Water Resources, Northern Railway, Central Water Commission and Irrigation Departments of the State of Punjab, Haryana and Rajasthan.

26th and 27th meetings of the Ghaggar Standing Committee were held on 21.03.2011 and 03.09.2013 respectively under the Chairmanship of Member (RM) and minutes were circulated among the members.

10.2.4 Sahibi Standing Committee

The Sahibi Standing Committee was constituted in 1978 to oversee the implementation of all the elements of the master plan and to ensure that regulation of flows at control points is carried out in best interest of the concerned parties. The Members of the Committee are from Northern Railway, Irrigation Department of the States of Haryana, Rajasthan and NCT of Delhi. The 15th meeting of the Committee was held on 18.07.1995.

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, Uttar Pradesh 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 Members of the Committee are from GFCC, Northern Railway, Central Water Commission, Ministry of Surface Transport and Irrigation Department of States of Haryana, Uttar Pradesh and NCT of Delhi.

The 84th meeting of the Committee was held on 15.5.2014 in which the proposal of PWD, Government of Delhi viz. 'Extension of Barapullah Elevated Road (Phase-III) across river Yamuna from Sarai Kale Khan to Mayur Vihar- New Corridor between Nizamuddin Bridge and DND Flyway' was cleared from flood angle subject to compliance to suggestions of the CWPRS regarding modifications in the orientation of piers as mentioned in its report. The proposal of DMRC viz. 'Proposed construction / extension of Receiving Sub Station (RSS) / (ESS) at Kashmiri Gate for line - 6 extension under Phase–III of Delhi MARTS Projects' was also cleared subject to fulfilling the conditions of I&FC Deptt, Govt of NCT of Delhi as per discussion of the Sub-Committee of Yamuna Standing Committee.

The 85th and 86th meeting of the committee was held on 24.07.2014 and 28.10.2014 respectively. The minutes of the meetings were finalized and circulated among the members.

10.2.6 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.

10.3 Andhra Pradesh Reorganization Bill, 2014–Follow up Action.

10.3.1 Polavaram Project Authority

Section (90)(1) of the Andhra Pradesh Reorganisation Act, 2014 pronounces that the Polavaram Irrigation Project is declared to be a National Project. Section (90)(2) of the Andhra Pradesh Reorganisation Act,2014 declares that it is expedient in the public interest that the Union should take under its control the regulation and development of the Polavaram Irrigation Project for the purposes of irrigation. Section (90)(3) of the Act states that the consent for Polavaram Irrigation Project shall be deemed to have been given by the successor State of Telangana and Section (90)(4) of the Act provides that the Central Government shall execute the project and obtain all requisite clearances including environmental, forests, and rehabilitation and resettlement norms.

Therefore, to carry out the purposes of the said provisions of Andhra Pradesh Reorganisation Act 2014, a **Polavaram Project Authority** has been proposed. In this regard, CWC was requested to prepare a draft notification for Polavaram Project Authority. Accordingly, draft Notification was prepared by CWC and sent to MoWR.

10.3.2 Sharing of Krishna river waters between the States of Andhra Pradesh and Telangana

A letter of MoWR, RD & GR forwarding therewith a letter from Krishna River Management Board (KRMB) seeking the views of Central Water Commission on sharing of Krishna river waters between the States of Andhra Pradesh and Telangana was received in ISM Directorate. The issue involved interpretation of Clause XV of Krishna Water Disputes Tribunal-I (KWDT-I) Final Order. In this regard, facts emerging from the

study of reports of KWDT-I about the breakup of allocation of Krishna river waters to the erstwhile State of Andhra Pradesh along with comments of ISM Directorate were furnished to MoWR, RD & GR.

CHAPTER-XI

ENVIRONMENTAL MANAGEMENT OF WATER RESOURCES PROJECTS

11.1 Environment Management

Resettlement of people displaced by creation of reservoirs is a complex task. It involves the shifting of people to new sites from familiar sites, which they have used for a long time. Also, the compulsory acquisition of land for water resources projects generally displace large number of people who are socially & economically backward through submergence of their lands or properties for project sites. Thus, there is a need to avoid large scale displacement, particularly of tribal population, and in case of unavoidable displacement, their comprehensive Resettlement & Rehabilitation (R&R) has become one of the central issues of the development process itself. Accordingly, Department of Land Resources, Ministry of Rural Development Government of India had issued a National Rehabilitation and Resettlement Policy (NRRP) 2007 which provides basic minimum facility to the displaced families. Recently, the Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013 has been passed in Parliament and implemented w.e.f. 01.01.2014. The Act is having better provision of Land Acquisition as well as Rehabilitation and Resettlement of Project affected people.

CWC is compiling salient features of Rehabilitation & Resettlement Data of Major /Medium, existing/on-going water resources projects based as the information received from various State Governments. Till now the information received from State Governments related to *490* Major and Medium Irrigation Projects have been compiled and brought out this publication in March, 2015.

CWC is also compiling of information on Submergence, R&R Issues of Major & Medium Projects monitored by field organizations of CWC and also as per the information received from various State Governments. Till now, the information received in respect of ***92*** Major and Medium Irrigation Projects have been compiled.

A National Environmental Monitoring Committee for River Valley Projects (NEMCRVP) has been setup by the Ministry of Water Resources to monitor implementation of Environmental Management Plan and observance of environmental clearance. Member (Water Planning & Projects) is the Chairman of this Inter-Ministerial Multidisciplinary Committee. NEMCRVP having representatives of Ministries of Environment & Forests, Agriculture & Cooperation, Tribal Affairs, Water Resources and Planning Commission.

The latest status of the implementation of the environmental safeguards of the projects have 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 information received in respect of ***10*** Projects has been received and compiled.

The Empowered Steering Committee (ESC) of National Ganga River Basin Authority (NGRBA) constituted by Ministry of Environment & Forests, Government of India as an empowered planning, financing, monitoring and coordinating authority for effective abatement of pollution and conservation of the river Ganga. Chairman, CWC is the Member of the Committee. Till now ESC of NGRBA conducted six meetings.

Recommendations about R&R aspects of Water resources Projects, formulated during "Jal Manthan" organized by MoWR, RD&GR from 20 to 22nd November 2014 was studied in light of "Right to Fair Compensation and Transparency in Land Acquisition, Rehabilitation and Resettlement Act, 2013" and comments of CWC were proposed and sent to MoWR,RD&GR.

11.2 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).

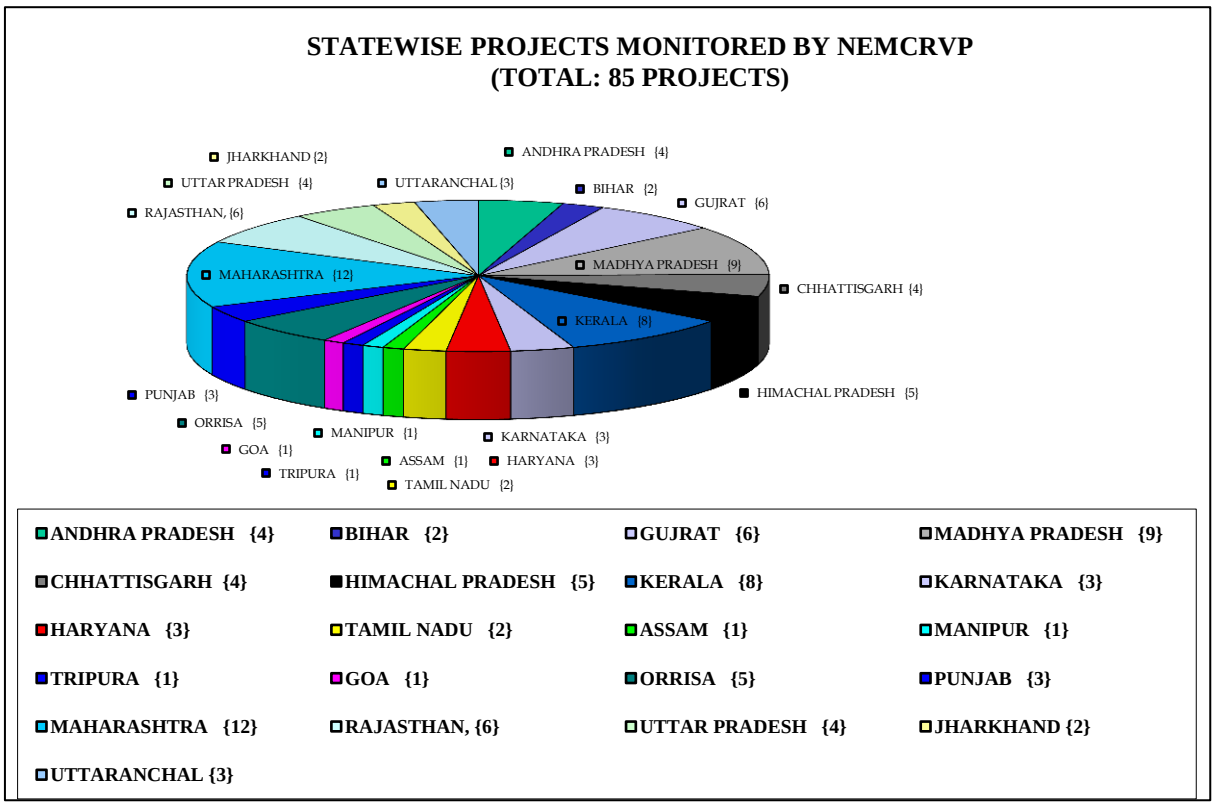


Fig.1

11.2.1 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.

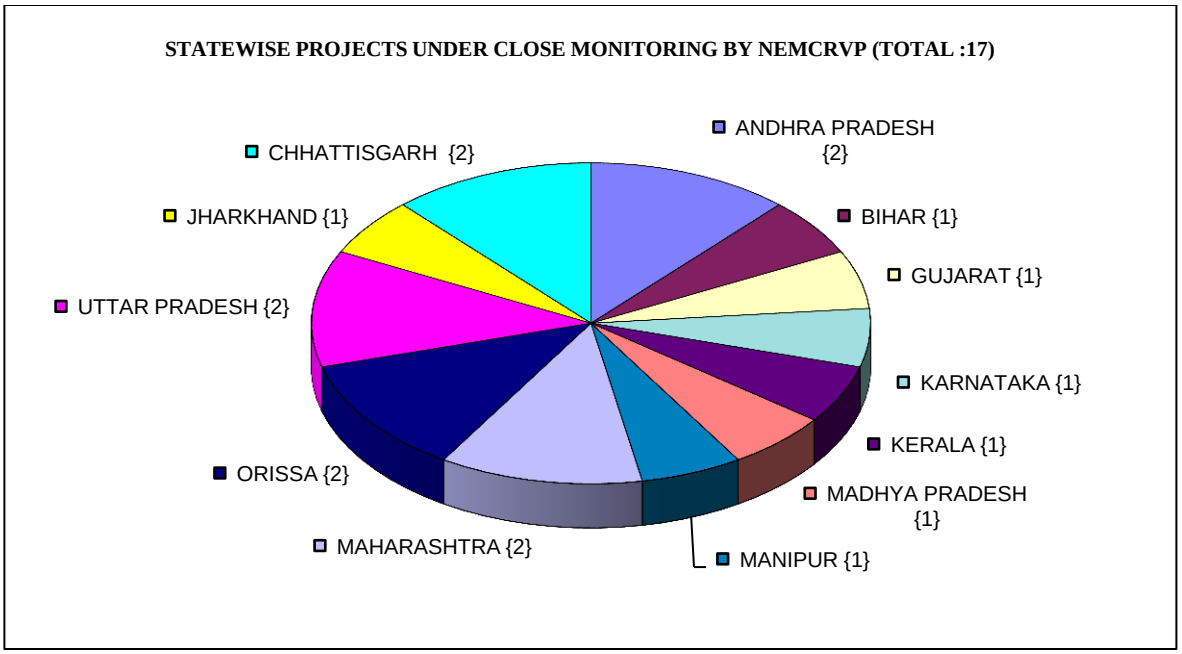


Fig.2

11.2.2 Functions of NEMCRVP

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

It encourages the constitution of State Environmental Monitoring Committee (SEMCs) and Project Environmental Management Committee (PEMCs) and monitors the activities of these committees. As a result of the above, 20 States have already constituted SEMCs under the Chairmanship of Secretary; State Water Resources/ Irrigation Department. PEMCs have been constituted for 68 out of 85 projects selected by NEMCRVP. In addition to this, 48 additional PEMCs have also been constituted for the other projects. PEMCs play a vital role in the implementation of environmental safeguards stipulated for the project. Chief Engineer (EMO)/Director (EM), CWC is the Member of the SEMCs whereas Regional Chief Engineer, CWC is the Special Invitee to these Committees. Director (Appraisal & Monitoring) of the concerned Regional Office of CWC represents CWC in PEMCs.

The progress achieved by the NEMCRVP is being brought out annually in Annual Report giving details of visits and meetings. The directions given to concerned State and project authorities for implementing the environmental safeguards are highlighted in the Annual Report. Status Reports on environmental and related aspects is also presented in the Annual Reports. Various publications have been published for creating balanced scientific awareness in public about river valley projects & environmental concerns in India. It is working to establish the BIS standards with respect to the Environmental Management of the river valley projects.

11.3 Conservation of Rivers- National Ganga River Basin Authority (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.

11.3.1 Constitution of Empowered Steering Committee (ESC) of (NGRBA)

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 Empowered Steering Committee of NGRBA.

11.3.2 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)

On the recommendation of an Inter- Ministerial Group, Central Water Commission (CWC) had taken up Environmental Impact Assessment studies of Subansiri and Siang Sub Basins through consultancy. The final report on EIA study of Siang sub basin was submitted in December 2013 and same has been accepted by the MoEF&CC. Cumulative Impact & Carrying Capacity study of Subansiri sub basin has now been completed and Final Report has been circulated and uploaded on CWC web site.

Administrative Approval of MoWR, RD&GR for carrying out Cumulative Impact & Carrying Capacity (CI&CC) Studies of Kameng and Dibang sub basins have also been accorded. As per decision taken in PMO, the said syudy is now to be carried out by MoEF&CC. Accordingly, file of these studies has been transferred to MoEF&CC for further action.

Appraisal of Environmental Impact Assessment Reports.

Draft Final report of EIA Study of Dmanganga - Pinjal Link Project was appraised and the same has been approved in August, 2014 by the Committee constituted to "Review and Monitor the Progress of Environmental Impact Assessment Studies of Par-Tapi-Narmada Link and Damanganga-Pinjal Link Projects" under the chairmanship of Chief Engineer, EMO, CWC.

Appraisal of Other Reports:

a. Interim Reports of Study of Impacts of Tipaimukh Dam on Bangladesh prepared by Government of Bangladesh was received from Ministry of External Affairs. The same was examined and comments of CWC have been sent to MoWR, RD & GR for further necessary action.

b. A core group has been constituted by Ministry of Environment, Forest and Climate Change (MoEF&CC) for review of National Forest Policy. In this regard, MoWR, RD & GR advised CWC to examine the National Forest Policy (NFP) -1988 in order

to address the concerns of water sector as per provisions of National Water Policy (NWP)-2012. The same was examined and comments of CWC were prepared and sent to MoWR, RD & GR.

c. MoEF&CC has constituted a committee under the Chairmanship of Additional Secretary (SS) & PD, NRCD for preparing a document for formulation of guidelines for management of river fronts including flood plains by evolving a River Regulation Zone. In this context "Guidelines for management of River Fronts including Floodplains through River Regulation Zone" and "Draft Notification on River Conservation Zone Rules" as circulated to concerned departments were examined and comments of EMO, CWC were prepared and sent to FCA Directorate for sending consolidated views of CWC to MoWR, RD & GR.

