सत्यमेव जयते

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

Annual Report 2013 - 14

CENTRAL WATER COMMISSION

INDIA – LAND AND WATER RESOURCES: FACTS

•	Geographical Area & Location	328.7 M ha Latitude 8^0 4' & 37^0 6' North Longitude 68^0 7' & 97^0 25' East
•	Population 2011	1210.19 Million
•	Rainfall Variation	100 mm in Western most regions to 11000 mm in Eastern most region
•	Major River Basin (Catchment Area more than 20,000 Sqkm)	12 Nos. having catchment area 253 M ha
•	Medium River Basin (Catchment Area between 2000 and 20,000 Sq km)	46 nos. having catchments area 25 M ha
•	Total Navigable Length of Important Rivers	14464 km

WATER RESOURCES

•	Average Annual Rainfall (2010)	3989.25 BCM
•	Mean Annual Natural Run-Off	1869 BCM
•	Estimated Utilisable Surface Water Potential	690 BCM
•	Total Replenishable Ground Water Resources	431BCM
•	Ground Water Resources Available for Irrigation	369.6 BCM
•	Ground Water Potential Available for Domestic, Industrial And Other Purposes	71 BCM (approx.)
•	Ultimate Irrigation Potential	140 M ha
•	Irrigation Potential from Surface Water	76 M ha
•	Irrigation Potential from Ground Water	64 M ha
•	Storage Available Due to Completed Major & Medium Projects (Including Live Capacity less than 10 M.Cum)	253 BCM
•	Estimated Additional Likely Live Storage Available due to Projects Under Construction / Consideration	155 BCM

LAND RESOURCES

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

HYDRO-POWER

•	Ultimate Hydropower Potential (As per reassessment)	84044 MW at 60% L.F.
•	Potential Developed by 31st March, 2014 (Installed Capacity)	40531.41 MW

FROM CHAIRMAN'S DESK

It is our pleasure to bring out this Annual Report of the Central Water Commission (CWC) for the year 2013–14. The Report gives an insight into the organisation structure, functions and activities of CWC highlighting the contribution made in the development and management of Water Resources of the country.

CWC continued to forge ahead in providing the necessary leadership and guidance for the development of the water sector and provided necessary support to the Ministry of Water Resources on all technical and policy matters during the year 2013-14. 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 77 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 36 projects comprising of 13 major, 4 medium irrigation projects and 19 flood control projects.
- General Monitoring of 9 projects and 108 nos. of projects under AIBP monitoring by CWC.
- Providing assistance in the coordination and monitoring of CAD Program in respect of 203 irrigation projects spread over 22 states and 2 union territories covering a CCA of more than 21 Mha.
- Examination of proposals for release of Rs. 1539.421 crore of Central grant under AIBP programme in respect of 32 Major and Medium Irrigation Projects.
- Examination of proposals under the scheme for renovation, restoration and revival of water bodies.
- Monitoring storage position of 85 reservoirs in the country.

Flood Management

- Timely issue of 7060 flood forecasts (with 95.75 % accuracy) during the monsoon period of 2013 to help effective flood management.

(A B Pandya)
CHAIRMAN

HIGHLIGHTS OF THE YEAR 2013-14

❖ **DESIGNS**

- Design units of CWC undertook detailed designs and drawings of various types of hydraulic structures for 77 water resources development projects.

❖ **RIVER MANAGEMENT**

- Carried out Hydrological Observations at 954 sites including snow and meteorological observation in different basins spread over the country.
- Operated 175 flood forecasting stations (including 28 inflow forecasting sites) spread over 9 major river basins. During the flood season 2013, 7060 flood forecasts (5741 level forecast and 1319 inflow forecasts) were issued out of which 6760 (95.75%) forecasts were within prescribed limits of accuracy. Daily flood bulletins and weekly flood news letters were issued during the flood season. Installation of satellite based telemetry system at 445 stations completed up to 11th plan and the work for 125 new stations are under process.
- Provided assistance to Royal Government of Bhutan for maintenance of 32 Hydro-meteorological sites in Bhutan.

❖ **WATER PLANNING**

- During the year 2012-13, 40 major irrigation projects were under appraisal in CWC. 36 projects comprising 13 major, 4 medium irrigation projects and 19 flood control projects were accepted by the Advisory Committee.
- Monitored 9 projects. In addition 108 projects including Extension/Renovation/Modernization (ERM),, receiving CLA under AIBP were also monitored.
- 85 important reservoirs with total live storage of 155.008 BCM were monitored on weekly basis.
- Examination of proposals for release of Rs. 1539.421 crore of Central grant under AIBP programme in respect of 32 Major and Medium Irrigation Projects.
- Provided technical assistance to MoWR in respect of the inter-State water disputes such as Cauvery Water Dispute, Mandovi Water Dispute, Krishna Water Dispute and the Vamsadhara Water Dispute.

❖ **HRM**

- National Water Academy, CWC, Pune conducted 37 training programmes during 2013-14 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 1782.

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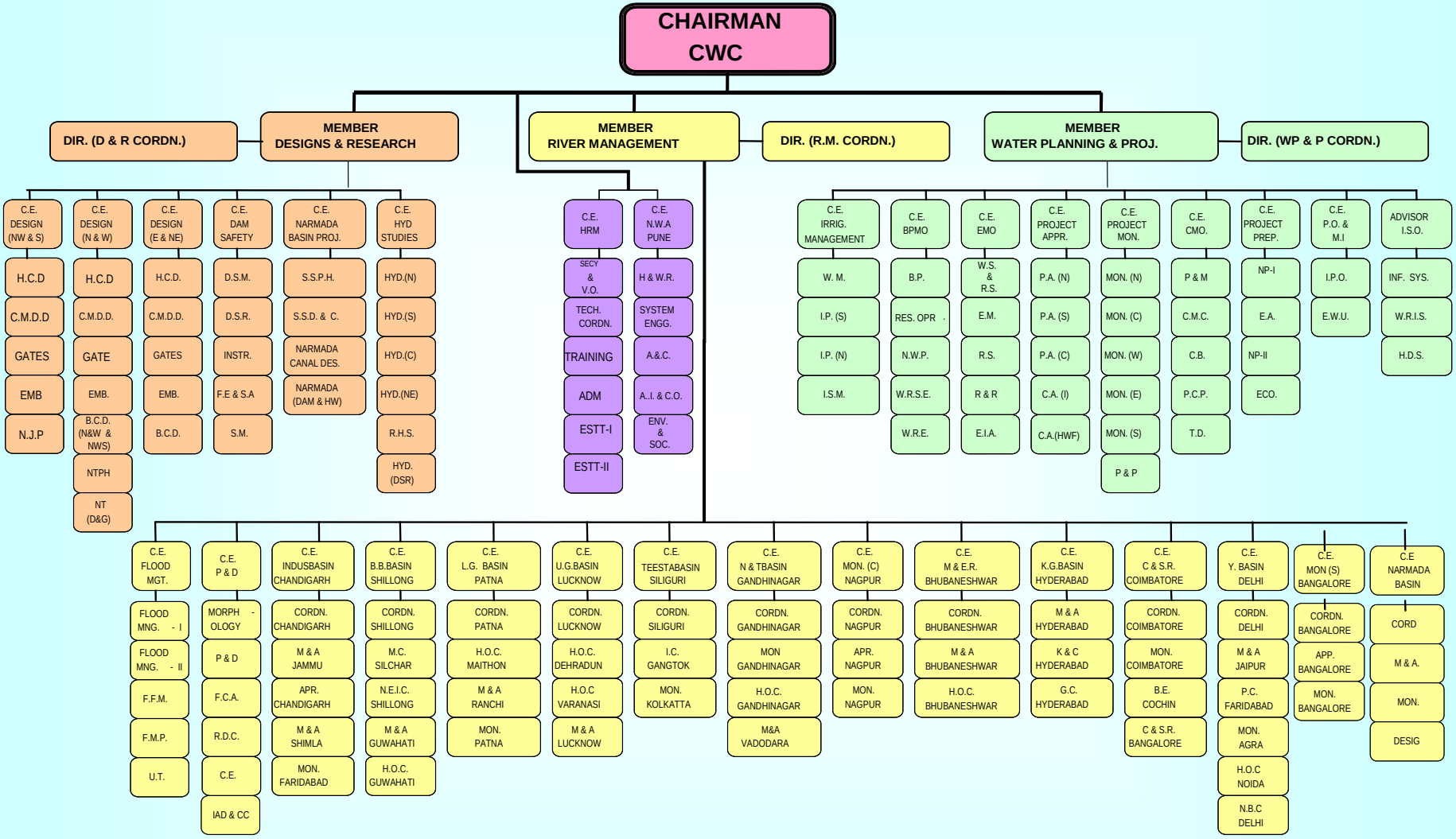
Organogram of Central Water Commission 2013- 14



CHAPTER-I

AN OVERVIEW

1.1 HISTORY OF CWC

Central Water Commission (CWC), an apex organization in the country in the field of Water Resources came into existence as "Central Waterways, Irrigation and Navigation Commission" vide Department of Labour Resolution No. DW 101(2) dated 5.4.1945. In the year 1951, it was renamed as "Central Water and Power Commission" (CW&PC) after its merger with the "Central Electricity Commission". Following the changes in the Ministry of Agriculture and Irrigation, in the year 1974, water wing of CW&PC was separated as "Central Water Commission", which continues till date. At present Central Water Commission functions as an "Attached Office" of the Ministry of Water Resources and is its main technical arm. It is manned by the Central Water Engineering Services (CWES) cadre, the only organised service of the Ministry of Water Resources.

1.2 ORGANISATION

CWC is headed by a Chairman, with the status of Ex-Officio Secretary to the Government of India. The work of the Commission is divided among 3 wings namely, Designs and Research Wing (D&R), Water Planning and Projects Wing (WP&P) and River Management Wing (RM). Allied functions are grouped under respective wings and each wing is placed under the charge of a full-time Member with the status of Ex-Officio Additional Secretary to the Government of India. Each wing comprising of a number of Organizations is responsible for the disposal of tasks and duties falling within the scope of functions assigned to it. In the discharge of these responsibilities, officers of the rank of Chief Engineer, Director/Superintending Engineer, Deputy Director/Executive Engineer, Assistant Director/Assistant Executive Engineer and other Engineering and Non-Engineering officers and supporting staff working in various regional and headquarter organizations, assist the Members. There is a separate Human Resources Management Unit headed by a Chief Engineer, to deal with Human Resources Management/ Development, Financial Management, Training and Administrative matters of the Central Water Commission. NationalWaterAcademy located at Pune is responsible for training of Central and State in-service engineers and functions directly under the guidance of Chairman. Broad functional areas of Chairman and Members are:

CHAIRMAN

Head of the Organization – Responsible for overseeing the various activities related to overall planning and development of surface water resources of the country and management of the Commission as a whole.

MEMBER (WATER PLANNING & PROJECTS)

Responsible for overall planning and development of river basins, national perspective plan for water resources development in accordance with the National Water Policy, techno-economic appraisal of Water Resources Projects and assistance to the States in the formulation and implementation of projects, monitoring of selected projects for identification of bottlenecks to achieve the targeted benefits, preparation of project reports for seeking international assistance, environmental aspects, issues related to construction machinery of projects, application of remote sensing technologies in water resources, etc.

MEMBER (DESIGNS & RESEARCH)

Responsible for providing guidance and support in planning, feasibility studies, standardization and designs of river valley projects in the country, safety aspects of major and medium dams, hydrological studies for the projects, coordination of research activities, etc.

MEMBER (RIVER MANAGEMENT)

Responsible for providing technical guidance in matters relating to river morphology, flood management, techno-economic evaluation of flood management schemes, collection of hydrological and hydro-meteorological data, formulation of flood forecast on all major flood prone rivers and inflow forecasts for selected important reservoirs, investigation of irrigation / hydro-electric / multipurpose projects, monitoring of major and medium projects with regard to Command Area Development, etc.

The incumbents to the posts of Chairman and Members of Central Water Commission during the year 2012-13 were:

1.	**Chairman**, CWC	:	Sh.Rajesh Kumar	(01-04-2013 to 31-07-2013)
			Sh.Bibhas Kumar	(01-08-2013 to 31-10-2013)
			Sh A. B. Pandya	(05-11-2013 to 31-03-2014)
2.	**Member** (D&R)	:	Sh. A. B. Pandya	(05-11-2013 to 31-03-2014)
3.	**Member** (RM)	:	ShDevendra Sharma	(01-04-2013 to 31-12-2013)
			Sh.K.N. Keshri	(01-01-2014 to 31-03-2014)
4.	**Member** (WP&P)	:	Sh.Rajesh Kumar	(01-04-2013 to 31-07-2013)
			Sh.A. B. Pandya	(01-08-2013 to 03-12-2013)
			Sh.Aranga Nathan	(05-12-2013 to 31-01-2014)
			Sh.A.Mahendran	(03-02-2014 to 31-03-2014)

BROAD FUNCTIONS

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

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

- To carry out Techno-economic appraisal of Irrigation, flood control & multipurpose projects proposed by the State Governments;
- To collect, compile, publish and analyse the hydrological and hydro-meteorological data relating to major rivers in the country, consisting of rainfall, runoff and temperature, etc.;
- To collect, maintain and publish statistical data relating to water resources and its utilization including quality of water;
- To provide flood forecasting services to all major flood prone inter-state river basins of India through a network of 175 flood forecasting stations;
- Monitoring of selected major and medium irrigation projects, to ensure the achievement of physical and financial targets. Monitoring of projects under

Accelerated Irrigation Benefit Program (AIBP), and Command Area Development (CAD) program has also been included in its field of activities;

- To advise the Government of India and the concerned State Governments on the basin-wise development of water resources;
- To undertake necessary surveys and investigations as and when so required, to prepare designs and schemes for the development of river valleys in respect of power generation, irrigation by gravity flow or lift, flood management and erosion control, anti-water logging measures, drainage and drinking water supply;
- To provide Design Consultancy including Hydrological Studies in respect of Water Resources Projects, when so requested, to the state governments concerned/project authorities.
- To undertake construction work of any river valley development scheme on behalf of the Government of India or State Government concerned;
- To advise and assist, when so required, the State Governments (Commissions, Corporations or Boards that are set up) in the investigation, surveys and preparation of river valley and power development schemes for particular areas and regions;
- To advise the Government of India in respect of Water Resources Development, regarding rights and disputes between different States which affect any scheme for the conservation and utilization and any matter that may be referred to the Commission in connection with river valley development;
- To impart training to in-service engineers from Central and State Organizations in various aspects of water resource development;
- To initiate studies on socio-agro-economic and ecological aspects of irrigation projects for the sustained development of irrigation;
- To conduct and coordinate research on the various aspects of river valley development schemes such as flood management, irrigation, navigation, water power development, etc., and the connected structural and design features;
- To promote modern data collection techniques such as remote sensing technology for water resources development, flood forecasting and development of related computer software;
- To conduct studies on dam safety aspects for the existing dams and standardize related instrumentation for dam safety measures;
- To carry out morphological studies to assess river behaviour, bank erosion/coastal erosion problems and advise the Central and State Governments on all such matters;

- To promote and create mass awareness regarding the progress and achievements made by the country in the water resources development, use and conservation.

1.3 Headquarters

There are eighteen organizations, each headed by a Chief Engineer at CWC headquarters, New Delhi. Out of which, nine organizations are under WP&P wing, six organizations are under D&R wing and two organizations are under RM wing. In addition, Human Resources Management (HRM) Unit headed by Chief Engineer (HRM) is also located at headquarters. The details of the organizations are given in the organogram.

1.4 Regional Offices

In order to achieve better results in the Water Resources Sector and have better coordination with the State Government departments, CWC has established regional offices in the major river basins. It has 13 regional offices, each headed by a Chief Engineer. The offices are located at Bangalore, Bhopal, Bhubaneswar, Chandigarh, Coimbatore, Delhi, Gandhi Nagar, Hyderabad, Lucknow, Nagpur, Patna, Shillong, and Siliguri.

1.5 Important Schemes and Programmes

Accelerated Irrigation Benefits Programme

The Accelerated Irrigation Benefits Programme is being implemented by MOWR. Central Water Commission has been assigned the responsibility to comprehensively monitor the projects receiving CLA/Grant. Presently, there are 147 ongoing projects under AIBP which are getting grant and are being monitored by CWC.

A grant of 1539.421 Crores has been released to 32 Major & Medium Irrigation Projects under AIBP during 2013-14 till 31.03.2014. The cumulative total Central Loan Assistance / Grant provided to States is Rs. 50101.75 Crores under AIBP since its inception of the programme till 31.03.2014 to 294 projects.

Flood Management Programme

The Government of India has decided continuation of "Flood Management Programme" during XII Plan with an outlay of Rs. 10000.00 Crore for providing central assistance to the States for taking up the works related to flood control, river

management, anti sea erosion, restoration of damage flood management works and catchment area treatment.The sanctions of competent authority in this regard, has been conveyed vide MoWR order no 5/3/2012-Ganga/P-II/3868-3928 dated 31.10.2013. The inter-se priority of the works would be decided by an Inter-Ministerial Committee headed by Secretary, Water Resources, Government of India depending upon the critical/emergent situation and availability of the annual budget/plan outlay. Two meetings of IMC-MoWR were held till 31.03.2014 at New Delhi and a total of 97 Projects amounting to Rs 4412.595 Cr have been considered in the meeting.

Development of Water Resources Information System (WRIS)

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

Further, the development of Information System is under progress and in continuation of above, following achievements have been made till March 2014.

i. River Basin Atlas of India was released by Hon'ble Minister of Water Resources on 01 Nov 2012.

ii. The updated version i.e 3rd version (that includes live telemetry data in respect of CWC hydrological stations, Mobile Application version 1.0 for Android platform, Climate Trend analysis, 2D-3D linked view) was launched by Hon'ble Minister of Water Resources on 04 Dec. 2012 at MoWR, S.S. Bhawan,New Delhi.

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

iv. The final version (ver 4.0) has been launched in March,2014.

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

National Projects

Government of India has approved a scheme of National Projects for implementation during XI Plan with a view to expedite completion of identified National projects for the benefit of the people. Such Projects are provided financial assistance of 90% cost of irrigation & drinking water component of the project as central assistance by the Government of India in the form of central grant for their completion in a time bound manner.However, for new projects under Non Special Category States, the grant would be 75%. Central Govt. has declared 16 water resources projects indicated in Annexure 7.3 as National projects.

So far, between August, 2009 and March, 2014 , total eight meetings were held by High Powered Steering Committee for implementation of National projects.

1.7 Modernization and Renovation works in CWC HQ

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

1.8 CWC Personal Information System

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

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

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

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

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

1.8.3 CWES Bio-Data information System : Bio-data Information System for Central Water Engineering Service (CWES) officers has been developed 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 was inaugurated on 12th Feb. 2013 and uploaded on to the CWC web-site. CWC officers can log in to system with their employee ID as login code and unique passwords.

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

1.9 Central Water Commission Library

CWC Library is one of the most prestigious technical reference 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 has been rearranged in a manner to make retrieval of desired publication fast and easy. Now the Library has adequate space and improved facilities. There are two fully air-conditioned reading rooms and has latest journals / magazines and newpapers.

The library is being 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 approximately eighteen thousand Toposheet, state map, rail map, political map.

Other facilites in the permissesinclue conference hall for organising training, seminar, meeting etc. Auditorium which is also a part of library building is nearly ready & will made operational soon.

1.10 Progressive Use of Hindi in Official Work

The official language policy is being implemented in all the offices under the administrative control of the Central Water Commission. Continued measures were taken for improving progressive use of Hindi for official purpose. The Official Language Implementation Committee of the Commission meets regularly under the Chairmanship of the Chairman, Central Water Commission. Various measures required for progressive use of Hindi are discussed and timely action is being taken on the decisions taken in the meetings. Sufficient progress has been made in the implementation of the Rajbhasha Act in the Commission. Following initiatives in regard to progressive use of Hindi in this year were taken:

1. With a view to review the progressive use of Hindi and also to keep a watch on the compliance of orders, instructions etc. field offices of the Central Water Commission are being inspected and effective measures taken for rectifying short- comings noticed during the inspection.
2. To generate awareness about Hindi, and to give practical knowledge of the Official Language provisions and incentive schemes etc. three Hindi workshops were organized at Central Water Commission (Headquarter) in which 74 (seventy four) officials participated.

3. Letters received in Hindi are invariably replied to in Hindi, The Progress made in the implementation of important instructions issued by the Deptt. Of Official Language regarding progressive use of Hindi for Official purpose, the Official language Act, 1963 and the Official Language Rules, 1976 is watched through the quarterly progress report regularly.

   For the effective implementation of the official language policy and to create awareness about Raj Bhasha, Hindi fortnight was organized from 14 to 28 sept. 2013. During this period, various competitions like Hindi Noting/Drafting, Essay writing, Technical essay writing, Dictation for 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 in Annual Noting & Drafting Scheme.

   Rajbhasha shields were also awarded to the Field Offices of Central Water Commission situated at regions, A, B and C viz., Narmada Basin Organisation, Bhopal, Tapi Circle, Surat& Sikkim Investigation Circle, Gangtok. Rajbhasha shield for Directorates and Sections at HQs were awarded to River Management (Cord) Dte. & Establishment-IX Section respectively for doing their maximum work in Hindi during the year.

4. Apart from translation of documents falling under section 3(3) of the Official Language Act, the Annual Report of the Central Water Commission, 2011-12 and other urgent translation material received from MoWR were translated into Hindi.
5. Second Sub-Committee of Parliament on Official Language inspected the field offices of CWC at Kullu & Bhopal. The suggestions of the Committee are being implemented effectively.
6. Hindi books for the Central Water Commission Library are being purchased as per the targets fixed in the Annual Programme of the Department of official Language.
7. Regional offices of CWC at Bhuvaneshwar (Orissa), Ranchi (Jharkhand) and Hyderabad (Telangana) were inspected by a team from headquarter for implementation of Hindi u/s 3(3) of OL Act,.

1.11 Welfare Measures and Incentives

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

1.11.1 Benevolent Fund

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

- Immediate Relief up toRs.15,000/-
- Long Term Relief up toRs.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 isRs.10/- (ten) per month.

1.11.2 Co-Operative Thrift and Credit Society

Department of Irrigation Co-operative Thrift & Credit Society Ltd., has been functioning with its registered office at West Block–I, R.K. Puram, New Delhi since March 1959 for the welfare and benefit of the officers and staff of the Ministry of Water Resources, Central Water Commission, Central Soil & Materials Research Station,Department of Power, Principal Pay & Accounts Office of the Ministry of Water Resources and Pay & Accounts Office, Central Water Commission. It provides its member loans to the extent of Rs. 1,50,000/- and emergency loan of Rs. 50,000/-, recoverable in 60 and 10 monthly installments respectively at a rate of interest of 9% per annum. The Society pays gratuity for retiring members and writes off outstanding loans against deceased members from the members' welfare fund. It has won several awards for best cooperative society of Delhi. Further, Smt. Lalitha Vasudevan, Vice President of the Society has been awarded with 'Best Co-operator – 2012', Presented by Hon'ble Chief Minister Smt. Sheila Dikshit of National Capital Territory, Delhi.

1.11.3 Sports and Cultural Activities

Employees of CWC are motivated and encouraged to regularly participate in Sports and Cultural Activities. The main achievements during the year 2013-14 are as under:

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

CWC Athletic Team Stood First position in the March-Past of the Inter Ministry Athletic Meet 2013-14.

Sh. Pradeep Kumr, Director(E-I), CWC won the Bronze Medal in the Shot Put (Distance 8.97 mtr.) in the Delhi State Veteran Athletics Championship 2014.

Sh. Ashwani Kumar, Asst., Esst. V Section, CWC won the Bronze Medal in 100 mtr. Race Men (Vet) in the Inter Ministry Athletic Meet 2013-14.

Sh. Suresh Naidu, Sr. Statistical Officer, Ganga Bain, CWC won the Silver Medal in the Inter Ministry Volleyball Tournament 2013-14.

CWC cultural & short play team under the captainship of Sh. Santeev Kumar, Asst., Cash Section won the Gold medal in Folk Dance (Group) in Inter Ministry Cultural &Short play competition 2013-14.

CWC cultural & short play team under the captainship of Sh. Santeev Kumar, Asst. Cash Section won the Silver medal in Folk Song (Group) in Inter Ministry Cultural &Short play competition 2013-14.

Sh. Santosh Kumar, SWA, O/o the Member RM won Bronze medal in Instrumental (Light& Western) in Inter Ministry Cultural &Short play competition 2013-14.

Sh. Surjit Singh, UDC, R&D (MoWR) won Bronze medal in Folk Dance (Solo) in Inter Ministry Cultural &Short play competition 2013-14.

Sh. K. Arumugam, Asst. Director-II, Tech. Co-Ordination Dte. won Bronze medal in vocal Carnatic Music in Inter Ministry Cultural &Short play competition 2013-14.

1.12 Employees Strength under various categories:

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

Table 1.1

Representation of OBC, SC & ST Officials in Different Grades

(As on 01-01-2014)

Category	No. of Filled posts	No. of SCs	No. of STs	No. of OBCs
Group A	520	89	33	30
Group B	1076	164	47	142
Group C	876	219	67	57
Total	**2472**	**472**	**147**	**229**

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

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

Table 1.2

Number of Disabled Persons in Position

(As on 01.01.2014)

GROUP	OH	VH	HH	TOTAL
'A'	9	0	0	9
'B'	14	1	1	16
'C'	4	4	1	9
Total	**27**	**5**	**2**	**34**

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

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

1.13 Citizen's Charter for CWC

As per the guidelines issued by Department of Administrative Reforms & Public Grievances (AR&PG), a Task Force under the Chairmanship of Member (WP&P), CWC and Chief Engineer (BPMO), CWC as Member-Secretary & Nodal Officer was

constituted for formulating Citizen's Charter for CWC. The Citizen's Charter was finalized with the concurrence of MoWR and has been uploaded on CWC website.

1.14 Right to Information Act

The Right to Information Act enacted by Parliament on 15th June, 2005 came into force on the 12th October, 2005 (120th day of its enactment). CWC has implemented the provisions of the Act. Information in respect of Central Water Commission in compliance of Right to Information Act ' 2005 has been put in public domain through its official website at http://www.cwc.gov.in

CHAPTER-II

WATER RESOURCE DEVELOPMENT

2.1 Water Resources in India

Central Water Commission (CWC) has been making periodic assessment of the Country's water resources. The water resources potential of the country, which occurs as a natural runoff in the rivers is about 1869 Billion Cubic 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 1121 BCM of the total annual water potential can be put to beneficial use. This can be achieved through 690 BCM of utilizable surface water and 431 BCM through ground water.

While water for drinking purpose has been accorded top most priority in water use, irrigation is the major consumer of water. Ultimate irrigation potential which can be created making use of the utilizable surface water resources through major, medium and minor projects would be about 75.9 m ha. Irrigation potential making use of ground water has now been assessed as 64 m ha. Thus the total irrigation potential from surface and ground water sources would be about 139.9 m ha. Besides this, an additional irrigation potential of about 35 m ha can be created by taking up long distance inter basin transfer of water from surplus to deficit basins. Water resources potential in the major river basins is given in CWC Publication – Handbook on Water and Related Information, March, 2009.

In order to appropriately address the present and future water demand and food grain requirements of the society, the following thrust/priority areas for water resources related issues have been identified by the Government.

- Improving water utilization efficiency;
- Command area development and participatory irrigation management;
- Flood management and erosion control;
- Protection of coastal erosion;
- Dam safety and rehabilitation;
- Revival and restoration of existing water bodies;

- Appropriate regulation and management of ground water;
- Ground water recharge;
- Pursue the agenda for Inter-linking of rivers, starting with the south-bound rivers;
- Rural drinking water supply and sanitation;

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

2.2 Highlights of Water Resources Sector

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

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

2.2.1 Irrigation Potential: Major & Medium Irrigation Sector

The ultimate irrigation potential of the country is estimated as 139.9 m ha., out of which irrigation potential from major and medium irrigation projects is assessed as 58.47 m ha. Irrigation potential created in the country from major and medium irrigation projects, which stood at 9.7 m ha. in 1951, has risen to 41.637 m ha. till the end of X Plan. The cumulative figures of potential created in the successive plan periods are given in Figure 2.1 and State wise cumulative potential created through major and medium projects 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.

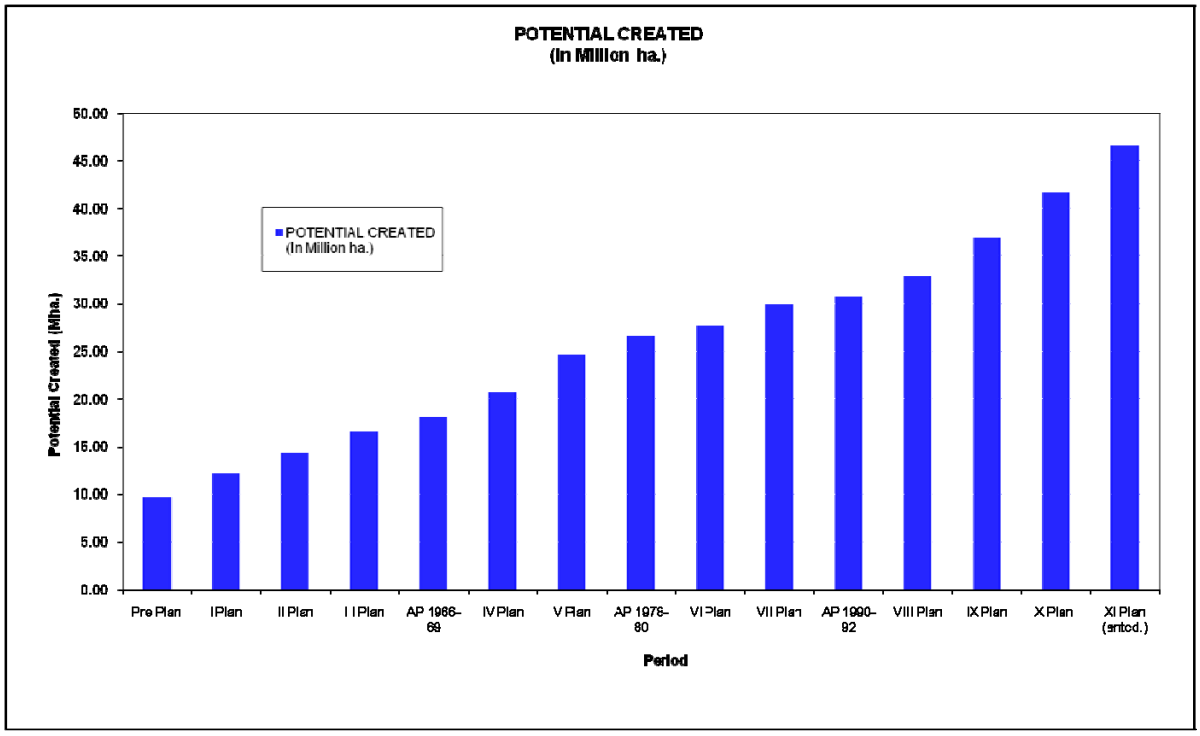


Fig 2.1 Growth of Irrigation Potential Created During Pre-Plan and Plan Period (Cumulative) (Major and Medium Irrigation Sector)

2.2.2 Major and Medium Irrigation Projects

In 1951, during launching of the First Five Year Plan, there were 74 major and 143 medium irrigation projects in the country. During the plan period since 1951 to end of X Plan in 2007, as per available information, total No. of projects taken up were 368 major, 1087 medium and 215 ERM schemes out of which 186 major, 813 medium and 120 ERM projects have been reportedly completed by end of X Plan. Further, as per the information furnished to the Working Group on Major Medium Irrigation & Command Area Development (MMI & CAD) for XII Plan formulation, 130 projects (31 major, 49 medium and 50 ERM) were reportedly taken up and 116 projects (35 major, 62 medium and 19 ERM) were completed during the XI Plan. Number of MMI Projects taken up and completed up to X Plan and during XI Plan are given in Table 2.2.