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 Governments 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 The 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 2014-15. Details of the project are given in Tables 12.1, 12.2 and 12.3.

Table 12.1

Major projects proposed for The World Bank Assistance

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

Table 12.2

Projects proposed for JICA Assistance

SI. No.	Name of Project	Estimated cost (in crore Rs.)
1.	AP Irrigation and Livelihood Improvement Project, Ph-II*	1155.00
2.	ERM proposal of Tawa Irrigation Project, M.P.	2366.00
3.	Rengali Irrigation Sub-project LBC-II (RD 28.177 km to 141.00 km)	3603.67

Table 12.3

Major projects proposed for Asian Development Bank Assistance

SI.No.	Name of Project	Estimated cost (in crore Rs.)
1.	Karnataka Integrated and Sustainable Water Resources Management Investment Programme (KISWRMIP)Tranche-II	3593.90

12.2 The 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, Maharashtra and Andhra Pradesh.

The main objectives of Water Sector Restructuring Project 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, 41 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 Staff Appraisal Report (SAR)	Utilised
1.	Andhra Pradesh	6	995.30	802.62
2.	Bihar	2	142.00	158.61
3.	Gujarat	7	921.50	805.82
4.	Haryana	3	519.00	505.98
5.	Karnataka	2	451.00	291.96
6.	Kerala	1	80.00	79.08
7.	Madhya Pradesh	2	360.00	318.18
8.	Maharashtra	5	778.00	779.03
9.	Orissa	5	544.90	457.55
10.	Punjab	2	294.00	290.06
11.	Rajasthan	1	XDR 93.45 M	XDR 80.69 M
12.	Tamil Nadu	3	340.90	268.36
13.	Uttar Pradesh	2	125.00 + XDR 87.27M	125.76 + XDR 85.67M
	Total	**41**	**5551.60+XDR 180.72M**	**4883.01+XDR 162.06 M**

12.2.3 On-going Credits / Loans Agreements

There are four projects under The World Bank funding. The assistance utilized is 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		Estimated Cost (in Million Rs.)		Assistance	
				Starting month	Closing month	Total as per SAR	Latest	Total	Utilized ending 12/2014
1.	Madhya Pradesh Water Sector Restructuring Project	LN 4750-IN	IBRD	01-2005	06-2015	20402.23	20402.23	387.40 M, USD	316.76 M, USD
2.	Andhra Pradesh Water Sector Improvement Project	LR 7897-IN	IBRD	08-2010	07-2016	44444.00	44444.00	450.60 M, USD	142.50 M, USD
3..	Uttar Pradesh Water Sector Restructuring Project Phase-II	5298-IN	IDA	10-2013	10-2020	-----	-----	239.40 M, XDR	17.24 M, XDR

*"In-principle" 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)

S. No	Name of Project	Loan Agreement No.	Loan Period		Estimated Cost as per agreement (in Million Rs.)	Total Assistance (M Yen)	Assistance utilized ending 12/2014 (M yen)	Remarks
			Starting Date	Closing Date				
1.	Rengali Irrigation Project	ID-P-210	03/10	11/15	36036.70	3047	3047.00	New loan agreement has been signed for balance works
	Rengali Irrigation Project–(III)*	ID-P-210A	03/10		------	25	20.75	Ongoing
2.	AP Irrigation and Livelihood Improve-ment Project	IDP 181	3/07	07/16	11377.00	23974	10725.07	Ongoing
Total						**27046**	**13792.82**	

* 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 on-going project under ADB funding. The assistance utilized is given in Table 12.7.

Table 12.7
External Assistance to Project (ADB)

S. No	Name of Project	Loan Agreement No.	Loan Period		Estimated Cost as per agreement (`Million)	Total Assistance (M Yen)	Assistance utilized ending 12/14 (M yen)	Remarks
			Starting Date	Closing Date				
1.	Orissa Integrated Irrigated Agriculture and Water Management Investment Program (OIIAWMIP)	2444-IND	02/09	03/15	4714.3	16.5	13.31	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, River Development and Ganga Rejuvenation 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 Uttar Pradesh 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.

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

Various Joint Committees have been formed to co-ordinate and deal with different aspects of cooperation on issues related to water resources development and management among the two countries. Details of important Committees are as under:

I. **India – Nepal Joint Committee on Water Resources (JCWR**) : With a view to discuss important issues pertaining to cooperation in the field of Water Resources, including implementation of existing agreements and understandings, an India – Nepal Joint Committee on Water Resources (JCWR) headed by Water Resources Secretaries of both countries, has been functioning with the mandate to act as an Umbrella Committee for all Committees and Groups in this regard.

II. **India-Nepal Joint Standing Technical Committee (JSTC**) :In pursuance of the decision taken during the 3rd meeting of JCWR held in 2008, the **India-Nepal Joint Standing Technical Committee** has been constituted under the Chairmanship of Chairman, GFCC, Patna as Team Leader and Sr. Jt. Commissioner (Ganga), MoWR as Member Secretary to coordinate all existing Committees and Sub-committees under JCWR. The 1st meeting of JSTC was held in 2008 at New Delhi and last meeting i.e 4th meeting was held in 2013 at Kathmandu, Nepal.

III. **India-Nepal Joint Committee on Inundation and Flood Management (JCIFM):** In pursuance of the decision taken during the 4th meeting of JCWR held in 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). JCIFM implements the decisions of JSTC in inundation and flood management issues and address the issues related to flood in this regard. The JCIFM has met 9 times and the last meeting was held in February, 2015 at Kathmandu, Nepal.

IV. **Joint Team of Expert (JTE) –** In the year 1991, an understanding was reached between Governments of Nepal and India on preparation of Detailed Project Report (DPR) of Sapta Kosi High Dam Multipurpose Project. In accordance with this, an understanding was reached to create Joint Committee of Experts (JCE) for finalising the modalities of investigations of the project, with a view to

prepare a detailed project at the earliest. The first meeting of JCE was held in 1992.

India-Nepal Joint Team of Expert (JTE) was constituted in 2000 for investigation of studies of all joint projects with Nepal other than Pancheshwar, with Member (RM), CWC as Team Leader from Indian Side. The mandate of JTE included administration of the project, both financially and physically. The JTE is also mandated to:

a) Prepare DPR of Sapta Kosi High Dam and Sun Kosi Multipurpose Projects
b) Forward the approved DPR to respective Governments for acceptance

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

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 Government of India and HMG Nepal. A Joint Project Office (JPO) has been set up in Nepal in August, 2004 for investigation and preparation of DPR within a period of 30 months, which was subsequently extended up to February, 2015.

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.

The 14th meeting of the India-Nepal Joint Team of Experts (JTE) on SaptaKosi high dam Multipurpose Project and Sun Kosi storage-cum-diversion scheme was held in January, 2015 at New Delhi. Based on the review, JTE recommended extension of tenure of JPO-SKSKI for another 24th months i.e. upto 28th February, 2017.

II. Pancheshwar Multipurpose Project

A Joint Project Office (JPO-PI) involving India and Nepal was set up in December, 1999 to jointly take up investigations & studies and to prepare Detailed Project Report (DPR) of 5600 MW Pancheshwar Multipurpose Project. Most of the parameters of the proposed project have been agreed upon by both the countries. Hower, some issues between India and Nepal remained unresolved. Accordingly, both sides prepared their own draft DPR for Pancheshwar Multipurpose Project in January, 2003. To get these issues solved, it was decided during the 3rd meeting JCWR held in 2008, to set up Pancheshwar Development Authority (PDA) at the earliest for the development, execution and operation of Pancheshwar Multipurpose Project. Recently, Pancheshwar Development Authority (PDA) has been constituted vide MoWR O.MNo.Z-14012/3/2013-Ganga/2302-2314 dated 7th August, 2014 for preparation of mutually acceptable DPR and execution of Pancheshwar Multipurpose Project. All the project parameters are to be finalized by PDA.

13.3 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 Experts Team (JET) consisting of officials from the Governments of India and Royal Government of Bhutan was constituted in 1985 and modified in 1988 and further reconstituted in August,1992 with Chief Engineer(B&BBO),CWC, as Team Leader from Indian Side. The mandate of JET are to formulate programme for the Five- Year Plans for continuation of /Improvement in the on- going scheme under operation, formulate year- to- year programme of work within the overall plan as per Five-Year Plans, review the progress of works, via- a-vis the programme laid down, recommend the releases to be made to the Royal Government of Bhutan on the basis of progress achieved/ likely to be achieved after dimensions/random general checks and look into any other specific point related to the scheme which may crop up from time to time. The team normally meet at least twice a year-once before the commencement of the monsoon and the other after the

monsoon season is over. The last i.e. 30th meeting of Joint Expert Team (JET) was held January, 2015.

A Joint Groupof Experts (JGE), headed by the Commissioner, Brahmaputra & Barak Basin (B&BB), MoWR, RD & GR 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 JGE has met 5 times so far and the 5th meeting of JGE was held in 2013 on 14-15 November, 2013 at Phuentsholing, Bhutan.

In accordance with the decision taken during the first meeting of JGE, a Joint Technical Team (JTT) on Flood Management between the two Countries was constituted with Chief Engineer, CWC Shillong as its Team Leader (Indian Side). So far 3 meetings of JTT have been held. The 3rd (last) meeting of JTT was held in 2013 at Phuentsholing, Bhutan..

CWC is providing technical assistance for development of hydropower potential in Bhutan. Bhutan Investigation Division (BID), CWC, Phuentsholing is coordinating with Royal Government of Bhutan and carrying out necessary field works in this respect. In the recent past, nine Mini Hydel Projects executed by CWC were handed over to Royal Government of Bhutan. The investigation of major hydro power projects like Chukha, Tala, Sankosh, Kurichu and Punatsangchhu were also carried out by BID, CWC.

River protection works at Paro airport has also been completed by BID, CWC. Presently, consultancy work for replacement of originally installed rope drum hoist with hydraulic system for radial gates and integration of remote automatic operation of gates of Chhukha Hydropower Plant, Bhutan is being executed by BID, CWC, Bhutan.

13.4 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 between the Bureau of Hydrology & Water Resources, Tibet Autonomous Region, the People's Republic of China and the Central Water Commission, Ministry of Water Resources, Government of India upon provision of hydrological information of the Yaluzangbu/Brahmaputra river in flood season by China to India was signed on 28.04.2009. The hydrological information during the flood season every year is received in terms of the signed Implementation Plan. The latest MoU for hydrological information for river Brahmaputra was signed on 20.05.2013 and corresponding Implementation plan was signed on 30.05.2013 at New Delhi.

Joint Expert Level Mechanism (JELM) –During the visit of the Hon'ble President of the People's Republic of China in November 2006, it was agreed to set up an Expert Level Mechanism (ELM) to discuss interaction and cooperation on the provision of flood season hydrological data, emergency management and other issues regarding trans-border rivers.The Expert Group from Indian side is led by Joint Secretary level officers. The last meeting of Expert Level Mechanism was held during June 24-27, 2014 New Delhi. During this meeting an Implementation Plan for river Brahmaputra was signed wherein was agreed to extend the period of monsoon data sharing from May 15 - Oct 15 every year. During the year, India received data from China as per Implementation Plan.

Besides Brahmaputra river, India and China are also cooperating on Hydrological data of river Sutlej. Since 2007, India is receiving data during the monsoon period (June 1st to Oct 15th) on continuous basis.

The corresponding Implementation plan was signed on 30.05.2013 at New Delhi.

13.4 Cooperation with Bangladesh

In order to ensure the most effective joint effort in maximizing the benefits from common river systems an **Indo-Bangladesh Joint Rivers Commission (JRC**) is functioning since 1972, which is headed by Water Resource Ministers of both the countries. So far, 37 meetings of JRC have been held and its last meeting was held in March, 2010.

As per the provision of the Treaty, signed by the Prime Ministers of India and Bangladesh on 12th December 1996 for the sharing of Ganga/Ganges waters, a Joint Committee has been set up for implementing, joint inspection and monitoring of the sharing arrangements at Farakka in India and at Hardinge Bridge in Bangladesh for the dry season (Jan to May) every year. The validity of Treaty is 30 years. The Treaty is being implemented to the satisfaction of both the countries since 1997.

Under bilateral arrangements, India provides flood data of Farakka & Sahibganj for Ganga and flood data of Pandu, Goalpara and Dhubri for Brhamaputra and Silchar and Badarpurghat for Barak, Domhani & Gazaldoba for river Teesta, Sonamura & Amarpur for Gumti, NH-31 on Jaldhaka (Dharla), Ghughumari on Torsa (Dudhkumar), Khowai Town for Khowai and Dharmnagar for Juri and Farakka during monsoon period to Bangladesh for use by their flood forecasting and warning arrangements besides data of river Manu. 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 mentioned sites to Bangladesh on continuous basis for use of data in development of flood forecasting models by Bangladesh. Flood data of above sites was communicated to Bangladesh on continuous basis during the Monsoon of the year 2014.

13.5 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 fulfilment 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 Development of Water Resources Information System (DWRIS)

Central Water Commission is implementing the Plan Scheme "Development of Water Resources Information System (DWRIS)" with an objective to operate a standardized national water information system in the country with provision for data collection, data processing and storage and online data dissemination. The scheme has following five major components:

i. Hydrological Observations Monitoring System
ii. Irrigation Census
iii. Water Quality Assessment Authority and Monitoring System
iv. Strengthening of Monitoring Unit in CWC
v. Data Bank and Information System

14.2 IndiaWRIS

CWC & ISRO has jointly undertaken the work of development of Water Resources Information System (DWRIS) during 11th plan. The estimated cost of the project was Rs. 78.3164 crores. The MoU was signed between CWC and ISRO during the month of December 2008 and the project was to be completed in 4 yrs time period i.e. upto December 2012. The project comprises of 30 major GIS layers (viz. River network, basins, canal network, water bodies, hydro meteorological 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.

Physical Progress:

a. The four version of website of INDIA WARIS have been launched so far. The URL of the website is www.india-wris.nrsc.gov.in which can be seen for more details.

b. The ver. 4.0 was launched in March' 2014 and is available in public domain at 1:250000 scale.

c. All unclassified data of CWC G&D stations has been uploaded at WRIS website recently in July 2013 as per Hydro-meteorological data dissemination policy 2013.

d. Further the project has been co-located from ISRO, Jodhpur to CWC HQ Sewa Bhawan in Feb 2015 and following activities were taken up by the center during March 2015:

e. Generation of unique code for all the water bodies in the country for undertaking census of water bodies.

f. Generation of district wise statistics and maps of surface water bodies.

g. Quantitative Precipitation Forecast based delineation of IMD sub-basin for providing information to IMD.

h. Support to RD Dte., CWC by creating hydro-meteorological network layer for HP-III project. Correction of spatial location of 800 Proposed HO sites of CWC is under progress.

i. Support in design of meteorological network for HP-III project with reference to 0.25 grid distribution.

j. The center worked on Mahanadi Godavari link under guidance of Shri B. K. Panda, OSD, MoWR, RD & GR and generated thematic maps showing benefits of Mahanadi Godavari link. Analysis for Volume of Storage, submergence area and villages under submergence was done for eight sites identified by Shri Panda for creating required storage for Mahanadi Godavari link. Further routes of 3 intra-basin flood moderation schemes of Odisha Government (IB (Mahanadi) – Sankha (Brahmani), Nagavali-Vamsadhara-Rushikuliya Link, Mahanadi (Barmul)-Rushikulya Link were analyzed using SRTM DEM.

k. Provided support to Hydrology unit, CWC for undertaking Feasibility analysis for storage of flood water between Kanpur and Varanasi in Ganga basin.

National Water Informatics Centre (NWIC): EFC of NWIC including byelaws has been submitted to MoWR, RD & GR.

14.3 Hydrological Observations including Snow Hydrology, Water Quality and Monitoring of Glacial Lakes

Hydrological Observations

India has a total geographical area of 329 Mha having an annual precipitation of 4000 BCM with wide temporal and spatial variation. India from river basin point of view has been divided into 20 river basins. The collection of hydro-meteorological data for all the river basin in scientific manner is essential for 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 level /inflow forecasting, solving of International & Inter-State issues, river morphology studies, Reservoir siltation studies, development of inland waterways, research related activities etc.

Central Water Commission is operating a network of 878 Hydrological Observation (HO) stations 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. In addition to above, it also operates 76 exclusive meteorological observations stations in carious basins in the country. The hydrological data collected from sites have been scrutinized, validated and published in the form of Water Year Book, Water Quality Year Book and Sediment Year Book, etc. by CWC.

To expand and strengthen the above activities, provision has been made to upgrade the existing 100 Hydrological Observation Stations, upgrade 23 water quality laboratories and opening of 800 new sites under component "Hydrological Observations Monitoring System" of the 12th Five Year Plan Scheme, namely, Development of Water Resources Information System. An outlay of Rs. 1024 crore has been kept for the purpose. This will help in addressing the data requirement of the country more precisely and in better scientific manner. Till now, Central Water Commission has opened 177 new sites. However, measurement of few parameter with reduced frequency is being done at these sites due to paucity of required manpower. Central Water Commission has also upgraded 100 existing sites as envisaged in the Plan.

Monitoring of Glacial Lakes/Water Bodies in Himalayan Region:

Glacial lakes are common in the high elevation of Glacierised basin. They are formed when glacial ice or moraines impound water. The impoundment of the lake may be unstable, leading to sudden release of large quantities of stored water. This may leads to flash floods in the downstream reaches of lakes, called as Glacial Lake Outburst Flood (GLOF). GLOFs have immense potential of flooding in downstream areas, causing disaster to human settlements, livestock and property. Incidents of outburst of Glacial Lakes/Water bodies in Himalayan region have been evident during recent past. Therefore, Glacial Lakes and Water Bodies in Himalayan Region need to be closely monitored.

CWC took up the work of monitoring of glacial lakes and water bodies. In order to make inventory and monitoring of glacial lakes and water bodies present in the Himalayan Region, a MoU with NRSC, Hyderabad was signed in 2009. As per inventory created in 2009, there are 2027 nos of glacial lakes and water bodies (GL/WB) with more than 10 Ha water spread area. Out of which 477 are more than 50 Ha. Monitoring of these lakes has been taken up. 477 glacial lakes/water bodies with water spread area more than 50 ha have been monitored every year during monsoon season (June–October) of 2011, 2012, 2013 & 2014. Monitoring reports were prepared and sent to Brahmaputra & Barak Wing, Indus Wing and Flood Management Wing of MoWR, RD&GR and concerned field offices of CWC.

Glacial lakes and water bodies need to be assessed for their vulnerability, which depends on their location, size and human habitation & water resources project downstream. CWC has assessed vulnerability of glacial lakes/water bodies with area greater than 50 ha. Glacial lakes/water bodies with water spread area greater than 50 Ha have been prioritized based on vulnerability assessment and stability of lakes for taking up GLOF studies. As per priority, glacial lakes in Sikkim under Teesta River Basin are assessed as most vulnerable and therefore, CWC has carried out GLOF study and prepared advisory sheet. This advisory sheet provides information about the various scenarios of Glacial Lake bursts and the corresponding water level/discharges rise at locations near human settlements and water resources projects

14.4 Coastal Management Information System (CMIS):

Considering the importance of collection of data on coastal processes relevant for evolving plans towards coastal protection measures, a new component in the XII-Plan (2012-17) period for creation of "Coastal Management Information System (CMIS)" has been approved by Ministry of Water Resources, River Development and Ganga Rejuvenation (MoWR,RD&GR), Government of India under the Plan Scheme "Development of Water Resources Information System (DWRIS)", which is to be implemented by Central Water Commission (CWC). In this regard, it is proposed to set up sites along the coast of the maritime States/UTs of India for collecting data of relevant coastal processes.

The activity of establishing a Coastal Management Information System is a field of activity wherein the experience and expertise is needed. Hence, for implementation and creation of CMIS, it has been decided that CWC would suitably associate with the maritime State/UT Governments and Institutes/Agencies who possess similar expertise and experience. In order to hear the views of the maritime State/UT Governments and Expert Institutes/Agencies, a "One day Brainstorming Workshop on Implementation and Creation of Coastal Management Information System (CMIS)" was organized by CWC on 13th May, 2014 at New Delhi. During the discussions in the work-shop, the preferred implementation model for CMIS was decided to be through signing of a Memorandum of Understanding (MoU) by CWC with the concerned agencies and respective maritime States/UTs. It was felt that a tripartite MoU, wherein, CWC would be the 'Project Implementer', the expert agency as the 'Project Executor' and the concerned State/ UT Government would be the 'Project Facilitator' would be a preferred option.

Subsequent to the workshop, the various agencies viz. were Ministry of Earth Science, National Institute of Oceanography, Goa, Central Water & Power Research Station (CWPRS), Pune, Indian Institute of Technology, Madras (IITM), Chennai were approached by CWC for undertaking the role of Project Executor or possible areas of collaboration. The process of consultation with State and prospective Project executors is going on which will be formalized through signing of tripartite MoU. Currently a proposal of Indian Institute of Technology, Madras for setting up of three sites for coastal data collection is under active consideration of CWC

14.5 Irrigation Census

Under this component of the scheme there are the following two sub-components

(i) Rationalization of Minor Irrigation Statistics (RMIS) Scheme

A Centrally Sponsored Scheme, "Rationalization of Minor Irrigation Statistics (RMIS)" was launched in 1987 in the Ministry of Water Resources with 100% Central Assistance to the States/UTs. During the 11th Five Year Plan, the RMIS scheme was converted to as one of the components of the Central Sector Plan Scheme 'Development of Water Resources Information System (DWRIS)' scheme of the Ministry of Water Resources. The main objective of the RMIS scheme is to build up a comprehensive and reliable database in the Minor Irrigation (MI) sector for effective planning and policy making.

Under RMIS scheme, each State/UT has identified a nodal department for compilation of minor irrigation statistics for the entire State/UT. A Statistical Cell consisting of suitable number of officers/staff has been set up in the nodal department for taking up the work relating to the MI sector. These cells are responsible for collection, compilation and reporting of data of minor irrigation relating to their State/UT on a regular basis. For this purpose, they coordinate with departments of Rural Development, Agriculture and Irrigation etc. at the State level. These cells are also responsible for conducting census of MI schemes on quinquennial basis with the help of staff of State/UT Governments posted at district/block/village levels.

In the MI census, detailed information on irrigation sources, namely, Dug well, Shallow Tube well, Deep Tube well, Surface Flow and Surface Lift schemes including the irrigation potential created and potential utilized is collected and compiled on systematic basis throughout the country. Besides this, information on their ownership, the social class and holding size of the owner, number of electrical/diesel devices used for lifting water is also collected. Information in respect of adoption of water and energy conserving devices such as sprinkler and drip irrigation, use of non-conventional energy sources such as solar pumps, water mills is also collected in the MI census.

The National Informatics Centre unit in the MoWR is associated with processing of data and generation of tables. Detailed database on minor irrigation works in the country has been generated through four censuses carried out under the scheme so far with

reference years 1986-87, 1993-94, 2000-01 and 2006-07 respectively. The census reports of 2nd, 3rd & 4th MI Census are available on the website of the Ministry of Water Resources (www.mowr.gov.in). The conduct of 5th Minor Irrigation Census is in progress. The All India Training Workshop for 5th Minor Irrigation Census was held on 25th February, 2014 in which UTs have participated. Detailed discussion on schedules of 5th MI Census took place in the Workshop. The field work for the Census is expected to start after release of Census funds to the States/ UTs in the next financial year 2014-15.

(ii) Census of Major and Medium Irrigation Projects

The Census of Major and Medium Irrigation Projects is to be undertaken through outsourcing. A schedule for collection of data along with guidelines for filling up the same has been drafted. The case for identifying a suitable agency for collecting data has been initiated and the work is expected to be awarded for collection of data in the FY 2014-15.

14.6 Water Quality Assessment Authority

Water Quality Assessment Authority (WQAA), an Inter-Ministerial Authority, was constituted under Environment (Protection) Act, 1986. Secretary, MoE&F is the Chairman of WQAA and Joint Secretary (A), MoWR is its Member Secretary. Water Quality Cell in MoWR is providing secretarial assistance to WQAA. A Sub Committee was constituted for 'Re-evaluation of Powers and Mandate of WQAA'. Its recommendations were accepted by the Authority in 10th meeting held on 30th May, 2013. The revision of mandate of WQAA is under process. The Authority decided to review the existing Uniform Protocol on Water Quality Monitoring (UPWQM) notified in the year 2005 and appointed a Committee for this task. The committee has revised the existing UPWQM and the same is to be approved in the 11th meeting of WQAA. The Authority also decided to remove duplicity in monitoring of water quality of the surface and groundwater. A committee was appointed for this work and rationalization of water quality monitoring network is also undergoing. The Authority also decided to issue directions to Central and State Government organization to initiate process of accreditation of their laboratories in order to improve quality of the data and the directions have been issued accordingly.

A study was assigned to National Environmental Engineering Research Institute (NEERI) on 'Desk Study on Artificial Recharge to Ground Water by Treated Wastewater through Soil Aquifer Treatment (SAT)'. NEERI submitted its report and the same was accepted.

In order to improve capacity building of the scientific/technical officers involved in water quality issues across the country, three training programmes have been conducted, one each at CWRDM Kerala, NIH Roorkee and CWC New Delhi (involving 128 Trainees) under the aegis of the Authority during the current Financial Year.

An independent web portal of WQAA having web address http://wqaa.gov.in/ has been updated with a number of reports / publications/ photo gallery/ downloads/ projects/ RTI and other information.

14.7 Computerisation Activities in CWC

An effort has been initiated by Central Water Commission to adopt advancement in the field of Information Technology through sanctioned plan scheme i. e. Upgradation and Modernization of IT 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 under the Plan Scheme "Development of Water Resources Information System" for XII Plan. 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 H/Q. The proposed works are essential for full implementation of CWC's IT vision, and involve activities that are in natural progression to the activities initiated under earlier plan scheme. In the financial year 2014-15, 71 Nos Computer Notebook (Laptop) and 13 Nos. Deskstop Computers are purchased. The work Stabilising Integrated software solution for Digital Archival and Retrieval of Engineering Drawing in CWC is going on. Networking components has been purchased and LAN connectivity has been provided at renovated 8th floor of Sewa Bhawan.

Bug fixing and improving UI (User Interface) design of in-house developed software "Accelerated Irrigation Benefits Programme Proposal Management System (AIBP-

PMS). Training on Abacus software has been conducted, maintenance of IT items at CWC (H/Q) and Software purchased of IT consumables etc.

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 Government 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 (NWA)

National Water Academy, Pune imparts training on almost all facets of water resources development and management covering the areas of planning, design, evaluation, construction, operation and monitoring of water resources projects and also the application of high-end technology in water sector. Initially, it was set up to provide training to primarily in-service engineers and water professionals of various Central and State agencies. However, subsequently, the programs at NWA were opened to all stakeholders of water sector including those from NGOs, Media, Private Sector Organizations, Academic Institutions, PSUs, Individuals and Foreign Nationals also.

National Water Academy has also forayed into custom-designed programs meeting specific requirement of client organizations, both at its campus and off-campus at the client locations. NWA has also taken initiative into the field of 'Distance Learning Program' in association with World Meteorological Organisation (WMO).

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.

In the year 2014-15, NWA took following initiatives:

i) The second phase of 26th Induction Training Program was conducted during 3rd February 2014 to 1st August 2014. Chairman, CWC chaired the valedictory function as Chief Guest. During the valedictory function, participants presented cultural events programmes.

ii) One day Workshop on "Storm Water, Wastewater and Flood Modeling using XPSWMM" was conducted at NWA on 4th June 2014. 22 officers from various organizations attended this workshop.

iii) Training Program on "Monitoring of Irrigation Projects using Bhuvan Web Services" was conducted at NWA during 30th June to 4th July 2014. 21 officers from various Central/ State Government organizations participated in this program.

iv) One day training program cum workshop on "Scenario of Water Resources in India" was conducted at NWA on 28th August 2014. This program was arranged for school teachers. 34 school teachers in and around Pune city participated this program.

v) The fifth Training of Trainers Program under National Water Mission on "Increasing Water Use Efficiency in Irrigation Sector' was conducted by NWA, Pune jointly with Water and Land Management Institute (WALMI) Aurangabad

during 22-26 September 2014. This program was attended by 27 participants drawn from Government of Maharashtra.

vi) Consequent upon selection through UPSC, 54 Assistant Directors / Assistant Executive Engineers joined CWC during the financial year 2013-14. Their Induction Training for six months duration has been commenced at NWA from 08.12.2014.

vii) The 2nd International Distance Learning Program on "Basic Hydrological Sciences" was conducted during 10th March 2014 to 25th April 2014 and Advanced Distance Learning Program on Hydrology was conducted during 27th January 2015 to 6th March 2015. 50 participants from various Asian countries participated in this program. This includes 26 participants from various organizations of India e.g. CWC, Government of Maharashtra, Andhra Pradesh, Odisha etc. The program includes online modules and quizzes developed by NWA, Pune and COMET, USA. These programs are conducted in association with World Meteorological Organisation (WMO).

viii) On the request of Government of Bihar, one week Training Program on "Analysis and Design of Dams (Gravity, Embankment, Arch RCC) was conducted during 1-6 December 2014 at WALMI, Patna. 40 Engineers of Water Resources Department, Government of Bihar participated in this program.

ix) Off-campus Training Program on "Design Flood Estimation" for the officers of Government of Bihar was conducted at WALMI, Patna during 19-23 January 2015. 30 officers participated in this program.

x) Off-campus Training Program on "Design of Barrages, Weirs and Canals" was conducted at Water and Land Management Institute (WALMI), Patna, Bihar for the officers of Government of Bihar during 19-23 Feb. 2015. 33 officers participated in this program.

xi) Core faculty of NWA participated in "India Water Week" organized by the Ministry of Water Resources, River Development and Ganga Rejuvenation at New Delhi during 13-16 January 2015.

xii) One day workshop on "Water Management: Issues and Remedies" was conducted at NWA on 13th March 2015. The workshop was organized for the members of local Gram Panchayats, NGOs, Media Personnel. 27 members from local Gram Panchayats attended this Workshop.