The cumulative irrigation potential created till the end of X Plan was 41.637 m ha. Working Group on MMI & CAD for XII Plan has anticipated a potential creation of about 5 mha through MMI projects during the XI plan. It has also recommended

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

Table 2.1

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

(Thousand ha.)

Sl. No.	State	Ultimate Irrigation Potential	Potential created up to IX Plan (1997-2002)	Potential creation during X Plan	Potential created up to X Plan	Potential Creation in XI Plan		
						Ach'ment 2007-10	Likely Ach'ment 2010-11	Target 2011-12
1	Andhra Pradesh	5000.00	3303.22	439.44	3600.21	366.52	64.91	517.00
2	Arunachal Pradesh	0.00	0.00	1.2	1.20	Nil	Nil	Nil
3	Assam	970.00	243.92	68.98	302.69	46.693	85.51	93.46
4	Bihar	5223.50	2680.00	279	2879.00	NF	6.20	65.00
5	Chattisgarh	1146.93	922.50	888.18	1810.68	62.315	35.00	35.00
6	Goa	62.00	21.17	16.48	33.75	12.031	3.82	5.95
7	Gujarat	3000.00	1430.37	788.13	2230.50	864.59	270.00	314.00
8	Haryana	3000.00	2099.49	91.87	2193.70	11.84	NF	NF
9	Himachal Pradesh	50.00	13.35	2.1	15.45	7.5	3.50	4.00
10	Jammu & Kashmir	250.00	179.69	23.61	203.30	NF	2.00	110.00
11	Jharkhand	1276.50	354.47	249.5	1137.00	NF	34.00	62.70
12	Karnataka	2500.00	2121.12	6.63	2127.75	171.72	59.45	94.50
13	Kerala	1000.00	609.49	480.98	1090.47	23.2	NF	NF
14	Madhya Pradesh	4853.07	1386.90	65.00	1451.90	264.682	93.70	206.15
15	Maharashtra	4100.00	3239.00	255.15	3494.15	285.56	NF	209.00
16	Manipur	135.00	91.15	11.9	103.05	16.86	15.00	20.09
17	Meghalaya	20.00	0.00	0.00	0.00	-	-	-
18	Mizoram	0.00	0.00	0.00	0.00	-	-	-
19	Nagaland	10.00	0.00	1.00	1.00	-	-	-

20	Orissa	3600.00	1826.56	163.41	1989.97	71.49	28.61	50.51
21	Punjab	3000.00	2542.48	62.19	2604.67	NF	NF	NF
22	Rajasthan	2750.00	2482.15	408.2	2890.35	NF	32.50	34.50
23	Sikkim	20.00	0.00	0.00	0.00	-	-	-
24	Tamil Nadu	1500.00	1549.31	11.75	1561.06	11.71	NF	NF
25	Tripura	100.00	4.90	13.8	18.70	6.124	6.57	3.03
26	Uttar Pradesh	12154.00	7910.09	871.26	8781.35	164.35	172.80	163.97
27	Uttrakhand	346.00	280.30	9.35	289.65	-	-	-
28	West Bengal	2300.00	1683.29	86.52	1769.81	NF	30.97	76.18
29	UTs	98.00	6.51	0	6.51	Nil	Nil	Nil
	Total States+U.Ts.	58465.00	36981.43	5295.63	41637.86	2756.465	944.54	2065.04

Source: Planning Commission

Table 2.2

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

Category	Projects Taken Up			Projects completed			Spill over into XII Plan		
	Pre-plan	Upto X Plan + During XI Plan	Total	Pre-plan	Upto X Plan + During XI Plan	Total	Notional	Ongoing	Lia.in XII Plan
Major	74	368+31	473	74	186+35	295	178	148	9
Medium	143	1087+49	1279	143	813+62	1018	261	138	28
ERM	-	215+50	265	-	120+19	139	126	40	1
Total	217	1670+130	1800	217	1119+116	1452	565*	326	37

*Several Projects have not been reported for XIIth Plan formulation by the States, effort is being made to obtain their Status.
Source: Planning Commission

Table 2.3

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

Period	Outlay/ Expenditure (Rs. Crores)	Expenditure (Rs. Crore)	Potential created (m.ha.)		Potential Utilized (m.ha)
	During	*Cumulative*	*During*	*Cumulative*	*Cumulative*
Pre-plan period	-	-	9.70	9.70	9.70
I Plan (1951-56	376	376.24	2.50	12.20	12.98
II Plan (1956-61)	380	756.24	2.13	14.33	13.05
III Plan (1961-66)	576	1332.24	2.24	16.57	15.77
Annual Plan (1966-69)	430	1762.05	1.53	18.10	16.75
IV Plan (1969-74)	1242	3005.3	2.60	20.70	18.69
V Plan (1974-78)	2516	5521.5	4.02	24.72	21.16
Annual Plans (1978-80)	2079	7600.10	1.89	26.61	22.62
VI Plan (1980-85)	7369	14968.9	1.09	27.70	23.57
VII Plan (1985-90)	11107	26576.2	2.22	29.92	25.47
Annual Plans (1990-92)	5459	31534.19	0.82	30.74	26.32
VIII Plan (1992-97)	21,072	52606.29	2.22	32.96	28.44
IX Plan (1997-2002)	48259	101896.29	4.09	37.05	31.03
X Plan (2002-2007)	82195	184090	5.30	41.64	33.74
XI Plan (2007-12)*	174473	358563	5.76	47.40	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.

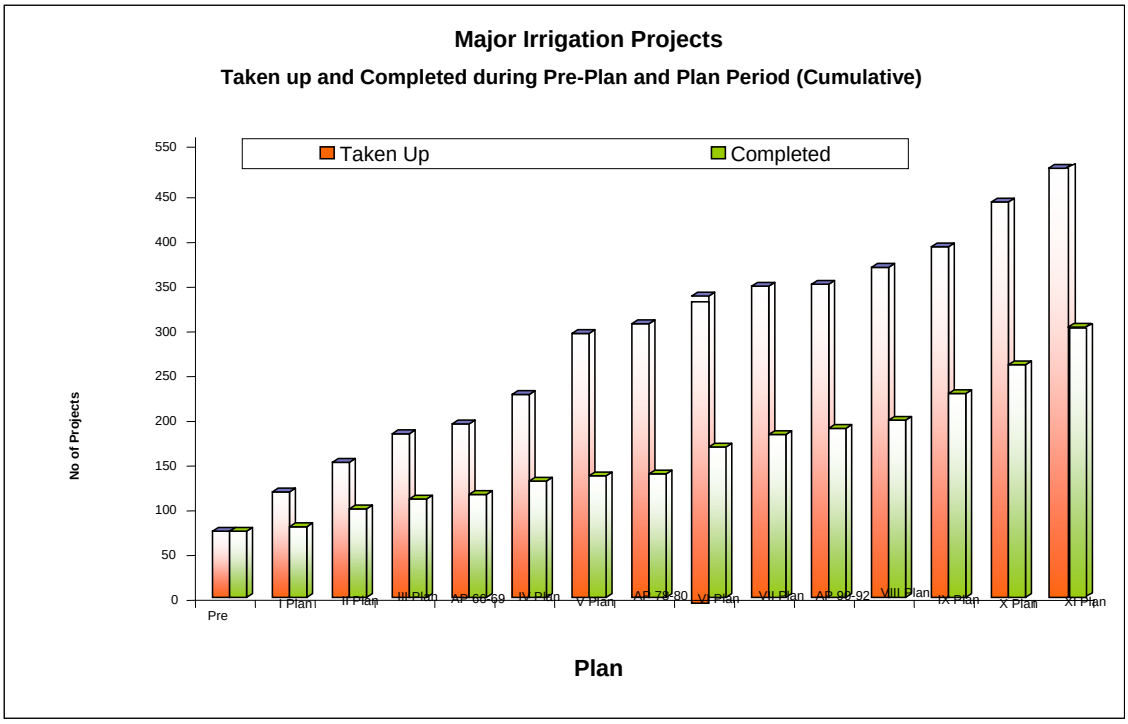


Fig 2.2 Major Irrigation projects taken up and completed during pre-plan and plan period (Cumulative)

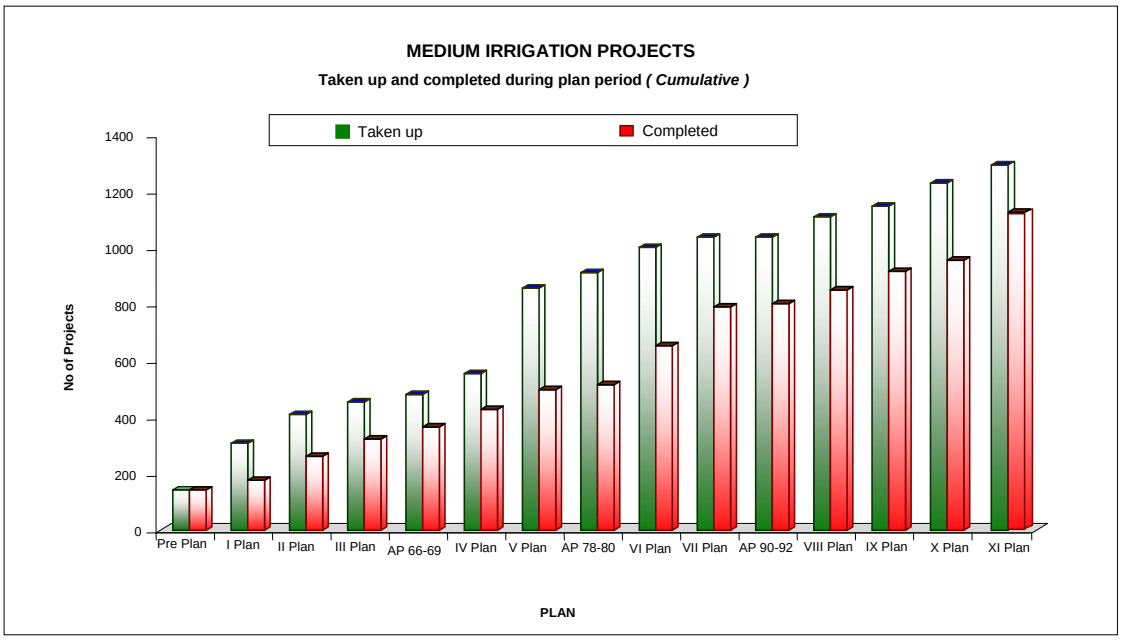


Fig 2.3 Medium Irrigation projects taken up and completed during pre-plan and plan period (Cumulative)

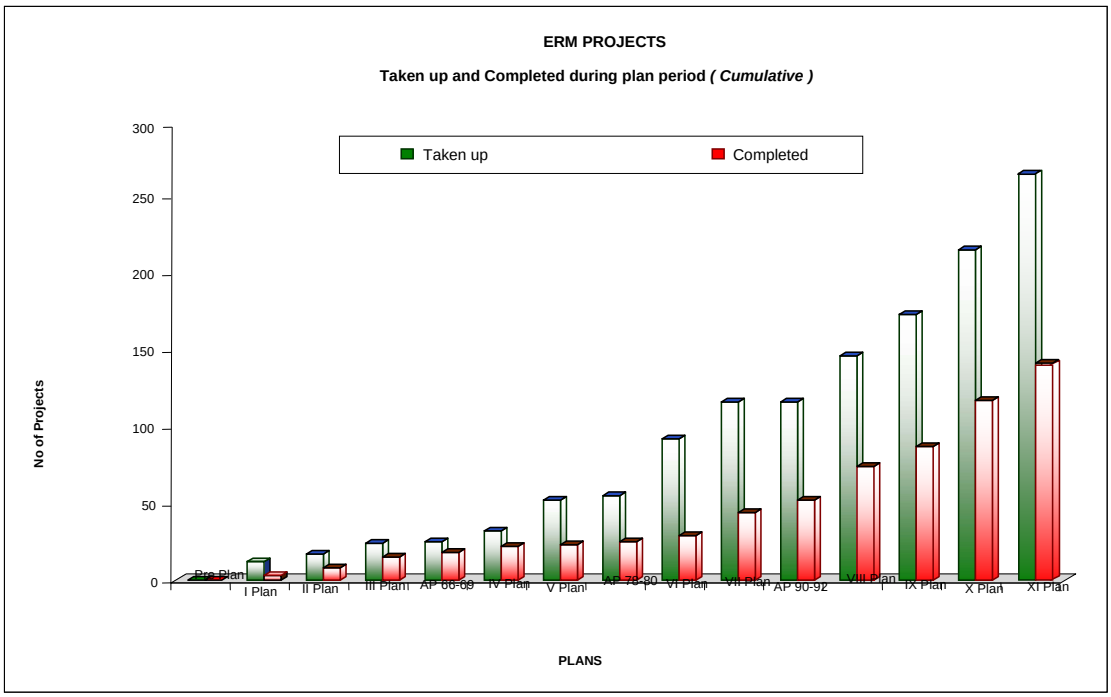


Fig 2.4 Modernisation of ERM Projects taken up and Completed during pre-plan and plan period (Cumulative)

2.3 Irrigation Development under Tribal Sub-Plan districts

A Tribal Cell was originally sanctioned in March 1979 as part of the strengthening of the Irrigation Dte. One of the functions entrusted to Tribal Cell is "Preparation of Annual Status Report on irrigation development in TSP areas in respect of all the given States having major/medium irrigation projects for the benefit of Scheduled Tribes. The report on the status of irrigation projects benefiting TSP is updated from time to time.

CHAPTER-III

RIVER MANAGEMENT

3.1 Systematic Collection and Compilation of Hydrological Data

Central Water Commission is operating a network of 954 hydrological observation stations including snow and meteorological observation in different river basins of the country to collect (i) water level, (ii) discharge, (iii) water quality, (iv) silt and (v) selected meteorological parameters including snow observations at key stations.The data collected is put to various uses viz., planning and development of water resources projects, studies related to assessment of impacts due to climate change, water availability studies, design flood and sedimentation studies, flood forecasting, international & inter-state issues, river morphology studies, development of inland waterways, research related activities etc.

The basin-wise distribution of HO stations is detailed below in Table 3.1.

Table 3.1

Basin-wise number of Hydrological Observation Stations

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

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

The basic data collected by field units is processed and validated at the Sub-Division, Division and Circle level and the authenticated data in the form of Water Year Books, Sediment Year Books and Water Quality Year Books are published.

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

Five Regional Data Centers were set up at Nagpur, Bhubaneswar, Hyderabad, Gandhinagar and Coimbatore for storage of data under Hydrology Project. At National Surface Water Data Centre, New Delhi, data of above regions of CWC is stored and combined catalogue of metadata is hosted on website.