15.2.1 Progress of Training Activities

Since its inception in the year 1988, NWA has conducted a total of 494 training programmes up to March 2015 and trained total 11706 officers. During the year 2014-15, 33 training programs were conducted at National Water Academy, CWC, Pune.

15.2.2 Other Important Activities

i) The Vigilance Awareness Week was celebrated at NWA during 27th October 2014 to 1st November 2014. During the week, a one day Seminar on "Combating Corruption- Technology as an enabler" was organized on 30th October 2014. Officers and staff of National Water Academy, CWC, Pune and Upper Krishna Division, CWC, Pune participated in this Seminar.

ii) On the clarion call of Hon'ble Prime Minister, the "Swachh Bharat Abhiyan" was started at NWA from 25th September 2014. On 2nd October 2014 i.e. the Birth Anniversary of Mahatma Gandhiji, "Swachhata Shapath" was administered by Chief Engineer, NWA, Pune to all officers and staff of NWA. As a part of Abhiyan, the cleanliness drive was undertaken and the NWA Office as well as Residential campus was cleaned.

15.2.4 Advisory Board of NWA

There is an Advisory Board of NWA for guiding NWA on various training activities headed by Chairman, CWC.

15.2.5 Program Advisory Committee of NWA

The first meeting of Programme Advisory Committee of NWA was held at CWC, New Delhi on 21st February 2014 under the Chairmanship of Chairman, CWC. During the meeting, the syllabus of following training programs was discussed and approved.

i) 26thTraining Program for newly recruited Assistant Directors of CWC, Phase– II.

ii) Core Area Training(CAT)

iii) River Management

iv) Orientation program for newly recruited Assistant Directors-II of CWC/SDE

v) Issues of technological up gradation of core faculty of NWA.

CHAPTER-XVI

VIGILANCE

16.1 Disciplinary Cases

The vigilance/ disciplinary cases and complaints received against officers and staff of CWC were given proper and prompt attention. During the year 2014-15, 12 new complaints/cases were taken up for investigation. Final decision was taken in respect of 15 cases. The break-up of vigilance/disciplinary cases in respect of different category of officers and staff is as follows:-

Sl. No.	Particulars	Category of Officers/Staff		
		Gr. 'A'	Gr. 'B'	Gr. 'C' (including cases of erstwhile Gr. 'D')
a)	No. of cases pending at the beginning of the year	15	19	17
b)	No. of cases added during the year	10	02	0
c)	No. of cases disposed of during the year	08	04	03
d)	No. of cases pending at the end of the year	17	17	14

Out of the 15 cases disposed of, officials in 02 cases were awarded major penalty and in 01 case minor penalty. Vigilance Awareness Week was observed at CWC Headquarters and its field offices from 27th October to 1st November, 2014.

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 various Technical Committees of various organisations either as the Chairman or as a Member. List of various Committees on which Chairman, CWC and Member, 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	Science and Technology Advisory Committee (STAC-MOWR)	Chairman, CWC	Member
2	Water Resources Division Council (WRDC) of BIS	Chairman, CWC	Chairman
3	Technical Advisory Committee to the Governing Council for Central Water and Power Research Station, Pune.	Chairman, CWC	Chairman
4	National Committee on Dam Safety(NCDS)	Chairman, CWC Member(D&R)	Chairman Vice Chairman
5	Standing Technical Advisory Committee (STAC) to the Governing Council for CSMRS, New Delhi.	Member (D&R)	Chairman
6	National Institute of Hydrology Society (NIH Society)	Chairman, CWC Member(D&R)	Member Member
7	Technical Advisory Committee of National Institute of Hydrology.	Chairman, CWC Member(D&R)	Chairman Member
8	Committee to monitor & supervise the overall work for preparation of DPR of Par-Tapi-Narmada and Damanganga-Pinjal Link Project	Chairman, CWC Member (D&R)	Chairman Member

Sl. No.	Name of Committees/Boards/Panel of Experts/Technical Groups etc.	Representation of CWC	
		Officer	Position in the Committee
9	Committee of International Commission on large dams, India (INCOLD)	Member (D&R)	Member
10	Technical Advisory Committee of National Water Development Agency.	Chairman, CWC Member(WP&P) Member(D&R)	Chairman Member Member
11	Society of National Water Development Agency.	Chairman, CWC Member(D&R) Member(WP&P)	Member Member Member
12	Governing body of National Water Development Agency.	Chairman, CWC Member(D&R) Member(WP&P)	Member Member Member
13	Governing Council for Central Soil & Materials Research Station.	Chairman, CWC Member (D&R)	Member Member
14	Advisory Committee for consideration of Techno Economic viability of Major & Medium Irrigation, Flood Control and Multipurpose project proposals.	Chairman, CWC Member(WP&P) Member(D&R) Member(RM)	Member Sp. Invitee Sp. Invitee Sp. Invitee
15	Committee of CEA to accord of techno-economic appraisal of Power Schemes.	Member (D&R)	Permanent Special Invitee
16	Indian Meteorological Department (IMD)	Member (D&R)	Hydrological Advisor
17	Governing Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
18	Research Advisory Committee (RAC) of National Council for Cement and Building Materials.	Member (D&R)	Member
19	National Committee on Seismic Design Parameters of River Valley Projects (NCSDP)	Member (D&R)	Chairman
20	Standing Advisory Committee(SAC) for R&D Programme	Member (D&R)	Chairman
21	National Level Steering Committee (NLSC) for Dam Rehabilitation and Improvement Project (DRIP)	Member (D&R)	Member

Sl. No.	Name of Committees/Boards/Panel of Experts/Technical Groups etc.	Representation of CWC	
		Officer	Position in the Committee
22	Technical Committee (TC) for Dam Rehabilitation and Improvement Project (DRIP)	Member(D&R)	Chairman
23	World Meteorological Organization	Member (D&R)	Principal Representative
24	Committee to assess Quantum on Excess Ravi Water Flowing Across International Border and suggest its diversion	Member (D&R)	Chairman
25	Sectional Committee of BIS, WRD-15	Member (D&R)	Chairman
26	Board of Directors of Tehri Hydro Development Corporation	Member (D&R)	Part Time Director
27	Technical Advisory and Review Committee (TARC) for preparation of PMP Atlas	Member (D&R)	Chairman
28	Technical Advisory Committee of the Farakka Barrage Project.	Member (D&R)	Chairman
29	Board meeting of Punatsangchhu-I H.E. Project Authority (PHPA)	Member (D&R)	Permanent Invitee
30	Technical Coordination Committee (TCC) for Punatsangchhu - I H.E Project, Bhutan	Member (D&R)	Co-Chairman
31	Governing Body of NIH	Chairman, CWC Member(D&R)	Member Alternate Member
32	Review Committee for the development of Hydrological Design Aids, Surface Water (SW) under HP-II	Member (D&R)	Member (D&R)
33	CEDC(Civil Engineering Divisional Council)	Member (D&R)	Member
34	CED 48 Sectional Committee of BIS	Member (D&R)	Principal Member
35	Programme Advisory Committee (PAC) for Fly Ash Unit constituted by Department of Science and Technology	Member (D&R)	Member
36	Committee to finalise the Action Plan on full utilisation of Eastern Rivers flowing across International Border	Member (D&R)	Chairman
37	Committee for monitoring the progress of Farakka Barrage Project	Member (D&R)	Chairman

Sl. No.	Name of Committees/Boards/Panel of Experts/Technical Groups etc.	Representation of CWC	
		Officer	Position in the Committee
38	Tender Committee of Farakka Barrage Project	Member (D&R)	Chairman
39	Expert Group for finalization of Specifications for relining of Rajasthan and Sirhind Feeder	Member (D&R)	Chairman
40	Committee to explore possibility of storing water on both banks of river during flood and to explore feasibility of New Barrage D/s of Okhla.	Member (D&R)	Chairman
41	Monitoring Committee for Basin Wise reassessment of Hydro Electric Potential in the country	Member (D&R)	Member
42	Punatsangchhu-II Hydro Electric Project Authority Meetings.	Member (D&R)	Permanent Invitee
43	Technical Co-ordination Committee (TCC) of Punatsangchhu-II Hydro Electric Project	Member (D&R)	Co-Chairman
44	Mangdechhu HE Project Authority Meetings.	Member (D&R)	Permanent Invitee
45	Technical Co-ordination Committee (TCC) Mangdechhu HE Project	Member (D&R)	Co-Chairman
46	Empowered Joint Group meetings (EJG) (for monitoring of implementation of Hydro-power projects in Bhutan).	Member (D&R)	Permanent Invitee
47	Standing Technical Committee (STC) for deciding project parameters of R-O-R Hydro-power scheme which were initially envisages as storage scheme.	Member (D&R)	Co-Chairman
48	Indian National Committee in Geo-Technical Engineering & Construction Material (INCGECM), CSMRS	Member (D&R)	Member
49	High Powered Steering Committee for Implementation National Projects.	Member (D&R)	Sp. Invitee

17.2 Activities of Some Important Committees for R&D

17.2.1 Indian National Committee on Surface Water (INCSW)

The secretariat functions of newly constituted Indian National Committee on Surface Water (INCSW) was assigned to R&R Dte vide CWC letter No.7/1/2012-WP&P-C/1347-91, dated 21.06.2012.

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 and Chief Engineer, EMO, CWC is Member – Secretary. There are 13 members representing MoWR/CWC, CSMRS, CWPRS, NIH, DST, Ministry of Agriculture, 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, recognized 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 activities were performed by INCSW during 2014-15:

- Presently, over 75 research schemes are under progress. Out of these, Service Requests from PIs of 36 ongoing Research schemes were processed and sent to MoWR for release of funds.
- Preliminary examination of 41 new study proposals before circulating to experts for views/comments for consideration/approval of INCSW.
- Annual Subscription of ICID for year 2013 processed and released.
- Nomination for 19 working groups of ICID finalised and conveyed.
- Nomination for Vice- President of ICID from India for 2014-15 finalised and conveyed.
- Process for nomination of non-permanent members of INCSW initiated, information compiled and forwarded to MoWR, RD&GR for acceptance/approval.
- The process of nomination for Jain INCID Award 2013, scheduled to be awarded during India Water Week 2015 in January 2015, initiated and finalized.
- Process for acceptance of draft final report of R&D Schemes (2 Nos.) initiated.

17.2.2 Technical Advisory Committee of NIH

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

TAC gets feedback from 3 Working Groups on Surface Water, Ground Water and Hydrological Observation and Instrumentation. Chief Engineer, HSO and Chief Engineer, BPMO are the Members of the Surface Water Group and Chief Engineer (P&D) is the Member of the Hydrological Observations and Instrumentation Group.

40th meeting of Working Group of NIH was held on 04.05.2014 at NIH Roorkee. The 67th meeting of TAC was held on 15.07.2014 at New Delhi.

17.2.3 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. 110th meeting of TAC of FBP was held from 15th to 16th December 2014 at Farakka, West Bengal.

17.2.4 Standing Technical Advisory Committee of CSMRS

The Standing Technical Advisory Committee (STAC) was constituted for providing an overall perspective and guidance in technical scrutiny of research schemes being undertaken at CSMRS. The STAC is composed of 11 members drawn from various public sector institutions and is headed by Member (D&R), CWC. The 30th meeting of STAC was held on 07.07.2014 at New Delhi under the Chairmanship of Member (D&R), CWC.

17.3 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 & 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 15 Sectional Committees of WRDC and 13 Sectional Committees of CEDC. FE&SA and CMDD (NW&S) are the Nodal Directorates in CWC dealing with works of WRDC & CEDC of Bureau of Indian Standards, respectively at CWC.

Since Chairman, CWC is the Chairman of WRDC, the approval of draft codes and amendments to BIS Codes for adoption and printing are processed in CWC and approval of Chairman is communicated to BIS. The 17th meeting of WRDC was held on 12.05.2014. During the current year 9 draft standards to BIS Codes have been approved by the Chairman for adoption and printing.

17.4 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.

17.5 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 center 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 2916 numbers composed pages and 80110 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 01.04.2014 to 31.03.2015. 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 Job	Nodal Agency/ Dte.	No. of Pages	No. of Copies
1.	Printing & Binding of Compilation of data regarding Major & Medium Water Resources Project	EM Dte.	291	50
2.	Printing of Disposal of V.I.P. References	E-IV Section	2	600
3.	भगीरथ (हिन्दी) अक्टूबर–दिसम्बर, 2013	भगीरथ (हिन्दी) अनुभाग	52+4	2300
4.	Printing of Report "Status of Trace and Toxic Metals in Indian River"	RD Dte.	216	100
5.	Printing of Bhagirath (Hindi) Jan-March 2014	Bhagirath Hindi	56	1000
6.	Printing of Rules and Syllabus for Departmental Examination	Estt. I	60	100
7.	Printing of Telephone Directory 2014	TD Dte.	90	1500
8.	Printing of Inspection Questionnaire on Organisation and Methods (O&M)	O & M	18	50
9.	Printing of Articles on Water Resources Development & Management	TD Dte.	2	77

Sl. No.	Name of Job	Nodal Agency/ Dte.	No. of Pages	No. of Copies
10.	Printing of Lokpal and Lokayuktas Act, 2013, Notified by DoPT	US O&M	11	300
11.	Printing of Transfer Policy of CWC Applicable to Group A&B Officers of CWES Cadre	O&M Section	5	300
12.	Printing and binding of inspection questionnaire	O&M Section	15	30
13.	हिन्दी पखवाड़ा 2014 के अवसर पर जल संसाधन, नदी विकास और गंगा संरक्षण मंत्री जी का संदेष	हिन्दी अनुभाग	1	170
14.	हिन्दी पखवाड़ा 2014 के अवसर पर जल संसाधन, नदी विकास और गंगा संरक्षण राज्य मंत्री जी का संदेष	हिन्दी अनुभाग	2	340
15.	हिन्दी पखवाड़ा 2014 के अवसर पर सचिव, जल संसाधन, नदी विकास और गंगा संरक्षण का संदेष	हिन्दी अनुभाग	1	170
16.	हिन्दी पखवाड़ा 2014 के अवसर पर उपनिदेषक, राजभाषा का सभी क्षेत्रीय कार्यालयों व केन्द्रीय जल आयोग के सभी निदेषालयों व अनुभागों से संबंधित अपील पत्र	हिन्दी अनुभाग	1	170
17.	Printing of Bhagirath (English) July-December, 2013 (Combind issue)	Bhagirath (English)	70	2300
18.	हिन्दी पखवाड़े के अवसर पर अध्यक्ष, केन्द्रीय जल आयोग की अपील	हिन्दी अनुभाग	1	300
19.	भगीरथ हिन्दी अप्रैल–जून, 2014	भगीरथ हिन्दी	56	1000
20.	Appeal for Swachh Bharat	Estt. IV	5	450
21.	संस्कृति विषयक मौलिक हिन्दी पुस्तक लेखन पुरस्कार योजना	हिन्दी अनुभाग	6	1500
22.	मौलिक पुस्तक लेखन पुरस्कार योजना – वर्ष 2013	हिन्दी अनुभाग	1	250
23.	Printing of National Sanitation Compaign Pledge	Estt. IV	3	450
24.	कंप्यूटर पर हिन्दी में काम करने के लिए बेसिक प्रषिक्षण कार्यक्रम 2014–15	हिन्दी अनुभाग	4	600

Sl. No.	Name of Job	Nodal Agency/ Dte.	No. of Pages	No. of Copies
25.	स्वच्छता षपथ	स्थापना– चार	1	500
26.	Printing of National Sanitation Compaign and letter from Secretary to the Government of India, Urban Development	Estt. IV	4	680
27.	Printing of Swachh Bharat Abhiyan Appeal	Estt. IV	3	510
28.	सरल प्रषासनिक हिन्दी ष्षब्दावली के मुद्रण के सम्बंध में है	हिन्दी अनुभाग	3	750
29.	केन्द्रीय जल आयोग की राजभाषा कार्यान्वयन समिति की 119वीं बैठक के कार्यवृत	हिन्दी अनुभाग	18	450
30.	Observation of World Toilet Day on 19th Nov., 14 – Quami Ekta Week from 19th Nov. to 25th Nov. 2014 (Three letters)	Secy. Office	6	680
31.	Compendium of Project Proposals Accepted by Advisory Committee of MOWR (111th and 112th Meeting)	PA (North Dte.)	380	10
32.	Printing of adherence to time Scheduled for submission of Pension Cases	Estt.IV	5	800
33.	Printing of Bhagirath English Jan.-June, 2014 (combined issue)	Bhagirath English	72	1000
34.	Bhagirath (Hindi) July-September 2014	Bhagirath Hindi Section	68	1000
35.	Printing of Inspection Questionnaire of Committee of Parliament on Official Language	Hindi Section	63	60
36.	Printing of Records Retention Schedule for Records Pertaining to Substantive Functions	US, O&M Dte.	82	200
37.	Printing and Spiral Binding of Draft Agenda Note for the 14th Meeting of Bansagar Control Board	- do -	648	12
38.	Printing of Annual Report (English) of CWC 2013-14	TC Dte.	170	300 under making

Sl. No.	Name of Job	Nodal Agency/ Dte.	No. of Pages	No. of Copies
39.	Printing of Bhagirath (Hindi) October – December 2014	Bhagirath Hindi Section	64	1000 under binding
40.	संसदीय राजभाषा समिति (निरीक्षण प्रष्नावली) की स्टिचिंग व बाईंडिंग	हिन्दी अनुभाग	79	1
41.	Printing of Order for timely completion of APARs for the year 2014-15	CM&V	4	1000
42.	Printing of Inspection Questionnaire regarding use of Hindi in Ministries/Deptt. Attached and subordinate offices etc. of Central Government	Hindi Section	16	350

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.

In addition, ISO, CWC also brings out the following publications:

i. Water and Related Statistics

The biennial publication titled 'Water and Related Statistics April, 2015 was brought out by CWC which inter-alia provides the following information.

- Rainfall in different meteorological sub-divisions of the country.
- Water resources potential in the river basins of India, basin-wise, storages in India.
- Month wise storage position of important reservoirs.
- State-wise ultimate irrigation potential, basin-wise hydrological observation Stations of Central Water commission.
- Land use Statistics and flood Damage i.e. Area Affected
- Coverage of Rural Habitations under Rural Water Supply.
- 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 and Medium irrigation as well as Minor irrigation.

ii. Water Resources Sector at a Glance

- Land Use Statistics
- Water Resources Potential& Estimated Water Demand.
- Irrigation Potential& Expenditure on Irrigation Project Plan Wise.
- Storage Capacity of Dams in India
- Flood Management Work
- Water Development Indicators of India
- India in International Scenario.

iii. Hand Book on Water Related Information:

The annual publication titled 'Hand Book on Water Related Information January, 2015 was brought out by CWC which inter-alia provides the following information

- Land Use Classification and Irrigation Statistics by State
- Rainfall in different Meteorological Sub-Divisions of the country
- List of new Projects under Appraisal in CWC
- List of Projects accepted by Advisory Committee of MoWR
- List of Irrigation Projects Accepted By Planning Commission
- Number of Major, Medium and ERM Irrigation Projects by State
- Achievements of Bharat Nirman on Irrigation Potential Creation including Minor Irrigation by State
- Central Loan Assistance (CLA)/Grant Releases on Major, Medium, ERM Projects under AIBP
- Project-wise Irrigation Potential Created (IPC) under AIBP
- Details of Declared National Projects
- Details of Ongoing Externally Aided Irrigation Projects
- Central Releases Under the Command Area Development and Water Management Programme by State
- Physical Progress of Flood Management Works under Flood Management Programme by State
- Number of Water Users' Associations (WUAs) Formed and Area covered by State
- Water Quality Standards & Water Quality Criteria in India
- State Wise Water Rate for Flow Irrigation and Lift Irrigation

iv. Integrated Hydrological Data Book:

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 2015 containing data up to 2011-12 is in progress and will be up-loaded on the website of CWC on its finalization.

v. Financial Aspects Flood Control Anti-sea erosion and Drainage Projects

This publication contains information on Financial Aspects at All India, States/UTs & Union Government level on Gross Receipts, Capital Outlay and Working Expenses which mainly focuses on 3 aspects:

- Major & Medium Irrigation Projects
- Minor Irrigation Projects
- Command Area Development Program

The source of information for this publication is Financial and Revenue accounts of the Union and State Governments brought out by the Comptroller & Auditor General of India and the Accountant General of the States respectively. The present publication for the year 2015 containing data from 1992-93 to 2011-12 is in progress and will be uploaded on the website of CWC on its finalization.

18.2 Journals

CWC publishes several technical and semi-technical journals and publications in the field of Water Resources development. 'Bhagirath' a quarterly semi-technical journal, both in English and in Hindi were published separately during the year as follows:

1. Bhagirath (English) journal July-Dec'2012, Jan-June 2013, July-Dec'2013 and Jan-June 2014 - **04 Issues**

2. Bhagirath (Hindi) journal July-Sept 2013,Oct-Dec'2013, Jan-March'2014, April-June'2014 and July-Sept'2014 - 0**5 Issues**

18.3 Azo Prints

Nearly 2391 number of Azo prints were developed from the tracings of drawings / documents pertaining to various Directorates of CWC / MOWR at Ferro-Printing Unit of T.D. Directorate.

18.4 Publicity and Mass Awareness

- 12 issues of CWC Administrative News Bulletin were brought out on monthly basis to cover period from April, 2014 to March, 2015.
- Newspapers clipping on Water Resources Development were prepared from 16-Newspaper and periodicals for perusal of Chairman & Members CWC.
- T.D. Directorate has been co-coordinating the works of Information, Education & Communication (IEC) activities of CWC during 2014-15. T.D.Dte. has also coordinated the CWC activities for observance of Water Conservation Year-2013 and a consolidated report for CWC activities during '' Water Conservation Year-2013'' has been prepared and submitted to MoWR, RD & GR, New Delhi during 2014-15.

18.4.1 Information, Education and Communication (IEC): Activities of Planning Circle, CWC, Faridabad (Participation In Fairs/Exhibitions):

Ministry of Water Resources, RD & GR /CWC participated in the following fairs/exhibitions (from 1st April, 2014 to 31st March, 2015):

- 18th National Exhibition at Kolkata, West Bengal from 3-7 September, 2014 on the theme "Service to the Nation for the progress of India".
- Participated in 34th India International Trade Fair (IITF) - 2014 at Pragati Maidan, New Delhi from 14th to 27th November, 2014 on the theme "Clean River-Bright Future" by erecting a pavilion. The pavilion carried out different exhibitory materials viz. Working models, translates, banners, posters etc. The Central attraction of the pavilion was a working model of size 6m x 3m of "River Ganga at Allahabad" besides several working models, translates, banners, posters etc. The interactive quiz shows and pantomime shows were also arranged for the visitors,

especially for children during the IITF-2014. The pavilion was inaugurated on 14.11.2014 by Prof. Sanwar Lal Jat, Hon'ble Minister of State for Water Resources, River Development and Ganga Rejuvenation. Sushri Uma Bharati Hon'ble Minister for Water Resources, River Development and Ganga Rejuvenation also visited the pavilion on 26.11.2014.

- Participated in 7th Vibrant Gujarat Global Trade Show 2015 at Gandhinagar, Gujarat during 8th – 13th January, 2015.
- Participated in WaterEx World Expo-2015 at Mumbai during 28-31 January, 2015.

18.5 Microfilming

- With a view to preserve important drawings and other documents for future references, the following jobs were completed during 2014-15:
  - Verification of microfilm roll and checking of scanned microfilm roll. -25 Nos
  - Spotting and touching works on scanned drawings -100 Nos
  - Scanning of old Bhagirath (English & Hindi) journals and uploading -25 Nos on CWC Website
- As requested by Meghalaya state Govt, the drawings of Umiam H-E project and Umtru Project of Meghalaya have been shortlisted and 480 Nos (19GB) of drawings are supplied in soft copy to Meghalaya State Government

Annexure – 5.1

List of Active Consultancy Projects in D&R Wing during the Year 2014-15

Sl. No.	Name of Project
Constrution / DPR Stage Projects	
Andaman & Nicobar Islands	
1	Kamsarath Water Supply Scheme (Construction)
Andhra Pradesh	
2	Indira Sagar (Polavaram) Project (Construction)
3	Manuguru Open Cast Flood Protection Embankment (Construction)
Arunachal Pradesh	
4	Kameng H.E. Project (Construction)
Assam	
5	Amjur Drainage Development Scheme (Construction)
Goa	
6	Opa Barrage Project (Construction)
Gujarat	
7	Garudeshwar Weir Project (Construction)
Jammu & Kashmir	
8	Ujh Multipurpose Project (DPR)
Jharkhand	
9	Kharkai Barrage under Subarnarekha M.P. Project (Construction)
10	Icha Dam Under Subarnarekha M.P.Project(Construction)
Madhya Pradesh	
11	Lower Goi Project (Construction)
12	Pench Diversion storage Project (Construction)
13	Pench Valley Water Supply Project (Construction)
14	Gulab Sagr (Mahan) project (Construction)
15	Ken Betwa Link Project Phase-II (Construction)
16	Bansujara Project (Construction)
17	Man Project(Construction)
18	Halon Irrigation Project (Construction)
19	Upper Narmada Project (Construction)
Manipur	

Sl. No.	Name of Project
20	Dholaithabi barrage Project (Construction)
21	Thoubal M.P. Project (Construction)
22	Ganol H.E. Project (Construction)
Meghalaya	
23	New Umtru H.E. Project (Construction)
Mizoram	
24	Tuirial H.E. Project (Construction)
Orissa	
25	Anandpur Barrage Project (Construction)
26	Rangali Right Canal in Brahmani Left Basin (Construction)
27	Chheligada Irrigation Project (Construction)
28	Indiravati Pump Storage H.E. Project (DPR)
Uttar Pradesh	
29	Arjun Sahayak Pariyojna (Construction)
Uttarakhand	
30	Tapovan Vishnugad Project - NTPC (Construction)
31	Loharinag Pala H.E. Project (Construction)
32	Lakhwar Multi Purpose Project (Construction)
Rajasthan	
33	Lhasi Medium irrigation project (Construction)
34	Kalisindh Dam Project (Construction)
35	Garada Dam Project (Construction)
36	Khetri Iron Ore Tailing Dam (Construction)
Sikkim	
37	Suntaley H.E. Project(DPR)
38	Kalezkhola H.E. Project(DPR)
West Bengal	
39	Turga Pumped Storage (DPR)
NWDA (Gujarat & Maharashtra)	
40	Par-Tapi-Narmada link Project (DPR)
Foreign Projects	
Afghanistan	

Sl. No.	Name of Project
1	Salma Dam Project(Construction)
Bhutan	
2	Punatsangchu Stage-I H.E. Project (Construction)
3	Punatsangchu Stage-II H.E. Project (Construction)
Nepal	
4	Sapta Kosi & Sunkosi Multi Purpose Project (DPR)
Sp. Problem Projects	
1	Srisailam Right Bank H. E. Scheme
Arunachal Pradesh	
2	Lower Subansiri Project
Madhya Pradesh	
3	Indira Sagar Project
Odisha	
4	Subarnarekha Irrigation Project
Rajasthan	
5	Garada Earth Dam (EMB)Rehabilitation of Garada Dam)
Telengana	
6	Srisailam Left Bank H. E. Scheme(Construction)

Annexure-7.1

List of the irrigation / multipurpose projects accepted by the Advisory Committee during 2014-15

Sl. No.	Project Name	Name of the State	Major/ Medium	Est. Cost Rs. crore	Irrigation Benefits in Ha
1	Kachhal Irrigation Project	Madhya Pradesh	Medium-Revised	91.39 (2009)	3,470
2	Telengiri Irrigation Project	Odisha	Medium-Revised	613.71 (2013)	13,829
3	Rengali Irrigation sub-project LBC-II (RD 29.177 Km to 141.00 Km)	Odisha	Major-Revised	3603.67 (2013)	177651
4	Kanhar Irrigation Project	Uttar Pradesh	Major-Revised	2252.29 (2013-14)	35467

Annexure-7.2

List of the Flood Control schemes accepted by the Advisory Committee During 2014-15

Sl. No.	Project Name	Name of the State	Est. Cost In crore Rs.	Flood Protection
1	Integrated Flood and River Bank Erosion Management Works at Rohmoria	Assam	78.48 (2013-14)	Area = 36000 ha. Population = 1,80,000
2	Bagaha town protection works (Phase-I) on the left bank of river Gandak in West Champaran District	Bihar	90.78 (2013-14)	Area= 4000 ha. Population = 1,00,000
3	Bagaha Town Protection Scheme (Phase-III) on the left bank of river Gandak in West Champaran district	Bihar	75.71 (2012)	Area = 2500 ha. Population = 1,00,000
4	Modernisation of Thannermukkom Barrage	Kerala	255.34 (2012)	Area= 55874.38 ha. Population = 14,00,000
5	Project for construction of Marginal bund in Ramraj Khadar along right bank of river Ganga in the District of Muzaffarnagar	Uttar Pradesh	29.39 (2012)	Area= 7500 ha. Population = 40,000

Sl. No.	Project Name	Name of the State	Est. Cost In crore Rs.	Flood Protection
6	Protection Work on both bank of Bhagirathi river at Uttarkashi in District Uttarkashi	Uttarkhand	48.814 (2013)	Area= 13.50 ha. Population = 105 Houses
7	River Training Works including miscellaneous associated works on both banks of Bhagirathi river as per requirement from Jhulapul to Tioth bridge execluding proposed works on left from Tiloth bridge to Switchyard of Maneri Bhali-I at Uttarkashi	Uttarkhand	76.71 (2013)	Area= 37.50 ha. Population = 165 Houses
8	Project for construction of Studs and Marginal Bund for protection of population and agricultural land from Banjarewala to Alawalpur villages situated at banks of River Solani in Distt. Haridwar,	Uttarkhand	38.898 (2014)	Area= 707 ha. Population = 23068
9	Flood Protection Scheme of Villages from Dakpathar Barrage to NH-72 Kulhal Paonta Sahib Bridge from River Yamuna (Left Bank) in Vikasnagar Block Distt. Dehradun,	Uttarkhand	77.349 (2014)	Area= 400 ha. Population = 10850
10	Project for Anti-Erosion & drainage work of Udmadi Rao Nala from Village-Kheda Pachhawa to Village-Fatehpur (Aasan River) in Vikasnagar Block Distt.-Dehradun,	Uttarkhand	34.05 (2014)	Area= 270 ha. Population = 2200
11	Project for Flood Protection Works from Hilly Shivalik Range Originated Nalas (Between Villages Sekhuwala to Prateetpur) in Vikasnagar Block Distt.-Dehradun,	Uttarkhand	31.25 (2014)	Area= 178 ha. Population = 20000
12	Scheme for Flood protection of the villages from River Asaan (Between Sahaspur-Sabhawala Bridge to Kunja Grant) in Vikasnagar Block, Distt-Dehradun,	Uttarkhand	57.74 (2014)	Area = 220 ha. Population = 1850