During the Year 2013-14, hydro-meteorological data from all 954 sites has been observed and 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. Also monitoring of glacial lakes/ water bodies in Himalayan region have been undertaken and model for snowmelt runoff forecasting has been developed with collaboration of NRSC, Hyderabad.

3.1.1 Hydrology Project

Hydrology Project Phase-I was implemented by Government of India with an objective to establish a functional Hydrological Information System (HIS) and to improve institutional capacity of 9 States viz. Andhra Pradesh, Chhattisgarh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, and Tamil Nadu and 6 Central Agencies viz. Central Water Commission, Central Ground Water Board,

Indian Meteorological Department, National Institute of Hydrology, Central Water and Power Research Station and Ministry of Water Resources. The project was implemented during September, 1995 to December, 2003.

During HP-I, an Integrated HIS providing reliable, comprehensive and timely hydrological and meteorological data relating to 56 parameters was established. This consists of 916 river gauge stations 7912 observation wells and 436 hydro meteorological stations for collecting data on qualitative and quantitative aspects of both surface water and ground water.380 data centers and 31 data storage centers equipped with specialized hardware and software has been established for data processing, storage and reliable data communication. Sufficient manpower has been trained for HIS operations and user support. In addition to current data some of the states have successfully computerized valuable historic data relating to rainfall and river discharge.

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

The project was cleared by the CCEA in October, 2005. The agreement for the project between the Govt. of India and the World Bank was signed on 19th January, 2006 and approved by the GOI in the month of May, 2006. Estimated cost of the CWC component of HP-II based on Revised Cost Table 2013 is 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 institutional strengthening and vertical extensions as given below:

I. Institutional Strengthening

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

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

a. Construction of facilities: The work of Construction of 2 Lecture halls, one computer lab and extension of Krishna Hostel has been completed. Godavari Hostel has been upgraded by installing TV, AC etc in each room.

b. Trainings: Total 57 training programmes have been completed since starting of the Project, under which 1342 officers have been trained till March 2014. 9 International Training course at UNESCO, IHE, Delft, the Netherlands/ in the field of water resources sector, have been attended by the officers of CWC in the different courses. Total 19 officers from CWC have so for been trained.

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

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

e. Modernization of Hydrological Observation Stations: Four Acoustic Doppler Current Profilers (ADCP) for discharge measurement on large rivers have been installed at Varanasi site on river Ganga, Billingundulu on River Cauvery, Garudeshwar on River Narmada and Wadenpalli on River Krishna during the year 2010-11. Eleven ADCP have been procured and installed at Barmanghat,

Hoshangabad, Handia, A.P.Ghat, Bhomoraguri, Pandu, Pancharatna, Rishikesh, Shahzadpur, Allahabad (Chhatnag) and Mirzapur sites during FY 2011-12/2012-13.

f. "Web Based Surface Water Information System": The Central Water Commission and other Implementing Agencies operate an extensive network of hydro-meteorological measurement station, from which data are collected on climate, river flows and water quality. A suite of software packages (Surface Water Data Entry System (SWDES), Hydrological Modelling Software (HYMOS) and Water Information System Data Online Management (WISDOM), collectively the Hydrological Information System (HIS) are used for entry, storage, analysis and dissemination of this data. New software solution is proposed to be developed through this procurement is designed to upgrade the functionality of the HIS by replacing obsolete components, improving system architecture and adding new components. The new HIS will consist of following components:-

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

The development of software is under progress.

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

II. Vertical Extension

a. Development of Hydrological Design Aids (HDA) including standardization of Methodologies/ protocols: The methods used for carrying out hydrological

analysis for planning of various water resources projects by different state agencies are not uniform and even today some of these projects are being planned using empirical formulas which are no longer in use. The hydrologic analysis, usually, is carried out in a limited way without exploring various alternatives under different data scenario condition. Under HP-II, it is proposed to develop tools for making use of state of art technology for rational design and analysis and carry out integrated water resources analysis including study of hydrology of the complete water system.

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

3.1.2 Water Quality Monitoring

Central Water Commission is monitoring water quality at 396 key locations covering all the major river basins of India. It has a three-tier laboratory system for analysis of the parameters. The level-I Laboratories are located at all field water quality monitoring stations on major rivers of India where six physical parameters viz., temperature, colour, odour, specific conductivity, total dissolved solids, pH and dissolved Oxygen are observed. There are 18 level-II Laboratories located at selected Divisional Headquarters to analyse 25 additional physico-chemical characteristics and bacteriological parameters of river water. Five Level-III/ II+ Laboratories are functioning at Varanasi, Delhi, Hyderabad, Guwahati and Coimbatore where 41 parameters including heavy elements/ toxic parameters etc are analysed periodically. The data generated are computerized in the database system and disseminated in the form of hydrological yearbook, status reports and bulletins. Water Quality year books are published and WQ Bulletins are issued regularly.

A report titled "*Status of Trace & Toxic Metals in Rivers of India*" is under publication. Another report titled "*Water Quality Hot Spots in Rivers of India-2014*" is under

preparation. The water quality data being so collected are put in various uses related to planning and development of water resources projects.

3.2 Flood Forecasting & Warning Services

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

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

On an average, over 6000 forecasts are being issued every year by Central Water Commission during flood season. Normally, these forecasts are issued 12 to 48 hours in advance, depending upon the river terrain, the locations of the flood forecasting sites and base stations. For the purpose of flood forecasting, hydrological and meteorological data is being observed at 878 sites and communicated through a network of 544 wireless stations. Synoptic weather situations, weather forecast/ heavy rainfall warnings etc. are also being collected from Flood Meteorological Offices (FMOs) of IMD.

3.2.1 Flood Forecasting Performance during 2013

During the flood season 2013 (May to Oct.), 7060 flood forecasts (5741 level forecast and 1319 inflow forecasts) were issued out of which 6760 (95.75%) forecasts were found within accuracy limit of +/- 0.15 m for level forecast and +/- 20% for inflow

forecast. During the flood season, the real time hourly data of over 250 stations (mostly of flood forecasting stations and few base stations) were collected through satellite and compiled, analyzed and was used to generate flood reports of the regions.

During the flood season of 2013 (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 in three flood forecasting stations namely Srinagar on Alaknanda in Uttarakhand, Mawi on Yamuna in Uttar Pradesh and Bhagalpur on Ganga in Bihar in the country.

High flood situations were experienced at 18 forecasting stations where peak level had attained within 0.5m of previous HFL viz., River Ganga at Rishikesh and Haridwar in Uttarakhand, Ghazipur and Ballia in Uttar Pradesh, Patna (Gandhighat), Hathidah and Kahalgaon in Bihar, River Yamuna at Delhi Railway Bridge in NCR, Delhi, River Kosi at Basua in Bihar, River Brahmaputra at Dibrugarh and Neamatighat, River Desang at Nanglamoraghat in Assam, River Ghaghra at Elgin Bridge in Uttar Pradesh, GangpurSiswan in Bihar and River Rapti at Balrampur in Uttar Pradesh, River Wardha at Balharsha in Maharashtra, River Subarnarekha at Rajghat and River Burhabalang at NH5 Road Crossing in Odisha.

3.2.2 Flood Bulletins

Central Water Commission (CWC) has been issuing Daily Flood Bulletins and Special Flood Bulletins during flood season every year based on the information collected from affected State Governments and its own field formations. During the year 2013, 170 daily bulletins (once daily) and 102 Orange Bulletins for High Flood Situation (Twice daily) and 82 Red Bulletins(every 3 hours) were issued as per Standard Operating Procedure (SOP) issued by Ministry of Home Affairs (MHA) and National Disaster Management Authority (NDMA). During flood season 2013, Central Flood Control Room (CFCR) of CWC transmitted flood forecast bulletins through e-mails/Fax and SMS to the concerned User Agencies.

3.2.3 Communication System of CWC used for flood forecasting purposes

Central Water Commission has been operating wireless stations covering almost all river basins to transmit and receive the data since beginning. Telephone, Mobile, FAX and E-mail were also used at all the Divisional Flood Control Rooms and Central

Flood Control Room under CWC, New Delhi for transmission of data. The Central Flood Control Room at Delhi was operated on 24x7 basis during monsoon. The data received in Central Flood Control Room are passed on to various offices daily primarily through Email. Sometimes phone, fax and SMS were also used to disseminate the flood information. The forecast, water level and rainfall information are also uploaded on web site http://india-water.gov.in regularly.

3.2.4 Modernization of Flood Forecasting Services

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

i)	Godavari basin	63 stations
ii)	Krishna basin	41 stations
iii)	Brahmaputra basin	21 stations
iv)	Damodar basin	20 stations
v)	Yamuna basin	15 stations
vi)	Mahanadi basin	8 stations

10 modellingcentreswere installed during 10th Plan at Dibrugarh (UBD) and Guwahati (MBD) in Assam, Kalindi Bhavan (UYD) in NCT, Delhi , Bhadrachalam (now shifted to New Delhi), Agra (LYD) in Uttar Pradesh, Hyderabad (LKD), Hyderabad (LGD), Kurnool (LTSD) in Andhra Pradesh, Bhubaneshwar (ERD) in Odisha, Asansol (DD) in West Bengal and Maithon (DVRRC) in Jharkhand where the hourly data is transferred from existing earth stations located at Jaipur (Rajasthan) and Burla (Odisha) through VSAT.

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 – 4

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

To improve the flood forecast modelling, windows based MIKE-11 software were procured and supplied to modelling centres established under IX and X Plans. Site specific models for Gandhisagarunder Chambal Division (Jaipur), Hirakud Dam under Mahanadi Division(Burla), Naraj, Gunupur, Kashinagar, Anandpur under ERD(Bhubaneshwar) have been developed and are being used for real time flood forecasting. Models for Jenapur, Rengali Dam, Rajghat under ERD (Bhubaneshwar), Bhadrachalam, Jaikwadi under LGD (Hyderabad), Srisailam, Almatti Dam under LKD (Hyderabad), Delhi, Mathura under UYD (New Delhi), Agra, Etawah under LYD (Agra), Guwahati under MBD, (Guwahati)andHathnur Dam under Tapi Division (Surat) have also been developed and are under testing. Once the models are successfully tested, the same will be used for real –time flood forecasting. Regular training for working staff in the field are being organised for working on MIKE-11 models.

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

The EFC memo for 12th Plan period of 2012-17 with provision of installation of satellite based automatic data acquisition system for existing 219 stations and 410 stations for 100 new forecasting stations is under process for approval. Out of 219 stations, 125 stations are under process for modernisation. The station index number, uplink frequency and time slot allotments for these 125 stations have been obtained from India Meteorological Department. Tenders have been floated/under process for the data acquisition system by field organisations. Planning for modernisation of remaining sites is under process.

3.2.6 Mathematical Modelling for Flood Forecasting

Development of MIKE-11 models for Flood Forecasting of Sankosh, Godavari, Brahmaputra and Yamuna Basins have been taken up. The work of development of models is in progress. Performance of MIKE-11 models being used by field offices of CWC is being monitored.

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 is under confirmation from States.

3.2.8 Future Activities

In view of early setting in and late withdrawal of south west monsoon and associated floods, it was decided to modify the designated flood period of all the basins in the 5th review meeting of RMCD. Accordingly, a notification has been issued extending the designated flood period vide no. 3/120/2013-FFM/ 2638-2717 dated 03 /12/2013.

A new web based data entry and on-line forecast dissemination & report generation system is being developed under Hydrology Project-II which is also having a flood forecasting module. The flood forecasting information will be available on new website from 2014 onwards. TheeSWIS flood forecast module has inbuilt programme for generation of email/sms for flood alert which can be sent to various users using

bulk sms from MTNL, Delhi. The utilities of FF module of eSWIS is almost ready for launching and training.

Besides, it is proposed to develop flood inundation models for inundation forecasting in about 30,000 sq.km. of flood prone area, whose high resolution DEMs are already available with NRSC. In addition, CWC proposes to develop rainfall based flood forecasting in Northern hilly regions of country using rainfall inputs from IMD. The work in this respect has been initiated in CWC.

3.3 Flood Management Programme

The Government of India has decided continuation of "Flood Management Programme" during XII Plan with an outlay of Rs. 10000.00 Crore for providing central assistance to the States for taking up the works related to flood control, rivermanagement, anti-sea erosion, restoration of damage flood management works and catchment area treatment. The sanctions of competent authority in this regard, has been conveyed vide MoWR order no 5/3/2012-Ganga/P-II/3868-3928 dated 31.10.2013. The inter-se priority of the works would be decided by an Inter-Ministerial Committee headed by Secretary, Water Resources, Government of India depending upon the critical/emergent situation and availability of the annual budget/plan outlay. Two meetings of IMC-MoWR were held till 31.03.2014 at New Delhi and a total of 97 Projects amounting to Rs 4412.595 Cr have been considered in the meeting.

3.3.1 Monitoring & Appraisal of Flood Management Scheme

KARNATKA STATE

i. Physical and financial progress for following two ongoing Flood Management Schemes for which fund was released in 2011-12 in Karnataka has been monitored for release of the fund during 2013-14.
   - Flood Protection Works for Hemavathi River at Holanarasipur in Hassan district.
   - b) Flood protection works along banks of River Tunga at Shimoga Town &Mattur village in Shimoga District.

ii. The proposal for 3 FMP Schemes received from Govt of Karnataka for IMC-FMP were examined and comments were sent to State Govt.

iii. The proposal for releasing the subsequent installment (1st installment for 2013-14) amount to ₹15.97 Crores during the year 2013-14 to the State Govt of Karnataka for the work "Flood protection works along the banks of River Tunga in Shimoga district (KAR-2) was submitted to MoWR.

Puducherry:

The proposal along with the Revised DPR received from U.T of Puducherry on the "Flood protection works of Yanam region of Puducherrywas examined and comments communicated to U.T of Puducherry for compliance.

Maharashtra State:

The comments on the proposal on the "Development and protection of Mithi River and its adjoining areas" were communicated to Govt. of Maharashtrafrom time to time and revised DPR is awaited.

Delhi Jal Board:

Fixing of Raw of rate for supply of Water by Bhakra Beas Management Board (BBMB) to Delhi Jal Board (DJB) for the period from 1.04.20012 to 31.03.2015 has been vetted, approved and submitted to MoWR.

3.4 Morphological Studies

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

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

by CWC.Collection of river cross sections data for pre and post monsoon seasons for 17 rivers viz., Ganga, Sharda, Rapti, Yamuna, Brahmaputra, Subansiri, Pagladia, Mahanadi, Kosi, Bagmati, Mahananda, Tapi, Krishna, Tungbhadra, Ghagra, Sutluj and Gnadak were carried out.

During the 12th Plan period (Five Year Plan 2012-17). Morphological studies of 15 rivers have been planned. CWC requested IITs/NIITs to take up these studies on consultancy basis. A joint meeting of CWC constituted "Consultancy Evaluation-Cum-Monitoring Committee (CEMC) for morphological studies of Indian rivers with the Consultants from IITs/NIITs was held in Jan.2013 . Consultancy proposals for theses 15 rivers have been received from different IITs/NIT. CWC scrutinized these proposals and sent to MoWR for approval. A provision of Rs. 15.60 crores has been sanctioned by MoWR for the 12th Plan under the Plan scheme *Research and Development Programme in Water Sector* for the works related to morphological studies.

3.5 Coastal Erosion

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

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

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

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

The Coastal Protection and Development advisory Committee (CPDAC) (erstwhile Beach Erosion Board) has been constituted by Ministry of Water Resources, Govt. of India in April 1995 under the Chairmanship of Member (RM), CWC. CPDAC provides a common platform to all maritime States/UTs to discuss and solve their coastal erosion problems.