Annexure-7.3

The list of H.E Project accepted by TEC

Sl No.	Project Name	State	Capacity (MW)
1.	Dikhu	Nagaland	3x 62 = 186
2.	Wangchu	Bhutan	4x 142.5 = 570
3.	Chango Yangthang	Himachal Pradesh	3x 60 = 180
4.	Arun-3	Nepal	4x 225 = 900
5.	New Ganderbal	Jammu & Kashmir	= 93
Total			1929

Annexure-7.4

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 (in crores Rs.)
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) 2014-15(NIL) 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) 2014-15(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) 2014-15(NIL) Total= 178.20
4.	Renuka	HP	1) Drinking water 2) 40 MW 3) 0.404 MAF	-
5.	LakhwarVyasi	Uttarakhand	1) 0.34 lakh 2) 420 MW 3) 0.325 MAF	-
6.	Kishau	HP/ Uttarakhand	1) 0.97 Lakh 2) 600 MW 3) 1.04 MAF	-

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 (in crores Rs.)
7.	Ken Betwa	Madhya Pradesh	1) 6.35 lakh 2) 78 MW 3) 2.18 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) 300 MW 3) 0.74 MAF	-
10.	2nd Ravi Vyas Link	Punjab	Harness water flowing across border of about .58 MAF in non-monsoon period	-
11.	Ujh Multipurpose Project	J&K	1) 0.32 lakh 2) 212 MW 3) 0.82 MAF	-
12.	Kulsi Dam Project	Assam	1) 22,000 ha. 2) 55 MW 3) 0.28 MAF	-
13.	Noa-Dehang Dam Project	Arunanchal Pradesh	1) 3605 ha. 2) 71 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) 14.04(NP comp. 4.73) 2) - 3) Barrage	2012-13 (67.98) 2013-14 (380.75) 2014-15 (210.855) Total = 659.585

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 (in crores Rs.)
16.	Indirasagar Polavaram	Andhra Pradesh	1) 4.68 lakh ha 2) 960 MW 3) 23.44 TMC of water to Vizag city for drinking and Industrial Purpose and Diversion of 84.70 TMC to Krishna.	Declared as National Project on 01.03.2014. 2014-15 (250.00) Released to Polavaram Project Authority

Annexure 8.1

General Monitoring - List of Projects - Targets and Achievements of Monitoring Visits during 2014-15

Sl. No.	Name of Project	Major/ Medium / ERM	Date of visit	Date of issue of status report	Remarks
	ANDHRA PRADESH				
1	1-Peddagedda Reservoir Project	Medium			Andhra Pradesh
2	2-Godavari Lift Irrigation Scheme	Major	13&14.08.14	22.08.2014	Telangana
3	3- KLRS Pulichintala Project &Krishna Delta Modernization Scheme including Pulichintala Dam Project (New)	Major			Andhra Pradesh
4	4-Pulivendula Branch Canal	Major			Andhra Pradesh
5	5-Tungabhadra high level canal stage -II	Major			Andhra Pradesh
	TOTAL- 05				
	BIHAR				
6	1-North Koel Reservoir	Major			IS

Sl. No.	Name of Project	Major/ Medium / ERM	Date of visit	Date of issue of status report	Remarks
7	2-Bateswar Asthan Ganga Pump Canal Phase-I	Major			IS
	TOTAL- 02				
	GUJARAT				
8	1-Und-II	Medium	17-18/03/2015		Mon. Dte Gandhinagar
	Total-01				
	HIMACHAL PRADESH				
9	1-Phina Singh Irrigation Project	Medium	02.09.2014	31.10.2014	M&A, Shimla
10	2-Nadaun Area Medium Irrigation Project	Medium	30.09.2014	11.12.2014	M&A, Shimla
	TOTAL-02				
	JHARKHAND				
11	1-Ajoy BarrageProject	Major			
12	2-Dhansinghtoli Res. Project	Medium			
13	3-Katri Res.Project	Medium			
14	4-Nakti Res. Project	Medium			
15	5-PunasiRes.Project	Medium			
16	6-Kans Reservoir	Medium			
	Total-06				
	KARANATAKA				
17	1-Hirehalla	Medium			
18	2-Amarja	Medium	12.6.2014	25.02.2015	
19	3-Bennathora	Major	10.6.2014	24.9.2014	
20	4-Lower Mullamari	Medium	10.6.2014	31.10.2014	
21	5-Sri Rameshwara Lift Irrigation	Major	25.6.14	28.8.2014	
	Total-05				
	KERALA				
22	1-Idamalayar Irri. Project	Major	28&29.05.2014	23.10.2014	Mon. Coimbatore
	Total-01				
	Maharashtra				
23	1-Wakod Irrigation Project	Medium			

Sl. No.	Name of Project	Major/ Medium / ERM	Date of visit	Date of issue of status report	Remarks
24	2-Kirmiri Darur Lift Irrigation Scheme	Medium			
25	3-Sonapur Tomta Lift Irrigation Scheme	Medium			
26	4-Chilhewadi Irrigation Project	Medium			
27	5-Haranghat Lift Irrigation Scheme	Medium			
28	6-Kamani Tanda Medium Irrigation Project	Medium			
29	7-Ghungshi Barrage Medium Irigation Project	Medium			
30	8-Shelgaon Barrage project	Medium	29.09.2014		Vadodara
31	9-Urmodi Irrigation Project	Major			
32	10-Tembhu Lift Irrigation Project	Major			
F	11-Bodwad Parisar Sinchan Yojna	Major	01.10.2014		Vadodara
34	12-Maharashtra Water sector Improvement Project (MWSIP) (World Bank Aided)-ERM	Major			
35	13- Purna Barrage (Ner Dhamana) Irrigation Project.	Medium			
36	14-Upper Pravara	Major			Vadodara
	TOTAL-14				
	Meghalaya				
37	1-Rongoi Valley	Medium			M&A Guwahati
	Total-01				
	NAGALAND				
38	1-D'zuza irrigation scheme	Medium			
	TOTAL_01				
	Rajasthan				
39	1-Takli Irrigation Cum Drinking Water Project	Medium			
40	2-Gagrin Irrigation Project	Medium			

Sl. No.	Name of Project	Major/ Medium / ERM	Date of visit	Date of issue of status report	Remarks
41	3-Piplad Irrigation Project	Medium			
42	4-Lhasi Irrigation Project	Medium			
	TOTAL-04				
	UTTAT PRADESH				
43	1-Bhupali Pump Canal	Major			M&A, Lucknow
44	2-Kanhar Irrigation Project	Major			M&A, Lucknow
45	3-Restoring capacity of Western Gandak Canal system – ERM	Major			M&A, Lucknow
	TOTAL-03				
	West Bangal				
46	1-Beko Irrigation scheme	Major	13-14.02.2015	12.03.2015	
47	2-Khairabera Irrigation Scheme	Major			Completed as per Mon. Dte/State
	Total-02				
	Monitoring Target by(FU)	**47**	**12**	**9**	

Annexure 8.2

AIBP Monitoring- List of Projects - Target & Achievements of Monitoring Visits during 2014-15

Sl. No	State/Project Name	Major/ Medium / ERM	Date of Visit	Date of issue of Report	Remarks
	ANDHRA PRADESH				
1	Yerrakalva Res.	Med			
2	Tadipudi LIS	Maj			
3	Pushkara LIS	Maj			
4	Gundlakdamma	Maj	4.3.15	30.6.15	
5	Thotapally Barrage	Maj			
6	Tarakarama thirtha Sagaram	Med			

7	Musurumilli	Med			
8	Indira Sagar (Polavaram)	Maj	6.2.15	2.3.15	IS
	TOTAL=08				
	ASSAM				
9	Dhansiri	Maj			
10	Champamati	Maj			
11	Borolia	Med			
12	Burhi Dihing lift	Med			
	TOTAL=04				
	BIHAR				
13	Western Kosi	Maj			IS
14	Durgawati	Maj	21-22.8.14	7.10.14	
	Bansagar				
15	Batane	Med			IS
16	Punpun	Maj	13.8.14	16.9.14	
	TOTAL=04				
	CHHATISGARH				
17	Kelo Project	Maj			
18	Kharung	ERM			
19	Sutiapat	Med			
20	Maniyari Tank (ERM)	Maj			
	TOTAL=04				
	GOA				
21	Tillari	Maj	21-26.4.14	30.6.14/Apr 15	IS
	TOTAL=01				
	GUJARAT				
22	Sardar Sarovar	Maj	10-13.10.14		IS
	TOTAL=01				
	HIMACHAL PRADESH				
23	Shahnehar Irr. Project	Maj	1.9.14	31.10.14	
24	Sidhata	Med	1-2.9.14	31.10.14	
25	Balh Vally (Left Bank)	Med	25.6.14	26.9.14	
	TOTAL=03				
	JAMMU & KASHMIR				
	Mod. of Ranbir Canal*				
	Mod. of New Pratap Canal*				

26	Rajpora Lift	Med			
27	Tral Lift	Med			
28	Mod. Of Dadi Canal	ERM			
29	Mod. Kandi Canal	Med			
30	Prakachik Khows Canal	Med			
31	Mod. Of Ahji Canal	ERM			
32	Restoration & Mod. Of Main Ravi Canal	ERM			
	TOTAL=07				
	JHARKHAND				
33	Gumani	Med			
34	Sonua	Med			
35	Surangi	Med			
36	Upper Sankh	Med			
37	Panchkhero	Med			
38	Subernarekha Multipurpose	Maj			IS
	TOTAL=06				
	KARNATAKA				
39	Upper Krishna St.I	Maj			
40	Malaprabha	Maj	24.6.14	28.8.14	
41	Karanja	Maj	9-10.6.14	27.8.15	
42	Upper Krishna St.II	Maj			
43	Varahi	Maj			
44	Dudhganga	Maj	26.6.14	28.8.14	IS
45	Mod. Canal System of Bhadra Reservoir Canal System (ERM)	ERM			
46	Hipparagi LIS	Maj	25-26.6.14	28.8.14	
47	Restoration Bhimasamundra Tank	ERM	13.2.15		
48	Bhima LIS	Maj	11.6.14	22.11.14	
49	Guddada Malapura Lift	Med	12.2.15	20.4.15	
50	Upper Tunga Irrigation Project	Major			
51	Sri Rameswar Irrigation	Major	25.6.14	28.8.14	
52	NLBc System Project(New ERM)	ERM	17.3.15	25.6.15	
	TOTAL=14				
	KERALA				
53	Muvattupuzha	Maj	26-27.5.14	23.12.14	

54	Karapuzha	Med			
55	Kanhirapuzha	ERM	22-23.4.14	31.10.14	
56	Chitturpuzha	ERM	21.4.14	17.10.14	
	TOTAL=04				
	MADHYA PRADESH				
57	Indira Sagar Unit II (Ph I & II)	Maj			
	Indira Sagar Canal Ph. III				
	Indira Sagar Unit IV				
	Indira Sagar Unit V				
	Bansagar Unit-II		12-13.3.15		
58	Sindh Phase II	Maj	10-11.3.15		
59	Mahi	Maj			
60	Bariarpur LBC	Maj			
61	Bawanthadi	Maj			IS
62	Mahan	Maj			
63	Omkareshwar Ph - I	Maj			
	Omkareshwar, Ph.-II				
	Omkareshwar, Ph.-III				
	Omkareshwar, Ph.-IV				
64	Bargi Diversion Ph - I	Maj			
	Bargi Diversion Ph -I I				
	Bargi Diversion Ph -I I I				
	Bargi Diversion Ph-IV				
65	Pench Div-I	Maj			
66	Upper Beda	Maj			
67	Punasa lift	Maj			
68	Lower Goi	Maj			
69	Jobat	Maj			
70	Sagar(Sagad)	Maj			
71	Singhpur	Maj			
72	Sanjay Sagar (Bah)	Maj			
73	Mahuar				
	TOTAL=17				
	MAHARASHTRA				
74	Gosikhurd [NP]	Maj	22-23.9.14	**दिसम्बर**-14	
75	Waghur	Maj	29-30.9.14		
76	Upper Manar	Med	28.5.14		
77	Upper Pen Ganga	Maj	Feb	**अप्रैल**-15	
	Bawanthadi [IS]	Maj	5.11.14		

78	Lower Dudhna	Maj	March		
	Tillari	Maj	8.12.14		
79	Warna				
80	Punad	Maj	18.11.14		
81	Lower Wardha	Maj	March		
82	Khadakpurna	Maj			
83	Dongargaon	Med	11.6.14		
84	Gul	Med	14.3.15		
85	Bembla	Maj	Feb	**अप्रैल**-15	
86	Uttermand				
87	Sangola Branch Canal	Maj			
88	Tarali	Maj	19-20.8.14	**अप्रैल**-15	
89	Dhom Balakwadi	Maj	6-7.8.14		
90	Morna (Gureghar)	Med			
91	Arjuna	Med	March		
92	Lower Pedhi	Maj			
93	Upper Kundalika	Med			
94	Wang Project	Med			
95	Lower Panzara	Med	13.3.15		
96	Aruna	Med	6.12.14	**अप्रैल**-15	
97	Krishna Koyana Lift	Maj	17-19.11.14		
98	Naradave (Mahammadwadi)	Med	7.12.14	**अप्रैल**-15	
99	Gadnadi	Med	March		
100	Kudali	Med			
	Nandur Madhmeshwar Ph-II	Maj	17.11.14		
	TOTAL=27				
	MANIPUR				
101	Khuga	Maj			
102	Thoubal	Maj			
103	Dolaithabi Barrage	Med			
	TOTAL=03				
	ORISSA				
104	Upper Indravati(KBK)	Maj	10.6.14	31.7.14	
105	Subernarekha	Maj	23.9.14	11.11.14	
106	Rengali	Maj	23.9.14	11.11.14	
107	Anandpur Barr./ Integrated Anandpur Barr.	ERM	16.7.14	28.8.14	