The 14th CPDAC meeting was held in Goa during 27-28th Feb, 2014. Important decisions/action taken during the meeting were in relation to:

a. Acceptance of new coastline length for maritime States/UTs as computed by National Hydro-graphic Office (NHO), Dehradun
b. Acceptance for publication of Shoreline Change Atlas of Indian Coast based on the satellite data of two time-frames i.e. 1989-91 and 2004-06 along with the protection measures undertaken, prepared by Space Application Centre (SAC), Ahmedabad with Central Water Commission
c. Preparation of Inventory of coastal data being collected by various agencies
d. Timeline for completion of updating of manual namely "*Protection and Control of Coastal Erosion in India*" by NIO, Goa
e. Amendments to composition of the committee
f. Timeline for completion of "*Status Report on Coastal Protection and Development in India*"

Earlier to above, the inter-departmental Expert Team of *Coastal Protection & Development Advisory Committee (CPDAC)* under leader-ship of Chief Engineer (Flood Management), CWC visited the Lakshadweep Islands during 16-20th April, 2013 in connection with Anti-Sea Erosion Measures in Lakshadweep Islands and submitted its

report including recommendations to Lakshadweep Administration. The recommendations of expert team inter-alia includes review of existing design parameters for protection works, development of proper maintenance protocol for existing protection structures, better co-ordination for construction activities in coastal zone, piloting of offshore structures for coastal protection etc.

In addition to above, the First meeting of Sub-Committee of Coastal Protection & Development Advisory Committee (CPDAC) on Coastal Data Collection, Compilation and Publication was held under chairman-ship of Chief Engineer (FM), CWC on 7th October, 2013 at CWC- HQ, New Delhi to discuss various issues on Coastal data collection. The sub-committee discussed and finalized the list of parameters, frequency, methodology & schedule of observations for coastal data to be collected and format for compilation of data.

New Activities

During 12th Plan period, under approved Plan scheme *Development of Water Resources Information system*, CWC proposes to develop *Coastal Management Information system* against an outlay of Rs.15 crore. Recognising the concern that the work involved in CMIS are new, these works may require deployment of expert and trained manpower. Accordingly, discussions were initiated with the maritime states for exploring possibilities of establishing and running coastal data collection sites with the help of State Governments as well as other central agencies against a tripartite agreement with State/ Central agencies involved in such type of work.

3.6 Real Time Flood Inundation Modelling

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

The DEM developed by NRSC is not sufficient to meet the modelling requirement, additionally whole area needs to be mapped by surveying physically / LiDAR especially

covering salient features i.e. flood embankments, road network, railway lines, airport, important government & industrial establishments, important cities / towns , water bodies etc. with ground truth verification for the developed DEMs with desired resolution of horizontal & vertical grids. The up gradation of existing infrastructure of CWC (Headquarter and filed offices), apart from procurement of necessary infrastructure , acquisition of data , engagement of consultant, signing of protocol with different agencies etc. are major activities under this work.

CWC has developed the mathematical model of inflow forecasting of Ukai Reservoir in Tapi Basin (Gujrat State),involved in activities related to collection of Data from NRSC, IMD and Govt. Of Odisha& Bihar for ADB Pata for Operational Research to Support Mainstreaming of Integrated Flood Management under Climate Change and supported formulation of BIS codes related to Hygrometry (WRD 01) through ISO TC/113.R&D proposal received from INCGW, CGWB, were examined & views/comments sent to INCGW, CGWB.

3.7 Real Time Water Quality Monitoring Systems:

Online Water Quality Monitoring System at three sites namely Agra (Jawahar Bridge) on river Yamuna, Lucknow on river Gomti and Moradabad on river Ramganga has been installed for monitoring of pH, conductivity, temperature, Dissolved Oxygen, Bio-chemical Oxygen demand (BOD), Chemical Oxygen Demand (COD). The real time water quality data is available for above sites from 18th July, 2013 on web site http://cwc.rtwqms.com.

3.8 Mapping of Traditional Water Bodies

Final report on mapping of traditional water bodies has been submitted to MoWR after incorporating the views of the committee members.

Two training programs on '*Use of MIKE-11 Mathematical Model for Flood Forecasting*' were organized. First program was organized during 1.7.2013 to 12.7.2013 for the officers of Planning and Development Organization of CWC, second was organized during 21.10.2013 to 24.10.2013 for the same officers.

One week training programme on the Development of Flood Forecasting Models using MIKE-11 software as a part of training schedule for the 26th ITP (Part-II) for the newly appointed officers of CWES ('A') at NWA, CWC, Pune was conducted from 3.3.2014 to 7.3.2014.

3.9 River Management Activities and Works Related to Border Areas

River Management Activities and Works Related to Border Areas is a continuing scheme being implemented by the Ministry of Water Resources from XI Plan period. During XI plan, the Cabinet Committee on Economic Affair (CCEA) has approved the central sector Plan Scheme in its meeting held 4th December, 2008 at a total cost of Rs. 601.00 crore later on which was revised to the total cost of Rs. 820.00 crore. During XI plan an expenditure of Rs. 721.14 crore was incurred under the scheme. The continuation of the Central Sector Plan Scheme (RMBA) during the XII Plan (20012-17)is under consideration of the CCEA with an outlay of Rs. 740.00 crore. Broad activities proposed to be under taken during XII Plan are as under

SN	Activity	Estt. Cost (Rs. in Crore)
1	Hydrological observations and flood forecasting on common border rivers with neighboring countries	82.16
2	Investigation of WR projects in neighboring countries	115.00
3	Pre-construction activities for WR projects on common border rivers	100.00
4	Grant in aid to states for bank protection /ant erosion works on common border rivers and Union Territories for flood management /anti sea erosion measurers	397.00
5	Activities of Ganga Flood Control Commission (GFCC)	45.00
	Total	**740.00**

CHAPTER-IV

BASIN PLANNING

4.1 National Water Planning

The uneven distribution of water in time and space and the recurring occurrence of floods and droughts in various parts of the country have underscored the need for a national perspective in water resources development involving participation of all concerned. Planning of water resources development and utilisation is a multi-level process involving Central and State Governments, Non-Governmental Organisations and beneficiaries with intense interaction among them. CWC is actively involved in aspects related to holistic approach towards development and management of water resources considering river basin as 'hydrological unit'. National Water Mission also highlights the importance of principles of Integrated Water Resources Management (IWRM). In this regard, draft guidelines on 'Integrated Water Resources Development and Management' were prepared and circulated to all State Govts/UTs, Field Offices of CWC and other Union Ministries for comments/observations.

4.2 Review of National Water Policy

The National Water Policy states that it may be revised periodically as and when need arises. Further, the National Action Plan on Climate Change (NAPCC) states that "the National Water Policy would be revised in consultation with states to ensure basin level management strategies to deal with variability in rainfall and river flows due to climate change". Accordingly, the Ministry of Water Resources initiated the process of revision of National Water Policy-2002. Various workshops were organized for consultation with Policy Makers, Academia, Experts and Professionals, NGOs and Panchyati Raj Institutions for review of National Water Policy. The draft National Water Policy was formulated by a Drafting Committee consisting of eminent experts in water resources sector and placed in public domain for inviting suggestions/feedback.

The final National Water Policy – 2012 was released during India Water Week, 2013. A committee was constituted by the MOWR (PP Wing) 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 Dte. has been closely associated with the process of preparation of the roadmap for implementation of the policy.

4.3 National Water Resources Council

National Water Resources Council (NWRC) was set up in March 1983 as a National apex body with the Hon'ble Prime Minister as Chairman. The Union Minister of Water Resources is the Vice-Chairman, and Minister of State for Water Resources, concerned Union Ministers/ Ministers of State, Chief Ministers of all States & Lieutenant Governors/ Administrators of the Union Territories are the Members. Secretary, Ministry of Water Resources is the Secretary of the Council. The constitution of the NWRC is given in figure 4.1. The council has held six meetings so far. The 6th meeting of the National Water Resources Council was held on 28th December, 2012.

4.4 National Water Board

To review the progress achieved in the implementation of the National Water Policy and to report the progress to the National Water Resources Council from time to time, the Government of India constituted a National Water Board in September 1990 under the Chairmanship of Secretary (WR). The constitution of the Board is given in the figure 4.2. The Board has held fourteen regular and two special meetings so far. The fourteenth meeting was held on 7th June, 2012 at New Delhi.

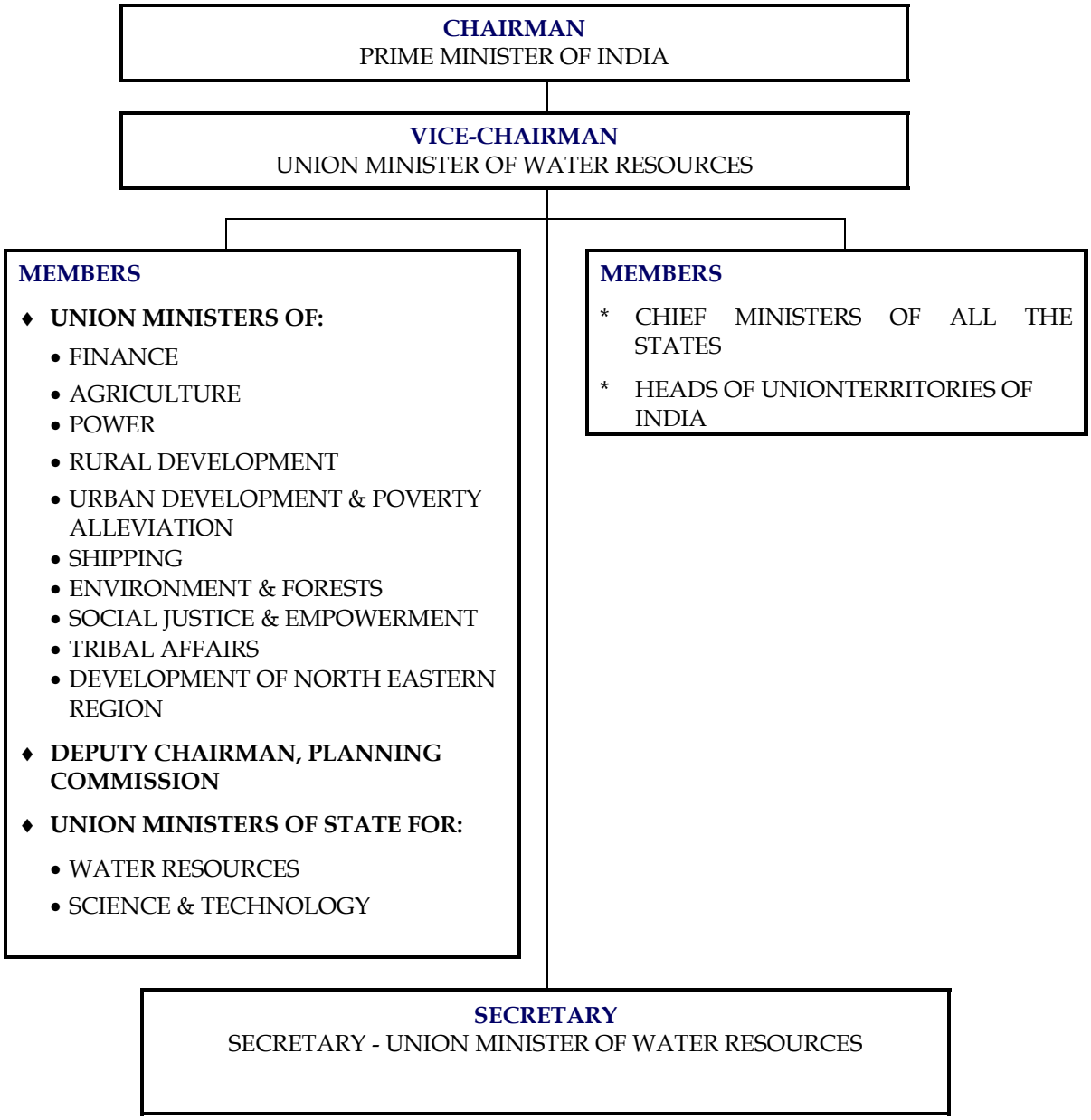


Fig. 4.1 - National Water Resources Council

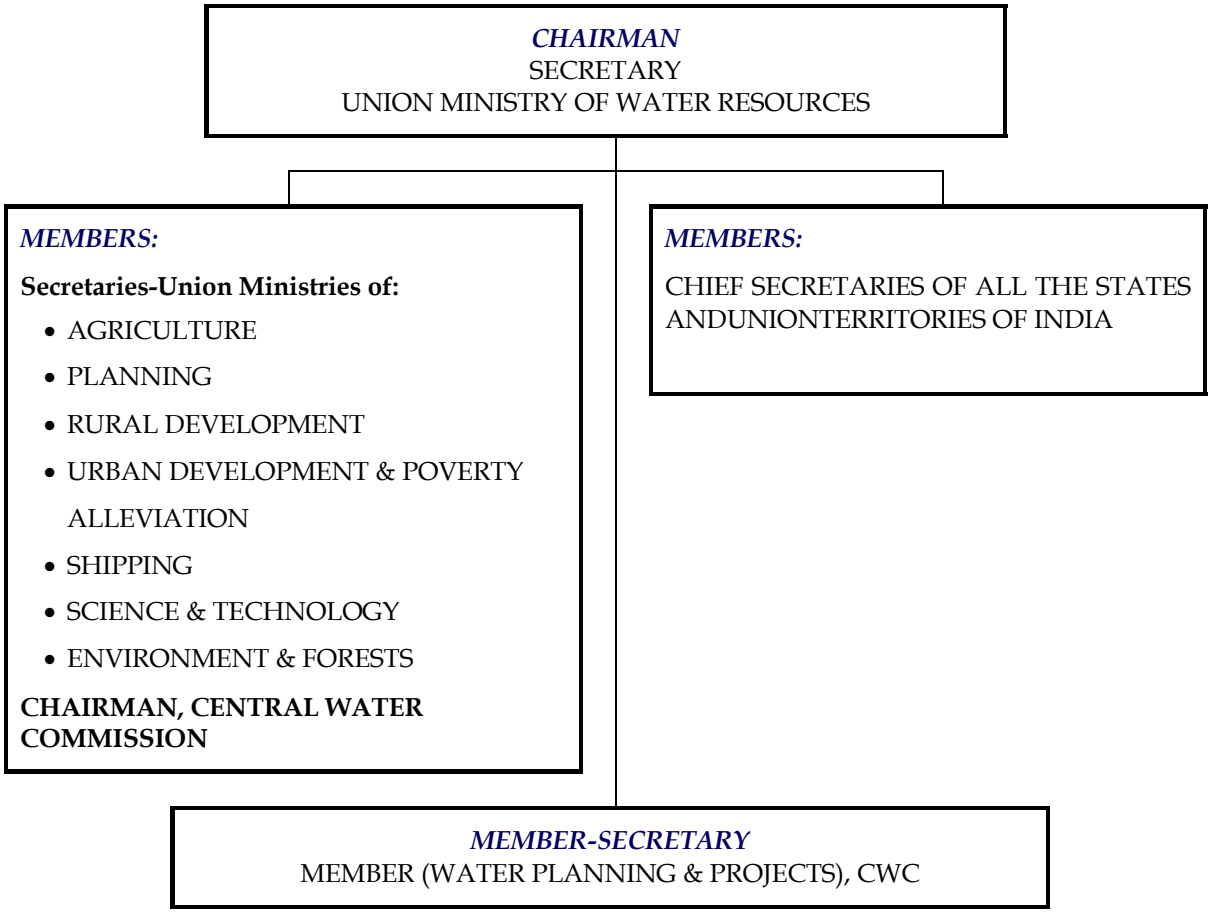


Fig. 4.2- National Water Board

4.5 Inter–Basin Transfer of Water & Interaction with NWDA

The National Water Development Agency is engaged in carrying out water balance studies, link canals studies for diversion of surplus waters to water deficit areas including inter-basin transfers and field surveys and investigations for preparation of feasibility reports of the link canals for water resources development with a national perspective. Now NWDA's function has been extended/amended to prepare pre-feasibility/feasibility/DPR of links under National Perspective Plan as well as Intra-State links proposed by the States. Chairman, Member (WP&P) and Member (D&R), CWC are members of NWDA Society and Governing Body of NWDA. So far 60 meetings of the Governing Body have been held. The 60th meeting was held on 30th January, 2014.