108	Lower Indra(KBK)	Maj	11.6.14	13.8.14	
109	Lower Suktel(KBK)	Maj			
110	Telengiri(KBK)	Maj	13.2.15		
111	RET Irrigation(KBK)	Med	25.6.14	25.7.14	
112	Kanupur	Maj	24.9.14	31.10.14	
113	Chheligada Dam	Med	14.2.15		
114	Rukura-Tribal	Med	30.9.14	31.10.14	
	TOTAL=11				
	PUNJAB				
115	Shahpur Kandi dam (N.P)	Maj	23-24.7.14	10.12.14	
116	Kandi Canal Extension (Ph.II)	ERM	19.02.15	28.7.15	
117	Rehabilitation of Ist Patiala Feeder and Kotla Branch Project	ERM	16-17.10.14	10.12.14	
118	Relining of Rajasthan Feeder Cannal	ERM			Work not
	Relining of Sirhind Feeder Canal				
	TOTAL=04				
	RAJASTHAN				
119	IGNP Stage-II	Maj			
120	Narmada Canal	Maj			IS
121	Mod. of Gang Canal	ERM			
	TOTAL=03				
	TELANGANA				
122	FFC of SRSP	ERM	1	28.8.14	
123	SRSP St.II	ERM			
124	Ralivagu	Med			
125	Gollavagu	Med			
126	Mathadivagu	Med			
127	Peddavagu	Med			
128	J. Chokka Rao LIS	Maj	13-14.8.14	22.8.14	
129	Neelwai	Med			
130	Sri Komaram Bheem	Med			
131	Palemvagu	Med	29.1.15	7.7.15	
132	Rajiv Bhima LIS	Maj	26.9.14	19.6.15	
	TOTAL=11				
	TRIPURA				
133	Manu	Med			
134	Gumti	Med			

135	Khowai	Med			
	TOTAL=03				
	UTTAR PRADESH				
136	Saryu Nahar NP	Maj	16-18.12.14		
137	Bansagar Canal	Maj			
138	Mod. of Lachhura Dam	ERM			
139	Improving Irr. Intensity of Hardoi Branch System	ERM			
140	Madhya Ganga Canal Ph-II	Maj			
141	Kachnoda Dam	Maj			
142	Arjun Shyak	Maj			
143	Restoring Cap of Sarda Sahayak [NP]	ERM			
	TOTAL=08				
	WEST BENGAL				
144	Teesta Barrage [N.P]	Maj	26-28.2.15	27.3.15	
145	Tatko	Med	13-14.2.15	12.3.15	
146	Patloi	Med	13-14.2.15	12.3.15	
147	Subernrekha Barrage ++	Maj.			To be dropped
	TOTAL=04				
	Grand Total	**147**	**65**	**43**	

Annexure 8.3

List of Inter-State Projects to be Monitored by CWC (Hq) during 2014-15

Sl. No.	Name of Project	Major/ Medium/ ERM	States	Remarks
	Director Mon. (E)			
1	Subernarekha multipurpose Irrigation project	Major	JHARKHAND (ORISSA,W.B)	
2	Western Kosi Canal	Major	BIHAR (JHARKHAND)	
3	Batane Irrigation Project	Medium	BIHAR (JHARKHAND)	
	Total - 3			
	Director Mon (N)			
1	Bansagar Canal (UP)	Major	UTTAR PRADESH (M.P)	

Sl. No.	Name of Project	Major/ Medium/ ERM	States	Remarks
	Total - 1			
	Director Mon (S)			
1	Indira sagar Polavaram	Major	ANDHRA PRADESH (ORISSA)	
2	Dudhganga project	Major	KARNATAKA (MAHARASTRA)	26.6.14
3	Subernarekha irrigation project	Major	ORISSA (JHARKHAND)	
	Total - 3			
	Director Mon (W)			
1	Rajasthan Feeder Canal	Major	RAJASTHAN (PUNJAB)	
2	Sardar Sarovar (Narmada)	Major	GUJARAT (RAJASTHAN)	10-13.10.14
3	Narmada Project	Major	RAJASTHAN (GUJARAT)	
	Total - 3			
	Director Mon (C)			
1	Bawanthadi (IS)	Major	MAHARASHTRA (M.P)	
2	Tillari #	Major	GOA (MAHARASHTRA)	21-26.4.14
3	Bansagar Canal (MP)	Major	M.P (UTTAR PRADESH)	
	Total - 3			
	Grand Total - 13		# projects visited = 3	

Annexure 8.4

State-wise Summary of AIBP Monitoring Targets and Visits during 2014-15

Sl. No.	Name of the State	Target	Achievement	Status Reports Prepared
1	A.P.	8	2	2
2	ASSAM	4	0	0

Sl. No.	Name of the State	Target	Achievement	Status Reports Prepared
3	BIHAR	4	2	2
4	CHATTISGARH	4	0	0
5	Goa	1	1	1
6	GUJARAT	1	1	0
7	HIMACHAL PRADESH	3	3	3
8	J&K	7	0	0
9	JHARKHAND	6	0	0
10	KARNATAKA	14	9	8
11	KERALA	4	3	3
12	M.P.	17	2	0
13	MAH	27	21	6
14	MANIPUR	3	0	0
15	ODISHA	11	10	8
16	PUNJAB	4	3	3
17	RAJ.	3	0	0
18	Telangana	11	4	4
19	TRIPURA	3	0	0
20	U.P.	8	1	0
21	WEST BENGAL	4	3	3
	Total	**147**	**65**	**43**

Annexure 8.5

Details of Completed Projects Under AIBP as on 31.03.2015

Sl. No	State/Project Name	Year of Inclusion in AIBP	Year of Completion
	ANDHRA PRADESH		
1.	Sriramsagar St.I	1996-97	2005-06
2.	Cheyyeru(Annamaya)	1996-97	2003-04
3.	Priyadarshini Jurala	1997-98	2006-07
4.	Somasila	1997-98	2006-07
5.	Nagarjunsagar	1998-99	2005-06
6.	Madduvalasa	1998-99	2005-06
7.	Gundalavagu	2000-01	2006-07
8.	Maddigedda	2000-01	2006-07
9.	Vamsdhara St-II Ph I	2003-04	2008-09
10.	Veligallu	2006-07	2008-09
11.	Alisagar LIS	2006-07	2006-07
12.	Guthpa LIS	2006-07	2008-09
13.	Swarnamukhi	2005-06	2008-09
	ASSAM		
14.	Pahumara	1996-97	2008-09
15.	Hawaipur	1996-97	2006-07
16.	Rupahi lift	1996-97	2001-02
17.	Kallonga @	1996-97	2006-07
18.	Boradikarai	1997-98	2004-05
19.	Mod. of Jamuna Irr.	2001-02	2008-09
20.	Intg. Irr. Scheme in Kallong Basin	1997-98	2006-07
	BIHAR		
21.	Upper Kiul	1996-97	2006-07
22.	Orni Reservoir	1997-98	2006-07
23.	Bilasi Reservoir	1997-98	2000-01
24.	Sone Modernisation	1998-99	2008-09
25.	Restoration of Kosi Barrage and its appurtenants for sustaining created irrigation Potential	2008-09	2010-11
	CHHATISGARH		
26.	Hasdeo Bango	1997-98	2006-07
27.	Shivnath Diversion	1997-98	2002-03
28.	Jonk Diversion	1999-2000	2006-07
29.	Barnai	2002-03	2006-07
30.	Mahanadi Res. Pr.	2005-06	2010-11

Sl. No	State/Project Name	Year of Inclusion	Year of
31	Minimata (Hasdeo Bango Ph. IV)	2007-08	2010-11
31	Koserteda	2002-03	2013-14
	GOA		
33.	Salauli	1997-98	2006-07
	GUJARAT		
34.	Jhuj	1996-97	1999-2000
35.	Sipu	1996-97	1999-2000
36.	Mukteshwar	1996-97	2006-07
37.	Harnav - II	1996-97	1997-98
38.	Umaria	1996-97	1996-97
39.	Damanganga	1997-98	1999-2000
40.	Karjan	1997-98	1999-2000
41.	Sukhi	1997-98	1999-2000
42.	Deo	1997-98	1997-98
43.	Watrak	1997-98	1999-2000
44.	Aji-IV	2000-01	2009-10
45.	Ozat-II	2000-01	2009-10
46.	Bhadar-II	2002-03	2010-11
47.	Brahmini-II	2000-01	2008-09
	HARYANA		
48	Gurgaon Canal	1996-97	2003-04
49	WRCP	1996-97	2006-07
	HIMACHAL PRADESH		
50	Changer LIS	2000-01	2011-12
	JAMMU & KASHMIR		
51.	Marwal Lift*	1996-97	2006-07
52.	Lethpora Lift*	1996-97	2006-07
53.	Koil Lift*	1996-97	2006-07
54.	Mod. of Kathua Canal	1999-2000	2006-07
55.	Igophey Irr. Pr.	2000-01	2006-07
56.	Mod. of Zaingir Canal	2001-02	2006-07
57.	Mod. Of Martand Canal	2006-07	2010-11
58.	Mod. Of Mav Khul	2006-07	2010-11
59.	Rafiabad High Lift Irr.	2001-02	2010-11
60	Mod. of Babul Canal	1997-98	2011-12
	JHARKHAND		
61.	Latratu	1997-98	2002-03
62.	Tapkara Reservoir	1997-98	2002-03
63.	Kansjore	1997-98	2010-11
	KARNATAKA		

Sl. No	State/Project Name	Year of Inclusion	Year of
64.	Hirehalla	1996-97	2006-07
65.	Maskinallah	2002-03	2003-04
66.	Votehole	2007-08	2008-09
67.	Gandorinala	2001-02	2010-11
68.	Ghatparbha		
	KERALA		
69.	Kallada	1996-97	2004-05
	MADHYA PRADESH		
70.	Bansagar Unit-I (Dam)	1996-97	2010-11
71.	Upper Wainganga	1996-97	2002-03
72.	Sindh Phase I	1999-2000	2006-07
73.	Urmil RBC	2000-01	2002-03
74.	Banjar	2000-01	2002-03
	Rajghat Unit - I (DAM)	1998-99	2004-05
	MAHARASHTRA		
75.	Surya	1996-97	2006-07
76.	Bhima	1997-98	2006-07
77.	Upper Tapi	1997-98	2004-05
78.	Upper Wardha	1997-98	2008-09
79.	Wan	1998-99	2005-06
80.	Jayakwadi Stage-II	2000-01	2004-05
81.	Vishnupuri	2000-01	2005-06
82.	Bahula	2000-01	2006-07
83.	Krishna	2002-03	2008-09
84.	Kukadi	2002-03	2008-09
85.	Hetwane	2002-03	2008-09
86.	Chaskaman	2002-03	2008-09
87.	Purna	2006-07	2008-09
88.	Nandur Madhmeshwar -Ph - I	2006-07	2008-09
89.	Wan - II	2006-07	2008-09
90.	Pothra Nalla	2006-07	2008-09
91.	Tajnapur LIS	2006-07	2008-09
92.	Lalnalla	2006-07	2008-09
93.	Kar	2006-07	2008-09
94.	Arunavati	2006-07	2008-09
95.	Sapan	2007-08	2009-10
96.	Utawali	2006-07	2008-09
97.	Khadakwasla	2002-03	2004-05
98.	Kadvi	2002-03	2004-05
99.	Kasarsai	2002-03	2004-05

Sl. No	State/Project Name	Year of Inclusion	Year of
100.	Jawalgaon	2002-03	2004-05
101.	Kumbhi	2002-03	2006-07
102.	Kasari	2002-03	2004-05
103.	Patgoan	2004-05	2006-07
104.	Madan Tank	2005-06	2008-09
105.	Shivna Takli	2005-06	2008-09
106.	Amravati	2005-06	2007-08
107.	Chandarbhaga	2007-08	2009-10
108.	Pentakli	2007-08	2009-10
109.	Prakasha Barrage	2007-08	2008-09
110.	Sulwade Barrage	2007-08	2008-09
111.	Sarangkheda	2007-08	2008-09
	ORISSA		
112.	Upper Kolab(KBK)	1997-98	2004-05
113.	Potteru(KBK)	2001-02	2004-05
114.	Naraj Barrage	2001-02	2005-06
115.	Improvement to Sason Canal System*	2002-03	2004-05
116.	Salandi Left Main Canal-Ambahata*	2002-03	2005-06
117.	Improvement to Salki Irrigation*	2003-04	2004-05
118.	Titlagarh St-II(KBK)	1998-99	2008-09
	PUNJAB		
119.	Ranjit Sagar Dam	1996-97	2000-01
120.	Remodelling of UBDC	2000-01	2006-07
121.	Irr. to H.P. below Talwara	2000-01	2005-06
	RAJASTHAN		
122.	Jaisamand (Modernisation)	1996-97	2000-01
123.	Chhapi	1996-97	2004-05
124.	Panchana	1997-98	2004-05
125.	Bisalpur	1998-99	2006-07
126.	Gambhiri (Modernisation)	1998-99	2000-01
127.	Chauli	1998-99	2006-07
128.	Mahi Bajaj Sagar	1999-2000	2006-07
	TAMILNADU		
129.	WRCP	1996-97	2006-07
	UTTAR PRADESH		
130.	Upper Ganga including Madhya Ganga Canal	1996-97	2003-04
131.	Sarda Sahayak	1996-97	2000-01
132.	Providing Kharif Channel in H.K. Doab	1996-97	2004-05
133.	Rajghat Dam	1996-97	1996-97

Sl. No	State/Project Name	Year of Inclusion	Year of
134.	Gunta Nala Dam	1996-97	1999-2000
135.	Gyanpur Pump Canal	1999-2000	2001-02
136.	Rajghat Canal	2000-01	2008-09
137.	Mod. Agra Canal	2002-03	2008-09
138.	Jarauli Pump Canal	2003-04	2006-07
139.	Eastern Ganga Canal	1999-2000	2010-11
	UTTARAKHAND		
140.	Tehri	1999-2000	2006-07
	WEST BENGAL		
141.	Kangsabati	1997-98	2001-02
142.	Mod. Barrage and Irrigation System of DVC	1997-98	2006-07
143.	Hanumata	2000-01	2008-09

Annexure-15.1

Training Program by Training Dte. HQ during 2014-15

Sl. No.	Topics of Program	Date	Venue	Participants S/Sh
1.	Conference on ''Building with nature''-perspective of Netherlands Organized by CPWD, New Delhi	03 April, 2014	Nirman Bhawan, New Delhi	6 officers
2.	Climate Service User Forum for the Water Sector (A Joint event by ICID & WMO)	23-25 April, 2014	Pune	3 officers
3.	Symposium Cum Training Course on ''Application of Numerical Methods in Geo Technical Engineering organized by IGS & CSMRS.	01-02 May, 2014	CSMRS, New Delhi	11 officers from CWC
4.	Workshop on ''Rapid & Cost Effective Investigations & Monitoring of Dams'' Organized by Aqua Foundation	09-10 May, 2014	New Delhi	Dr. B.R.K. Pillai Director (DRIP), CWC as a Key Speaker
5.	Training Program on ''Ethics and Value in Public Governance'' Conducted by ISTM, New Delhi	21-23 May, 2014	ISTM, New Delhi	4 officers of CWC