4.5.1 Technical Advisory Committee (TAC) of NWDA

The Governing Body of the NWDA Society has constituted a Technical Advisory Committee (TAC) for the Agency under the Chairmanship of the Chairman, Central Water Commission, for examination and scrutiny of the various technical proposals framed by the Agency. Member (D&R), CWC and Member (WP&P), CWC are the members of the TAC of NWDA. So far 41 meetings of the TAC have been held. The 41stTAC meeting was held on 5th October, 2012.

4.5.2 Consensus Group

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

So far 11 meetings of the consensus group have been held. The 11th meeting was held on 27th November, 2013.

4.5.3 Expert Committee

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

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

Ministry of Water Resources constituted a Committee under the Chairmanship of Chairman CWC to monitor and supervise the overall work of preparation of Detailed Project Report (DPR) of Ken-Betwa link project in February, 2006. NWDA has now taken up the work of preparation of the DPRs of Par-Tapi-Narmada (P-T-N) & Damanganga-Pinjal link projects (D-P). Subsequently, MoWR decided to include monitoring and supervision of all the DPRs by NWDA in the functions of the above committee vide office order No 2/56/2003-BM dated 11th November, 2009.

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

4.6 Basin Planning and Related Issues

4.6.1 Reassessment of 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.

Central Water Commission (CWC) and National Remote Sensing Centre (NRSC) jointly executed demonstrative pilot studies in Godavari and Brahmani-Baitarani river basins wherein Space based geo-spatial inputs were used to estimate basin-level mean annual water resources. The report of the pilot study in the Godavari and Brahmani-Baitarani Basin was finalized by the Chairman, CWC in July 2013 after incorporating some of the refinements suggested by the Working Group and it was decided that other suggestions of WG will be implemented while replicating the study at all India level.

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

The Working Group held two meetings on 21.09.2012 and 08.11.2012 and prepared a draft proposal for reassessment of water availability in the country jointly by CWC

and NRSC which envisages carrying out the reassessment in three phases for all the remaining basins from April 2013 to March 2016. The approximate financial requirement for the study is estimated to be Rs. 6.34 Crore (NRSC Component- Approx Rs 2.19 Crore; CWC Component- Approx Rs 4.15 Crore).

4.6.2 Indo-Australia Cooperation

In pursuance to the Memorandum of Understanding (MoU) signed between Government of India and Government of Australia on 10.11.2009, a Joint Working Group (JWG) comprising of members from the two countries has been constituted. CWC is represented by Director (Basin Planning) as one of the members of JWG from Indian side.

During the first meeting of the JWG held in November, 2010, an Action Plan to Enhance Cooperation in the field of water resources development and management through the sharing of policy and technical experience of water management was signed by both sides. The Action Plan inter-alia envisages to collaboratively develop a project plan and funding proposal for integrated water resources management and planning, drawing together key policy, scientific and information inputs, in a case study of a river basin. Brahmani-Baitarni basin has been selected for the case study. The work is proposed to be carried out in association with concerned State Govts and experts of Australia.

Second Meeting of the Indo-Australia Joint Working Group was held at Canberra during April 29-May 3, 2013. As a follow up of 2nd meeting of JWG, the data of Brahmani-Baitarni Basin were collected/compiled and made available to the Australian side.

Indo-Australia Joint Workshop was organized by BPMO on October 30th -31st, 2013 for discussing pathways to river basin reform and efficient water use as well as for preparation of Integrated Water Resources Management (IWRM) Plan for Brahmani-Baitarani River Basin at New Delhi. Participants from MoWR, CWC, CGWB, IMD, NIH, State Govts. of Odisha, Jharkhand, Chhattisgarh and I.I.T. Delhi attended this workshop apart from five resource persons from Australia.

A two weeks training course on ‘eWater Source’ at National Water Academy (NWA), Pune was held during November 2013 for about 25 participants under Indo-Australia

Joint Cooperation Programme during which work of setting up basin model of Brahmani- Baitarni basin on e-water source was initiated.

The officials of MoWR/CWC along with the Australian experts visited Brahmani-Baitarni river basin from 10.03.2014 to 13.03.2014 and a wrap up meeting with Secretary, MoWR was held at Shram Shakti Bhawan, MoWR, New Delhi on 14.03.2014. The work of data collection for preparation of IWRM plan for Brahmani-Baitarni Basin is in progress.

4.6.3 Decision Support System (Planning)

Under World Bank funded Hydrology Project-II, a Decision Support System (Planning) has been prepared by National Institute of Hydrology, Roorkee, which is the nodal agency for this work. A Committee for Annual Maintenance Contract (AMC) for DSS (P) has been constituted under the chairmanship of Director (NIH) and Director (RO), CWC is one of the members of the committee. The first meeting of the committee was held on 12.11.2013 in New Delhi.

4.7 Climate Change Issues and National Water Mission

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

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

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

CWC has prepared "Inventory of Glacial Lakes/Water Bodies in the Himalayan Region of Indian River Basins" through National Remote Sensing Centre, Hyderabad (NRSC) and started monitoring of these glacial lake water bodies on monthly basis during monsoon season from 2011 onwards. This monitoring is continuing during 12th Five Year Plan (2012-2017). Training program of CWC officers has been conducted in NRSC, Hyderabad as part of technology transfer. NRSC has been authorized to incur expenditure up to Rs. 99.42 lakhs during 2012-13.

Another work of "Snowmelt runoff forecasting in HimalayanRiver Basin" has been taken up by CWC and the model development part has been entrusted to NRSC, Hyderabad by CWC. The forecast has started from April 2012. Second installment of Rs.61.17 lakhs has been released to NRSC in September, 2012. NRSC has been further requested to take up development of Snowmelt Runoff Models of Teesta & Brahmaputra basin also.

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

MOWR/CWC has entered into an agreement to undertake a study on "Operational Research to Support Mainstreaming of Integrated Flood 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 total of 27 nos. of Academic and Research Institutes of excellence have been requested to frame the Proposal for research and studies of Impacts of Climate change. In response 16 nos R&D proposals have been received which are under examination in

Indian National Committee on Climate Change (INCCC) and 10 nos. have already been approved for study purposes. Further, State governments have been requested to take up related Base line studies through WALMIs, WALMATARI, NERIWALM and retired engineers of Water resources Departments.

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 in BPMO, 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 are to be finalized in a workshop proposed to be held for the purpose during 2014-15.

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 dt. 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 (26th meeting) was held in New Delhi on 07th October 2013 in which the actual releases made from Rihand reservoir during 2012-13 were discussed and the operation plan for 2013-14 was finalized.

CHAPTER-V

DESIGN AND CONSULTANCY

5.1 General

Design and Research Wing of Central Water Commission plays a pivotal role in the field of design and consultancy for water resources projects. Various units of the wing are actively associated with Design Consultancy, Technical Studies and Research & Development activities in the water resources sector. In addition to above, technical appraisal of Detailed Project Reports of water resources development projects prepared by different agencies is also carried out in this Wing.

Major activities of D&R Wing comprise of:

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

5.2 Planning and Design of Water Resources Projects

The following four design units cater to specific requirements and attend to special design related problems of the water resources projects located in different regions of the country:

1. Design (North & West) unit
2. Design (North-West & South) unit
3. Design (East & North-East) unit
4. Design (Narmada Basin Project) unit

Each of the above units have specialised Directorates such as Hydel Civil Design Each of the above units 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.

Design consultancy work in respect of 77 projects is being carried out in the design units of D&R Wing during the year 2013-2014 as under:

Sl. No.	Category	No. of Projects
1.	Projects at construction stage.	56
2.	Projects at investigation and planning stage (for which detailed project reports are being prepared)	17
3.	Projects with special problems	4
	Total	**77**

This includes 5 foreign projects, 1 in Afghanistan and 2 each in Bhutan and Nepal.

The list of 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. Sapta Kosi High Multipurpose Project, Indo-Nepal

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

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

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

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

Punatsangchhu -I HE Project (PHEP-I) 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 number 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 Mm^3 and live pondage of 5.00 Mm^3 between MDDL 1195m and FRL 1202 m 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. 95 nos. construction drawings have been issued during the year 2013-14.

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

The Punatsangchhu-II H.E. Project, (PHEP-II), Bhutan envisages construction of 86m high concrete gravity dam, with an installed capacity of 1020 MW. 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 213.00 m. The top of dam is at El.846.00 m with FRL at El.843.00 m and MDDL at El.825.00 m. Seven sluices of gate size 8m (w) x 13.2 m (H) have been provided at El.797.00 m for discharging simultaneously PMF 11723 cumec and GLOF of 4300 cumec. The project has a catchment area of 6835 km2. The gross storage capacity of the reservoir formed by dam construction is 7.0 MCM and the live storage capacity is 4.64 MCM. 170 Nos. construction drawings have been issued during the year 2013-14.

5. Tehri Dam Project, Uttarakhand

Tehri Dam Project is the first multi-purpose river valley project taken up for construction on river Bhagirathi to tap its vast potential and is being executed by Tehri Hydro Development Corporation (THDC) Ltd. A 260.5 m high earth and rock fill dam has been constructed, which is the fourth highest dam in the world. The design engineering and consultancy including construction drawings for dam and appurtenant structures, such as Chute Spillways, Shaft Spillways, and Intermediate Level Outlets etc. were handled in D&R wing. An inspection gallery has been provided in the core of fill dam joining left and right abutments, which is a unique feature for rock fill dam undertaken for the first time in India. CWC had carried out structural design of lining and issued all the necessary construction stage drawings in respect of Intermediate Level Outlet tunnel (ILO at EL 700) and additional ILO (at EL 750). CWC is rendering consultancy for recommending remedial measures to various post-commissioning problems related to civil structures of the project.

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

6. Koteshwar HE Project, Uttarakhand

Koteshwar HE Project is an integrated part of Tehri Power Complex comprising of Tehri Hydro Power Plant (1000MW), Tehri Pumped Storage Plant (1000MW) and Koteshwar Hydro Electric Project (400 MW) to develop the hydro-electric potential of river Bhagirathi. The project envisages construction of a 97.5 m high concrete gravity dam across river Bhagirathi and a surface power house with an installed capacity of 4x100 MW on the right bank near village Pindaras of Tehri District, about 20 Km downstream of Tehri Dam site at Koteshwar.

The reservoir which will be created by Koteshwar Dam shall also act as a lower reservoir for Tehri Pumped Storage Scheme as well as balancing reservoir for Koteshwar Hydel Scheme. This will facilitate the functioning of Tehri Power Complex as a major peaking station in Northern Grid, having a total installed capacity of 2400 MW. As per a Memorandum of Understanding (MoU) signed between Central Water

Commission and Tehri Hydro Development Corporation, the D&R wing is providing design consultancy services for the entire power house including intake and tailrace etc. All construction stage drawings of the project have already been released for construction. All four units have been synchronized with the Northern Grid. The special technical problems are being dealt as and when referred to this Unit.

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

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

a) Lohari Nag Pala HEP (600 MW), Uttarkashi, Uttarakhand.

Lohari Nag Pala Hydroelectric 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. Central Water Commission is assisting project authorities for tendering/award of the safety measures works in the project area to mitigate the hazards associated with leaving the project incomplete.

b) 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. About 11.7 km length head race tunnel is being constructed by conventional 'Drill & blast method' as well as with the help of Tunnel Boring Machine.

8. Ujh Multipurpose Project, J&K

Ujh Multipurpose Dam Project proposes a 119 m high concrete faced rock-fill dam (CFRD), 2.5 km long Head Race Tunnel (HRT), Diversion Tunnel and a surface Power House. As per the power potential studies, finalized by CEA, the installed capacity is 212 MW with one dam toe powerhouse. Design discharge per unit is 58.45 cumecs. Geological investigations are under progress. CWC is rendering design consultancy services for preparation of DPR chapters & drawing of Ujh Multipurpose Project.

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

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

HCD (N&W) Directorate is providing design consultancy to WAPCOS for the design of various hydro civil components of the project i.e. power intakes, water conductor system, complete powerhouse structure etc. Design & drawings of Power intake component and pressure shaft steel liner and tunnels and part of the power house civil structure have already been vetted/ examined and released to WAPCOS in time bound manner. The power house in advance stage of construction with the service bay being raised up to the crane beam level. The vetting of construction stage design and drawing of WAPCOS is being rendered in time bound manner.

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

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

construction of the project commenced in January, 2005. But, since start, the project has been mired in controversies.

In May 2008, NHPC at the instance of Govt. 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 Shri A.B. Pandya, 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, 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 Dec. 23, 2013 and the second on Jun 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.

11. Kharkai Barrage under Subernarekha Multi Purpose Project,Jharkhand.

Project envisages construction of 234 m long barrage across river Kharkai a major tributary of river Subernarekha near Village Ganjia, Jharkhand. Construction stage design & drawings have been taken up during year 2014 and 9 construction drawings have been issued.

12. Arjun Sahayak Pariyojna, 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 Arjun, Kabrai and Chanrawal. Construction stage drawings for Earthen Dam, Head Sluice Outlet, Spillway, Outlet Sluice, Embankment Dam and Hydro-mechanical components have been prepared and issued to the project authorities.

13. Durgawati Reservoir Project, Bihar.

The Durgawati Reservoir Project envisages construction of an earth dam on river Durgawati in Ganga basin near Karamchat village in Rohtas District of Bihar. The Dam is about 1615.40 m long and 46.3 m high connecting Rajadeo and Shergarh hills and will impound waters of Durgawati and its tributaries to facilitate irrigation in the drought prone areas of the west bank of the river Sone. Consultancy for certain modifications in provision of Concrete Slab for supporting Gantry Crane has been provided.

14. Icha Dam under Subernrekha Multi-Purpose Project, Jharkhand

Icha dam is proposed across river Kharkai, a major tributary of Subernarekha River, near village Icha, District West Singhbhum in Jharkhand state. The project envisages construction of 38.5 m high Dam with Gross storage of 1048 MCM. Consultancy work has been taken up by CWC on the request from State Government. The works of design and construction drawings of Spillway, Embankment Dam and hydro-mechanical components pertaining to Overflow and Non-overflow section are under progress.

15 . Kalisindh Dam Project, Rajasthan

Kalisindh Project is proposed on river Kalisindh, a tributary of Chambal river, between villages Bhangwarasi and Divri in Jhalawar district ,Rajasthan to supply 40 MCM of water to 1200 MW Kalisindh Thermal power project. CWC is rendering consultancy for Vetting and approving design and construction drawing of Kalisindh Gravity Dam.

16. Water Resources Development Projects in North Eastern Region

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

Atpresent, there are 6 projects at construction stage for which design consultancy is being provided by D&R wing of CWC. In addition, there are 8 projects for which DPRs are under preparation.

The projects in North Eastern Region dealt in D&R Wing during 2013-14 are listed below:

Arunachal Pradesh		
1	Jiadhal M.P Project	DPR stage
2	Nao Dehing HE Project	DPR stage
Assam		
3	Amjur Drainage Development Scheme	Construction stage
4	Barbhag Drainage Development Scheme	Construction stage
Manipur		
5	Thoubal Multipurpose Project	Construction stage
6	Dholaithabi Barrage Project	Construction stage
7	Khuga MP Project	Construction stage
Meghalaya		
8	New Umtru HE Project	Construction Stage
9	Kulsi HE Project	DPR stage
10	Killing Dam Project	DPR stage

Mizoram		
11	Tuipui HE Project	DPR stage
12	Tuichang HE Project	DPR stage
Sikkim		
13	Kalezkhola HE Project	DPR stage
14	Santaley HE Project	DPR stage

5.4 Hydrological Studies

The Hydrological Studies Organization (HSO), a specialized unit under D&R Wing of Central Water Commission, carries out hydrological studies in respect of most of the 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

HSO Unit also offers consultancy services in the field of hydrology to the State Water Resources Departments, State & Central Agencies at various stages of the project implementation.

During the year 2013-14 HSO Unit has dealt with 117 projects from hydrological point of view which includes 35 projects for design flood review studies under Dam Rehabilitation and improvement Project (DRIP) and 82 projects for technical examination/study of hydrology.

In addition to above, HSO unit is also carrying out other specialized work related to hydrology as detailed below:

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

To compute the design flood in un-gauged catchments, country has been divided into 26 hydro-meteorologically homogeneous sub-zones and flood estimation reports have

been developed for each subzone. So far flood estimation reports covering 24 sub-zones have been published. The periodic revisions/updating of earlier reports are carried out whenever additional data are received.

(b) Development of Hydrological Design Aids (HDA) under Hydrology Project-II (HP-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 Assessment (HDA-Y)
2. Estimation of Design Flood (HDA-F) and
3. Sedimentation Rate Estimation (HAD-S)

Draft report of HAD-F (Estimation of Design Flood) & HAD-S (Sedimentation Rate Assessment) submitted by the consultant, have been accepted in the 13th Review Committee Meeting held on 04/03/2014 in New Delhi with some issues which have to be addressed by the consultant expeditiously and their reports in all respect should be submitted for final review. The scheduled date of completion of studies is 31/05/2014.

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

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

(i) Preparation of New PMP Atlases for:

- Ganga River Basin
- Brahmaputra River Basin

(ii) Updating of six existing PMP Atlases for:

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

The work is being carried out through a consultant, who has submitted the draft Final Report of all the basin namely Ganga including Chambal, Betwa and Sone; Brahmaputra; Godavari and other East Flowing Rivers; Narmada, Tapi, Sabarmati, Banas and Luni river system and Rivers of Saurashtra and Kutch Region; West Flowing Rivers of Western Ghats have been finalized. The work in respect of remaining Rivers are in advanced stages.

5.5 Dam Safety Aspects.

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

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

5.5.1 Dam Rehabilitation & Improvement Project (DRIP)

As part of continuous strengthening of the dam safety activities in India, **Dam Rehabilitation & Improvement Project (DRIP)** has been taken up with World Bank assistance at an estimated cost of Rs. 2100.00 Crore. About 223 large dams in four

states i.e. Madhya Pradesh, Orissa, Kerala and Tamil Nadu would be rehabilitated under this project. The State-wise numbers of dams covered under DRIP and the estimate of the project cost is summarized in the table below:

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

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

Out of the total project cost, 80% will be funded by the World Bank loan/credit, while 20% will be borne by respective State governments and Central Water Commission. Apart from structural and non-structural measures for rehabilitation and improvement of identified dams, the scope of project includes the development of appropriate institutional mechanisms for safe operation and maintenance of all large dams in participating states. In addition, strengthening of the institutional setup for national level dam safety surveillance and guidance would be taken up in Central Water Commission.

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. CPMU, headed by the Project Director is assisted by an Engineering and Management Consultant (M/S EGIS EAU, France).

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 140 DRIP dams have been completed.
- Dam Safety Review Panels have inspected 150 DRIP dams.
- Project Screening Templates in respect of 70 dams have been prepared by the Project authorities and are at different stages of approval process.
- Project authorities have prepared about 40 tender documents which covers the works of dam rehabilitation as well as works of basic facilities, and works have been awarded for 22 tenders, while 16 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. Sixteen training sessions have been conducted, wherein about 570 officials have been trained on different aspects of DRIP implementation.
- Cost allocation to new states/organizations has been finalized, and they are expected to join DRIP shortly.
- So far seven meetings of Technical Committee for DRIP have been held. World Bank has also completed four of its Review Missions, wherein road blocks as well as way forward in project implementation have been discussed.

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 Feb 2014 is Rs. 21.59 Crore. 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 progresses will improve subsequently.

5.5.2 Central Dam Safety Legislation

The Standing Committee in its report of July 1986 has recommended for unified dam safety procedures for all dams in India and the necessary Dam Safety Legislation. The need for legislation was also repeatedly emphasized by the National Committee on Dam Safety in its several meetings. Initial efforts for dam safety legislation were directed towards enactments of appropriate legislation by respective State Governments, and accordingly State of Bihar enacted the Dam Safety Act, 2006. However, some of the States favoured the idea of a uniform Central Dam Safety Act. The States of Andhra Pradesh and West Bengal have adopted resolutions in their respective Assemblies for enactment of dam safety legislation for regulation in their States by an Act of Parliament. In pursuance of the above, the Union Government has decided to enact a Central Dam Safety Legislation.

Accordingly, Ministry of Water Resources formulated a (Draft) **Dam Safety Bill 2010,** which was introduced in the Parliament on 30th August 2010. The Bill was referred to the Parliamentary Standing Committee on Water Resources for the examination of the Bill. The Parliamentary Standing Committee submitted the recommendations vide its Seventh Report on Dam Safety Bill, 2010 in the Parliament in August, 2011, and subject to its recommendations and observations, the Standing Committee has recommended passing of the Bill by the Parliament. The observation and recommendations of the Parliamentary Standing Committee on Water Resources were examined by Ministry of Water Resources for necessary compliance. The modified draft of Dam Safety Bill 2013 has been approved by the Ministry of Law and Justice and is under process for placement before the parliament.

5.5.3 National Committee of Dam Safety (NCDS)

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

- Monitor the follow-up action on the report on Dam safety Procedures both at the Centre and at the State level,

- Oversee dam safety activities in various states and suggest improvements to bring dam safety practices in line with state-of the art practices consistent with Indian conditions, and
- Act as a forum of exchange of views on techniques adopted for remedial measures to relieve distress in dams.

The National committee was reconstituted in 2002 and consists of 28 members drawn from 16 states and various other organizations viz. MoWR, CWC, GSI, IMD, and BBMB. The 32nd meeting of NCDS was held on 27/12/2013.

5.5.4 National Committee on Seismic Design Parameters (NCSDP)

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

During 2013-14, two meetings (25th & 26th) of NCSDP were held. In the 25th meeting of NCSDP, held on 28th June & 8th July 2013, the site specific study reports of 11 projects were cleared. The 26th meeting of NCSDP was held on 11th December 2013 wherein the site specific study reports of 6 projects were cleared.

5.5.5 Consultancy Services on Instrumentation in Hydraulic Structures

During the year 2013-14, consultancy services towards planning and preparation of Instrumentation specification/ construction drawings have been provided for the following projects:

I. Saheed Bhima Nayak Sagar Project, MP.

II. Pench Diversion Project,Chhindwara MP.

Instrumentation Chapter for DPR of Ujh Multipurpose Project, Jammu & Kashmir has been prepared and issued during the year.

5.5.6 National Register of Large Dams

The National Register of Large Dams (NRLD) is maintained by CWC. As per the latest information compiled during March 2014 there are 5195 nos. large dams in Country. Out of which, 4847 nos. have been completed and 348 are under construction.

The regular updating 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.

5.6 Special Studies

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

During the year 2013-14, the GLOF study of Chatru H.E Project, Himachal Pradesh; Raigum H.E Project, Gimiliang H.E Project, New Melling H.E Project, Magochu H.E Project,.Tsachu-I, Tsachu-I Lower and Tsachu-II H.E Projects of Arunachal Pradesh; Bhutan has been completed. Further, GLOF Study report in respect of Kholongchu Kiru H.E Project and Kwar H.E Projects of J&K; and Sach Khas H.E Project, Himanchal Pradesh were examined & cleared.

CWC has conducted Dam Safety Inspection of four Dams namely, Baglihar (J&K), Tehri & Koteshwar (Uttrakhand) and Tungabhadra (Karnataka) during the FY 2013-14.

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 2013-14, Central Water Commission have monitored the live storage of 85 important reservoirs of the country having total live storage capacity at FRL of 155.008 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	
			2012-13	2013-14
Number of Reservoirs			84	85
Total Designed live Storage Capacity at FRL (in BCM)			154.421	155.008
ACTUAL STORAGE	On June, 1st (Start of the Water Year)	In BCM	29.889	32.178
		In % of Storage at FRL	19	20.76
		In % of 10 years Avg. Storage	129	125
	On Sept, 30th (End of Monsoon Period)	In BCM	115.123	133.352
		In % of Storage at FRL	75	86.03
		In % of 10 years Avg. Storage	106	118
	On Dec, 31st	In BCM	88.594	105.935
		In % of Storage at FRL	57.20	68.60
		In % of 10 years Avg. Storage	106.39	122.30

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 Rs. 15.00 Crore has been framed and the same has been approved. The scheme is proposed to be executed during the XIIthFive Year Plan. During the Financial Year 2014-15, telemetry is proposed to be installed on 87 reservoirs.

6.2 Cauvery Water Bulletin:

Weekly storage position of five important reservoirs in the Cauvery basin is also monitored and a bulletin is issued every week .It includes four reservoirs of Karnataka namely Kabini, Hemavathy, Harangi, Krishnaraja Sagar and one reservoir in the state of Tamilnadu namely Mettur. Four such bulletins are issued every month.

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

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.

6.5 Reservoir Sedimentation-Capacity survey of Reservoirs

6.5.1 Hydrographic Survey

Capacity Survey of reservoirs has been undertaken as a plan scheme since VIII Plan. Upto the end of X plan, the hydro graphic survey of 23 major reservoirs were completed in all respect Balance work of X plan of 3 reservoirs and 10 reservoirs from XI plan out of targeted 20 reservoirs has been completed in 2012-2013. Thus, the work of capacity survey work total 36 reservoirs has been completed in all respects.

During XII plan, a proposal of Central Sector Plan Scheme has been sanctioned by MoWR estimated cost Rs. 27.81 cr. vide letter dated 14/08/2013 for CWC. The capacity survey work of 25 reservoirs has been targeted during XII Plan, out of these the work of eight reservoirs is under progress.

6.5.2 Capacity Survey using Remote Sensing Technique

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

Physical Progress _ (i) one in-house study i.e. Satellite Monitoring of AIBP funded project i.e. namely Chandrabhaga Medium Irrigation Project was taken up on pilot basis during 2013-14. The study has been completed using Cartosat-1 high resolution (2.5 m) satellite data and Report on "Assessment of Irrigation Potential created in Chandrabhaga Dam command area under Chandrabhaga Medium Irrigation Project using High Resolution Cartosat Satellite Data" has been finalized and circulated in Oct' 2013.

(ii) Satellite Remote Sensing based Reservoir Sedimentation assessment study (In-house) of 1 reservoir i.e. Peechiparai (Tamilnadu State) has been carried out and Draft report prepared. Final Report will be completed by March 2014.

(iii) Award of work of 30 reservoirs for Satellite Remote Sensing based Reservoir Sedimentation assessment study through outside agencies has been taken up. The Expression of Interest (EoI) will be published in leading newspapers by Dec' 2013. The process of award of work is under progress.

Financial progress - BE Provision for 2013-14 – Rs. 54.00 Lakhs, RE -2013-14 – Rs. 39.50 Lakhs. Expenditure incurred so far – Rs. 19.25 Lakhs (upto Feb' 2014)

6.6 Benchmarking of Irrigation Projects

Benchmarking in Water Resources Sector is in practice in developed countries for quite some time. This concept is now being acknowledged as a management tool in irrigation sector in India as well. A Core Group under the Chairmanship of Member (WP&P), CWC was set up for Benchmarking of Irrigation Systems in India. This core group has been reconstituted.

National/ regional/ project level workshops are being organized by CWC through State Government institutions in various states to facilitate concerned State Governments to take up Benchmarking of irrigation projects in their respective States. First National Workshop on Benchmarking of Irrigation Projects was organized in February, 2002 at Hyderabad and since then, thirteen regional projects level workshops have been organized in various parts of the country.

6.7 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 2013-14, the Draft final reports of the following five projects of NERIWALAM, Assam, Tezpur have been considered in 8th TAC meeting held on 27.11.2013 and the minutes of the meeting has been sent to all members of TAC for their consent.

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

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

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 Govts. 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 Ministry of Water Resources (MoWR) on Irrigation, Flood Control and Multipurpose Projects headed by Secretary, Water Resources (WR) considers projects for acceptance and thereafter recommends the same for investment clearance by the Planning Commission. Besides these, the Hydro-power projects proposed by State Power Corporations / Electricity Boards / Private Sector Organisations for Techno-economic clearance by Central Electricity Authority (CEA) are also scrutinised in CWC from the view point of hydrology, civil design, inter-state issues and cost aspects of civil components. Technical aspects of water supply schemes and cost aspects of Flood Control Schemes (except projects for Ganga Basin) are also appraised as and when referred by State Governments/Ministry of Urban Development.

7.2 Appraisal of Major Irrigation Projects

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

ofMinistry of Environment and Forests in respect of Environment Impact assessment and Forest area being diverted. If Scheduled Tribe population is affected, the clearance of R & R Plan is also obtained from the Ministry of Tribal Affairs. The DPR then prepared is examined in CWC. In State, where Central Design & Planning Organisations do not exist, the CWC checks the design also. Subsequent upon examination and finalization of the technical aspect, the CWC finalises the Cost, Benefit Cost Ratio etc. State Govt. obtains concurrence of the State Finance Department for the finalised cost. The project proposal thereafter is put up to the Advisory Committee of MoWR for consideration and acceptance. After acceptance by the Advisory Committee and according investment clearance by Planning Commission,the project may be taken up by the project authorities.