Sl. No.	Topics of Program	Date	Venue	Participants S/Sh
6.	Conference on ''Rehabilitation of Dams & Appurtenants Structures organized by CBIP, New Delhi	27-28 May, 2014	CWC (HQ), New Delhi	5 Officers of CWC
7.	Training Program on ''MS Office Suite for Officers & Staff'' Conducted by ISTM, New Delhi	02-06 June, 2014	ISTM, New Delhi	10 Officers of CWC
8.	Training to Junior Engineers in the field of Hydrological Observation, Flood forecasting, Survey, Estimate-Preparation and Water quality	09-10 June, 2014	CWC Complex, Adabari, Guwahati	25 Junior Engineers
9.	Training to Work Charged Staff in the field of Hydrological Observation, Flood forecasting, Survey, Estimate-Preparation and Water quality	12-13 June, 2014	CWC Complex, Adabari, Guwahati	25 Work charged Staff
10.	Hindi Workshop	17 June, 2014	CWC (HQ)	35 Participants
11.	Workshop on ''Communication Skills'' organized by ISTM, New Delhi	30 June to 1 July, 2014	New Delhi	Shiv Dutt Sharma, Director, CWC Dhananjay Kumar, DD, CWC Shiv Ram, AD-II, CWC
12.	National Seminar on ''Engineering Geology, Geotechnical and Geohazards-A quest for excellence'' organized by Indian Society of Engg. Geology in association with GSI.	10-11 July, 2014	Kolkata	Ramesh Kumar, Dy. Director, CWC

Sl. No.	Topics of Program	Date	Venue	Participants S/Sh
13.	Workshop on ''Best Practice & Advancement in Geotechnical of Hydropower and Infrastructure'' organized by CBIP.	24-25 July, 2014	New Delhi	V.K. Talwar, CE, TBO, CWC, Siliguri A.K. Gupta, Director, SS(PH) Rakesh Gaurana, DD, BCD (N&W) O.P.Gupta, DD, FE&SA, CWC Kamlesh Jain, AD, Emb.(N&W), CWC Upanand Rath, AD, DSM Dte, CWC
14.	Training Program on ''Remote Sensing and GIS Application in Water Resources''.	19-23 August, 2014	IIRS, Dehradun	25 Officers
15.	TERI Workshop on ''Adoptive Governance''	20 August, 2014	New Delhi	A. Mahendran, Member (WP&P), CWC S.K.G. Pandit, CE, Design(N&W), CWC R.K.Gupta, CE (PAO), CWC R.K.Jain, CE (BPMO), CWC M.P.Singh, CE (P&D), CWC
16.	Training Program on'' Disaster Risk Reduction(D&R) Strategies for Sustainable Development Planning and Policy Instruments'' for Joint Secretary/Advisor level officers of GOI/State Government organized by NIDM, New Delhi	21-22 August, 2014	New Delhi	C.P. Singh, CE (FM), CWC Lav Nathan, CE (Dam Safety), CWC
17.	Workshop on ''Challenges and Opportunities in Interdisciplinary Water Research'' organized by IIT, Mumbai	25 August, 2014	Mumbai	R.K.Gupta, CE (EMO), CWC A.K.Kharya, Director, CC&IAD Dte, CWC

Sl. No.	Topics of Program	Date	Venue	Participants S/Sh
18.	Indo-Japan Workshop on ''River Mouths, Tidal Flats and Lagoons'' organized by Deptt. Of Civil Engineering, Tohoku University, Japan	15-16 September, 2014	IIT, Madras	J.C.Iyer, CE, C&SRO, CWC, Coimbatore. R. Thagamani, Director, Beach Erosion, CWC, Cochine. Rajesh Yadav, Director, CWC, New Delhi D.P. Mathuria, Director, RMCD, CWC, New Delhi
19.	''Saph Pani: Conference jointly organized by University of Applied Science & Arts, North-Western Switzerland and NIH, Roorkee	18-19 September, 2014	New Delhi	M.P.Singh, CE (P&D), CWC N.K.Manglik, Director, RDC Dte, CWC Navin Kumar, Director (BP), CWC
20.	Conference on ''Challenges and Barrier in Hydropower Development'' organized by CBIP, Himachal Pradesh Power Corporation Ltd. & Forum of the Hydro Power Producers.	18-19 September, 2014	Shimla	N.N. Roy, Director, CWC N.V.Satish Seemakurti, DD, CWC Kaushal Kumar, AD, CWC
21.	Workshop on ''Noting & Drafting'' organized by ISTM, New Delhi	22-23 September, 2014	ISTM, New Delhi	S.B. Mukherjee, UDC, Estt.13 Section, CWC, New Delhi
22.	Training Course on'' Laboratory Easement of Rock (with Practical Demonstration)'' organized by CSMRS, New Delhi	24-25 September, 2014	CSMRS, New Delhi	A.K. Jeph, DD, CWC, New Delhi
23.	Training Program on ''Knowledge & Change Management'' for CWC Officers by IIPA.	13-17 October, 2014	IIPA, New Delhi	25 Officers from CWC

Sl. No.	Topics of Program	Date	Venue	Participants S/Sh
24.	Level-IV CSSS Cadre Training to Sr. PPS & PPS organized by ISTM, New Delhi.	13-31 October, 2014	ISTM, New Delhi	Jagjit Tangri, PPS R. Ramesh, PPS
25.	Seminar on ''Geo-Synthetics'' organized by CBIP, New Delhi.	16-17 October, 2014	CBIP, New Delhi	Shiv Nandan Kumar, Director, CWC S.K.Sharma, Director, CWC Kamlesh Jain, AD, CWC
26.	Seminar on'' Reform in Management of Public Irrigation System'' organized by CBIP, New Delhi	30-31 October, 2014	Banglore	R.K.Pachauri, Director, CWC B.C. Vishwakarma, Director,
27.	Training Course on ''ILBM Approach for Conservation & Management of Lakes'' organized by NIH, Roorkee.	10-14 November, 2014	NIH, Roorkee	Satish Jain, AD, CWC Aditya Sarweswara Sarma Moola, AD, CWC
28.	Indo Rock 2014: 5th Indian Rock Conference	12-14 November, 2014	CSMRS Auditorium, New Delhi	30 Officers
29.	Training Program on ''Financial Management'' in complaisance of OM no. T-17/1/2014-CTP(CSS), dated: 17.10.2014 of DoPT.	14 November, 2014	CWC (HQ), New Delhi	34 Participants
30.	Conference & Exhibition on ''Rediscovering the Nation's Energy Industry: Ideas, Incentives and Policies organized by Council of Power Utilities.	19 November, 2014	New Delhi	Dhananjay Kumar, DD, CWC Ankit Dudeja, AD, CWC
31.	Training Program on ''Soil and Water Assessment Tool (SWAT) conducted at IIT-Delhi exclusively for CWC Officers.	24-28 November, 2014	IIT, Delhi	25 Officers

Sl. No.	Topics of Program	Date	Venue	Participants S/Sh
32.	Basin Storming Meeting on ''Flood Warning System'' organized by Ministry of Earth Science, New Delhi.	26 November, 2014	Lodhi Road, New Delhi	M.P.Sinhg, CE, CWC D.P.Mathuria, Director Ritesh Khattar, Director N.N.Rai, Director V.D.Roy, Director
33.	Hindi Workshop	28 November, 2014	CWC (HQ), New Delhi	29 Participants
34.	Meeting of the focus Group on Smart Water Management (FG-SWM) hosted by Ministry of Communication of Information Technology, New Delhi	09 December, 2014	Kochi	Sh. V.D. Roy, Director, CWC
35.	Technical Ecology Congress 2014 organization by School of Environmental Science, J.N.U, New Delhi & International Society for Technical Ecology.	10-12 December, 2014	JNU, New Delhi	Sh. R.K.Jain, CE, CWC A.K.Kharya, Director Bhopal Singh, Director N.N.Rai, Director
36.	International Conference on sustainable clean Ganga Mission: Opportunities & Challenges Organization by EA Water Pvt. Ltd., New Delhi.	12 December, 2014	India Habitate Centre, New Delhi	G.L.Bansal, Director, CWC S.D.Sharma, Director, CWC Neeraj Kr. Manglik, Director
37.	Seminar on Flood Forecasting organized by Indian Water Resources Society (IWRS).	13 December, 2014	Patna	Dr. R.N.Sankhua, Director, NWA, CWC, Pune Sh. V.D.Roy, Director, CWC

Sl. No.	Topics of Program	Date	Venue	Participants S/Sh
38.	Level-III CSSS- Cadre Training Program organized by ISTM, New Delhi.	15 December, 2014	ISTM, New Delhi	Sh. Chandra Shekhar Chabbra, PS, CWC, New Delhi
39.	Training Program on ''Snow melt run-off forecasting in Himalayan River Basin using Remote Sensing Inputs'' conducted by NRSC, Hyderabad.	22-17 December, 2014	Hyderabad	11 Officers of CWC
40.	Training Program on the topic ''Ethics & Values in compliance of OM No. 17/1/2014-CTP (CSS), Dt: 17-01-2014 of DoPT	19-23 January, 2015	CWC (HQ), New Delhi	32 Officers of CWC
41.	Training Program on ''Surface Water Data Entry System.''	27-31 January, 2015	Bangalore	20 officers of CWC
42.	Training Program on ''Economic Analysis of Irrigation Project''.	27-31 January, 2015	IIPA, New Delhi	25 officers of CWC
43.	Workshop on ''Environmental Flows for Strategic Planning for the Ganga Basin'' organized by World Bank in association with CWC.	05-06 February, 2015	New Delhi	30 Officers of CWC
44.	''3rd Assam Water Conference conducted by W.R. Deptt. Government of Assam, Guwahati	06 February, 2015	Guwahati	5 Officers of CWC
45.	Training Program of ''e-tendering System'' conducted by TCI Ltd., New Delhi.	10-11 February, 2015	New Delhi	10 Officers of CWC
46.	Conference on ''Smart Cities Smart Water Solution'' organized by EA Water Pvt. Ltd., New Delhi.	12 February, 2015	Mumbai	Sh. S.K.Srivastava, CE, NWA, Pune
47.	Training Program on ''Management related Issues''.	09-13 February, 2015	IIPA, New Delhi	25 officers of CWC
48.	Training Program on ''Application on MS Office & Internet''.	23-27 February, 2015	Coimbatore	20 officers of CWC

Sl. No.	Topics of Program	Date	Venue	Participants S/Sh
49.	Hindi Workshop	12th March, 2015	New Delhi	35 Participants
50.	Training Program on ''SOBEK Software for Flood Modeling'' under Operational Research to Support main streaming of integrated Flood Management under Climate Change (05-12-2015).	23-26 May, 2015	New Delhi	14 officers

ABROAD

Sl. No.	Topics of Program	Date	Venue	Participants S/Sh
1.	Regional Workshop and Field visit in Bangladesh in connection with Asian Development Bank's Project- ''Innovation for More Flood & Less Water''.	11-16 October, 2014	Bangladesh	1. Sanjiv Aggarwal, CE(PMO) 2. Virendra Sharma, Director, CWC
2.	SAARC- Special Training /Fellowship Program on Hydro-Infrastructural Development of Co-Operation Agency (KOICA)	12 October, 2014	South Korea	Narendra Singh, Director, CWC
3.	Participation in the Workshop as a member of the Indian delegation on ''Modeling and Managing Flood Risk in Mountain Area'' organized by NIH, Roorkee	17-19 February, 2014	California	N.N.Roy, Director, CWC

Annexure - 15.2

Details of Training Programs completed by National Water Academy, Pune till March 2015

Sr. No	Details of the Programs	Dates	Duration in weeks	Number of officers Trained	Man-weeks of training
1	26th ITP	01 Apr -1 Aug 2014	18	25	450
2	International DL Program : Basic Sciences	01-25 April 2014	4	44	176
3	T2: Preparation of PMP Atlases	21-25 April 2014	1	7	7
4	CAT - River Management	19 May - 20 Jun 2014	1	17	17
5	Structural Measures of FM	19-23 May 2014	1	0	0
6	Non- Structural Measures of Flood Management	26-30 May 2014	1	4	4
7	River Morphological Studies including Flood Management Works	02-06 Jun 2014	1	1	1
8	Flood Inundation Mapping including use of RS-GIS	09-13 Jun 2014	1	8	8
9	Water Quality Monitoring and Climate Change	16-20 June 2014	1	7	7
10	Monitoring of Irrigation Project using Bhuvan Web-services (ISRO funding)	30 June - 04 Jul 2014	1	21	21

Sr. No	Details of the Programs	Dates	Duration in weeks	Number of officers Trained	Man-weeks of training
11	T4 : ToT Program on Preparation of PMP Atlases	04-08 Aug 2014	1	35	35
12	Preparation of Detailed Project Report of Water Resources Projects	11-22 Aug 2014	2	42	84
13	Training-cum-Workshop on Water Resources for School Teachers, NGOs etc.	28-Aug-14	0.2	34	6.8
14	Training Program on e-SWIS	01-05 sept 2014	1	23	23
15	Management Development Program for Non-Technical Officers of CWC and MoWR officers	08-12 Sept 2014	1	13	13
16	River Basin Dynamics & Flood Risk Management with GIS (ISRO Funding)	15-19 Sept 2014	1	31	31
17	Increasing Water Use Efficiency in Irrigation Sector (at WALMI Aurangabad)	22-27 Sept 2014	1	27	27
18	Remote Sensing and Geographical Information System - an overview (under ISRO Funding)	07-10 October 2014	1	17	17
19	Economic and Social Aspects related to Irrigation Projects	10-13 Sept 2013	1	15	15
20	Orientation Program for newly Promoted AD-II/SDE - I	27Oct - 7 Nov 2014	2	45	90
21	Modernization & Capacity Enhancement of existing Hydroelectric Projects	17-21 Nov 2014	1	21	21

Sr. No	Details of the Programs	Dates	Duration in weeks	Number of officers Trained	Man-weeks of training
22	Orientation Program for newly Promoted Assistant Director-I/Assistant Executive Engineer	10-21 Nov 2014	2	36	72
23	Orientation Program for newly Promoted AD-II/SDE - I	24 Nov - 05 Dec 2014	2	62	124
24	Analysis and Design of Dams (Concrete, Gravity, Arch, RCC) at WALMI, Patna	01-5 Dec 2014	1.2	29	34.8
25	27th Induction Training Program (ITP) for the officers of Central Water Engineering (Group 'A') Services -26weeks**	08 Dec 2014 - 05 June 2014	18	54	864
26	Remote Sensing & Flood Modelling using GIS (under ISRO Funding)	15-24 Dec 2014	2	22	44
27	Design Flood Estimation (at WALMI, Patna)	19-23 Jan 2015	1	30	30
28	Integrated River Basin Planning and Management	05-09 Jan 2015	1	22	22
29	International DL Program : Advanced Topics in Hydraulics and Hydrological Sciences	27 Jan - 06 Mar 2015	7	44	308
30	Design of Barrages, Weirs and Canals (At WALMI, Patna)	09-13 Feb 2015	1	30	30
31	Cost Engineering of Water Resources Projects	23-27 Feb 2015	1	18	18
32	Capacity Building for Newly Recruited Assistant Engineers of Government of Haryana (At HIRMI Kurekshetra)***	16 Feb - 18 March 2015	4	33	132

Sr. No	Details of the Programs	Dates	Duration in weeks	Number of officers Trained	Man-weeks of training
33	Training Workshop on "Water Resources Management : Issues and Remedies" (for the officials, Gram Panchayat; NGOs; Media Personnels involved in the field of WRM)	13-Mar-15	0.2	25	5
	Total		**80.6**	**842**	**2737.6**

** 13 weeks completed till date out of 26 weeks

*** The complete training module is developed by NWA, Pune in Consultation with NIH;WAPCOS;CSMRS;CGWB; CWPRS. Out of the 4 weeks training, 1.6 weeks is being co-ordinated by NWA, Pune