During the year 2013-14, 40 major / multipurpose projects (23 new & 17 revised) have been appraised up to March,2014. Out of that, 8 major / multipurpose projects (5 new & 3 revised) have been accepted by the Advisory Committee of MoWR. Apart from the above, "In principle consent of CWC" for DPR preparation has been given in respect of 3Major Irrigation Projects. A Pie Chart showing state-wise distribution of major irrigation / multipurpose projects under appraisal during 2013-14 is shown at **Fig-7.1**

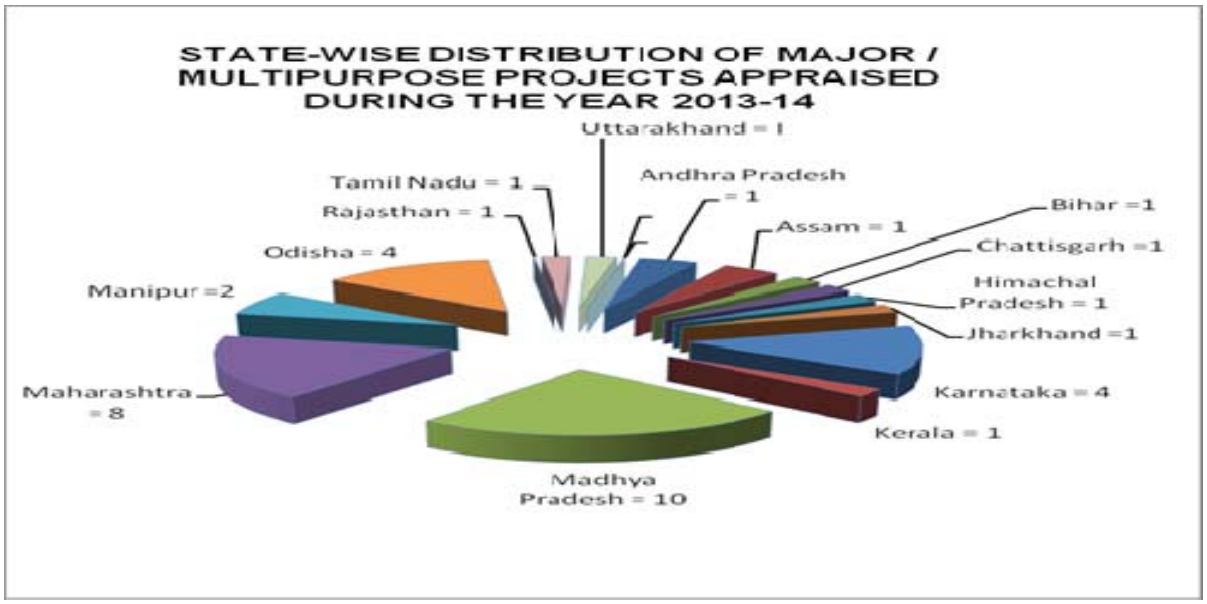


Fig. 7.1

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 2013-14, 51 medium projects (36 new & 15 revised) have been appraised in field units of CWC. Out of that, 3 medium projects (1 new & 2 revised) have been accepted by the Advisory Committee of MoWR. Necessary assistance was provided by PAO, CWC to the concerned regional offices for processing the projects for acceptance by the Advisory Committee.

7.4 Interaction with State/Project Authorities

To expedite the appraisal process, Central Water Commission interacts frequently with State Govt. Engineers and interstate/review meetings are convened to resolve issues having a bearing on project clearance. During the year 2013-14, meetings with following State Governments were convened by the Project Appraisal Organization in which issues related to projects were resolved:

i)	Bihar	5th July 2013 at Patna
ii)	Jharkhand	16th December 2013 at New Delhi
iii)	Karnataka	24th December 2013 at New Delhi
iv)	Maharashtra	2nd August and 14th December 2013 at New Delhi
v)	Uttar Pradesh and Uttarakhand	21 May at Dehradun and 3 October, 11 October and 26 December at New Delhi
vi)	Karnataka	7th March, 2014 at New Delhi

7.5 Meeting of the Advisory Committee

During year 2013-14 the Advisory Committee of MoWR (Ministry of WR), under the Chairmanship of Secretary (WR) accepted 36projects comprising 17 Major & Medium Irrigation / Multipurpose projects and 19 Flood Control schemes in 6 meetings. List of major & medium irrigation / multipurpose projects

and flood control schemes accepted by the Advisory Committee is enclosed as **Annex-7.1**and **Annex-7.2** respectively.

The irrigation projects accepted during 2013-14 envisages annual irrigation benefits to 10,12,225 hectare in the States of Assam, Manipur, Odisha, Rajasthan and Karnataka. The Flood Control Scheme, accepted during 2013-14 envisages protection to the population of about 20.34 lakh and area of about 6.43 lakh hectares in the states of Bihar, Uttarakhand, Himachal Pradesh, Assam, Punjab, Uttar Pradesh and Tripura. Pie Chart showing State-wise distribution of 17 Nos. major & medium irrigation / multipurpose projects accepted by the Advisory Committee during the current year is enclosed as**Fig. 7.2**

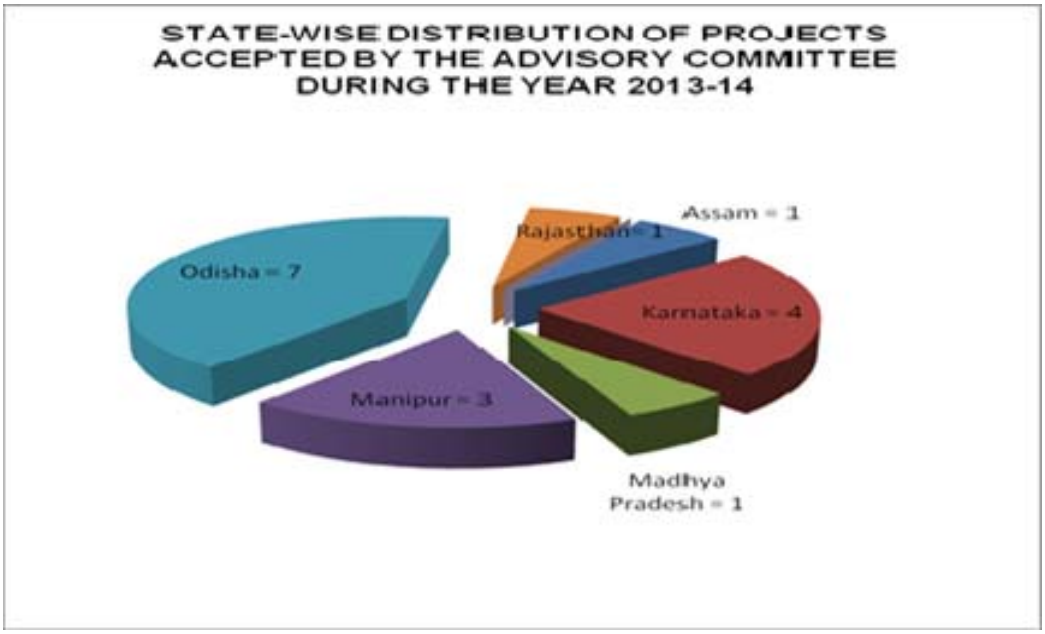


Fig. 7.2

7.6 Appraisal of Power Projects

The civil components of Hydro-Electric Projects are also appraised in PAO, CWC. Other aspects of Hydro-Electric Projects are appraised in CEA and TEC to the project is also accorded by the CEA. During 2013-14, CEA has accorded TEC to 5 Nos. Hydro-Electric Projects having total installed capacity of 5822 MW.

7.7 National Projects

Government of India has approved a scheme of National Projects for implementation during XI Plan with a view to expedite completion of identified National projects for the benefit of the people. Such Projects are provided financial assistance of 90% cost of irrigation & drinking water component of the project as central assistance by the Government of India in the form of central grant for their completion in a time bound manner.However, for new projects under Non Special Category States, the grant would be 75%. Central Govt. has declared 16 water resources projects indicated in Annexure 7.3 as National projects.

The criteria for selection of National Projects are as under:

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

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

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

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

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

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

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

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

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

Out of above 16 projects only 4 are under execution at present and Indirasgar Polavaram Project has been included on 01.03.2014. Lakhwar Multipurpose Project has been accepted by Advisory Committee of MoWR. Balance 10 projects are under DPR preparation/appraisal stage. The 4 National projects under execution are: Gosikhurd Project of Maharashtra, Shahpur Kandi Project of Punjab, Teesta Barrage project of West Bengal & Saryu Nahar Pariyojana of Uttar Pradesh.

Besides these, 13 new proposals have been received from State Governments including Uttar Pradesh for consideration under National projects. Out of these, 2 proposals namely, Restoring capacity of Sharda Sahayak system (U.P.), Bargi Diversion Project (M.P.) satisfy the criteria and have been recommended by the High Powered Steering Committee. Remaining 11 proposals do not satisfy the criteria and have been returned to the State Govt.

7.2.1 High Powered Steering committee

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

The terms of reference of the Committee are as under:

i. To recommend implementation strategies for National Projects.

ii. To monitor implementation of National Projects.

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

So far, between August, 2009 and March, 2014 , total eight meetings were held by High Powered Steering Committee for implementation of National projects.

7.3 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. 1250 crore for implementation during XI Plan Period.

Under the scheme with domestic support 3341 water bodies were taken up for restoration. Under the scheme with external assistance, 10887 water bodies have been taken up for restoration in Andhra Pradesh, Odisha, Karnataka and Tamil Nadu States. During XI Plan Rs. 811.85 crore under the scheme with domestic budgetary support and Rs. 464.50 crore with external assistance were released.

The continuation of the scheme "RRR of Water Bodies" during the XII Plan was approved by Union Cabinet on 20.09.2013 and guidelines were issued in October, 2013. It is envisaged to provide Central Assistance for restoration of about 10,000 water bodies with an earmarked outlay of Rs. 6235 crore (Total Cost Rs.10000 crore) for the scheme. Out of these 10000 water bodies, 9000 water bodies in rural areas and 1000 water bodies in urban areas would be covered under the scheme.

CHAPTER-VIII

MONITORING OF PROJECTS

8.1 Monitoring of Major and Medium Irrigation Projects

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

As per the present arrangement in CWC, Inter-State, Externally Assisted and Centrally aided projects are being monitored by monitoring units at Headquarters and other projects by respective field units. During 2013-14, a total of 47(18 Major and 29 Medium) projects under general monitoring and 147(81 Major, 49 Medium and 17 ERM) ongoing projects under AIBP were also targeted for monitoring by CWC. In addition, 7 Interstate Major Projects, parts of which were also being monitored under AIBP by CWC field Units, were also targeted to be monitored from CWC (HQ). The CWC made monitoring visits to the projects in accordance with these targets.The list of these projects under General/AIBP monitoring is given in **Annexure- 8.1**

S. No.	Item	Target	Achievement
1	General Monitoring by Regional Offices	47	9
2	AIBP Monitoring by Regional Offices	147	108
3	Inter State Projects Monitoring by HQ	7	1

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

8.2 Accelerated Irrigation Benefits Programme

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

The Government has further relaxed the criteria for central assistance under the AIBP since Dec 2006. The earlier guidelines stipulating completion of an on-going 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 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 on-going projects which will be 90% central assistance(CA) of project cost(works Component) in case of special category States, and KBK region of Odissa 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 25% CA of project cost in case of Non-special category States except for (ii) above. Could be enhanced up to 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 Install) after release of at least of 50% of State Share. And balance 10% (IInd Install) after obtaining the UC of minimum of 50% of CA released earlier and

(ii) For projects receiving higher than 50 % CA: - 50% (Ist Install) after the State Releases its full Share and 50% (IInd Install) same as above

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

A grant of Rs. 1539.421 Crores has been released to 32 Major & Medium Irrigation Projects under AIBP during 2013-14 till 31.03.2014. The cumulative total Central Loan Assistance / Grant provided to States is Rs. 50101.75 Crores under AIBP since its inception of the programme till 31.03.2014 to 294 projects.

The number of States benefited from the programme is 25 till 31.03.2014. Out of 294 projects, 143 projects have been completed as a result of AIBP.**Anexxure 8.2** gives State wise list of Major & Medium projects completed under AIBP.

As reported by the State Governments 6.641 million hectare of additional irrigation potential has been created under AIBP since the start of the scheme till March, 2012.

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 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. Meetings on the SatAIBP were held on 27-12-2013 and followed by review meeting held on 14.03.2014 to know the actual progress made by the Regional Directorate over the data entry, digitization and report preparation of these identified projects. Two studies were completed and remaining is under Progress and persuasion.

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 midterm plan 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.

CHAPTER-IX

CONSTRUCTION EQUIPMENT PLANNING AND MANAGEMENT

9. Construction Equipment Planning And Management

CWC is actively involved in various aspects of construction equipment planning and management which involves techno-economic appraisal of project reports from Plant Planning angle, consultancy in equipment planning, assistance in procurement of equipment and spare parts, contract management and preparation of cost estimates.

9.1 Project Appraisal

During the year, 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 22 projects reports were accepted with provisions worth Rs.7561.45Lakhs in respect of construction equipment. In respect of the remaining 2 nos. of project reports, the observations/ comments were conveyed to the project authorities for compliance and further review.

9.2 Consultancy

MOU has been signed with NWDA regarding two River inter-linking Projects viz., "Daman Ganga-Pinjal River Link Project", "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 the same is under process.

9.3 Manpower Planning

A study on "Expenditure & Employment Statistics in Major & Medium Irrigation projects (under construction) during 2007-08, 2008-09 & 2009-10 (XIth Five year plan period (2007-20012)" has been conducted by CWC. During the year, information/ data in respect of 59 major & medium irrigation projects were received/ collected through

specially designed format. At present, scrutiny of data and compilation of basic statements is in progress.

A study on "Expenditure Generation in Major & Medium irrigation projects during Operation & Maintenance" for the 5 years period from 2005-06 to 2009-10 has also been conducted in CWC. During the year, information/ data in respect of 49 major & medium irrigation projects received/ collected as per format from the States of Andhra Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Jharkhand, Karnataka, Maharashtra and Uttar Pradesh.

A report titled "Employment Generation in Major & Medium irrigation projects during Operation && Maintenance" was published in August, 2013 in CWC.

9.4 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). Punatsangchhu-HE Project, Bhutan
  b). Wangchu Hydro Electric Project, bhutan
  c). Kameng Hydro Electric Project, Arunachal Pradesh
  d). Ken-Betwa Link project, Phase-2
  e). Arun-III Hydro Electric Project, Nepal
  f). Chango Yangthang HEP, Arunachal Pradesh
  g). Chamkharchhu Hydro Electric Project, Bhutan

- "A committee had been constituted for the finalizing the cost of R.C.C for Punatsangchhu-I H.E Project, Bhutan. Director, CMC Dte, CWC was one of the members of this committee. In this context, various Meetings were attended and visit to project site at Bhutan had been made. The report of said committee has been submitted.

- "A Technical committee had been constituted for evaluation of technical bids received against the tender for procurement of 3 nos. big size Dredger Machine for I&FC Department, Govt. of NCT Delhi. Director, CMC Dte, CWC was one of the members of this committee. In this context, two Meetings were held at DGS&D. The report of said committee has been submitted.

CHAPTER-X

INTER-STATE MATTERS

10.1 Inter-StateRiver 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 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

ISM Directorate is the Secretariat for SC.

The Supervisory Committee has so far held four meetings during 2013-14 on 01.06.2013, 12.06.2013, 15.07.2013 and 08.11.2013. The Agenda Note and Minutes preparation, analysis of inflow, outflow, withdrawal and storage data of reservoirs of Cauvery basin and other logistic arrangements for the Supervisory Committee meetings were done / arranged by ISM Dte. The data is analyzed regularly with reference to Final Order of CWDT.

10.1.2 Krishna Water Disputes Tribunal -II

The Krishna Water Disputes Tribunal was constituted during April 2004. Later on the effective date of constitution of the Tribunal was revised to 01.02.2006. Krishna Water Disputes Tribunal (KWDT-II), under section 5(2) of Inter-State River Water Disputes Act 1956 submitted its report and decision on 30.12.2010 to the Central Government.

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

MoWR had given instructions to CWC to assist Advocate of Central Government for making submissions on the further references filed by it before the KWDT-II. Accordingly, Inter-State Matters Directorate, CWC provided requisite technical assistance to Advocate before the KWDT-II from time to time during 2013-14.

The KWDT-II has submitted its final decision on 29th November, 2013. Necessary further action is to be taken by Central Government as per this Order.

10.1.5 Palar Water Dispute

Government of Tamil Nadu had complained to the Central Government in February, 2006 that Government of Andhra Pradesh is proposing a reservoir on Palar river without their consent which would affect the established utilization in the state and is against provisions of 1892 agreement. Tamil Nadu also filed a suit in the Supreme Court in the same month. Supreme Court heard the suit on 7.1.2008 and ordered that the Central Government can consider the representation of Tamil Nadu and try to arrive at a settlement of the issue. Accordingly, three inter-state meetings were held. The third inter-state meeting on Palar river issue was held on 24.12.2010 under the chairmanship of Chairman, CWC at New Delhi. However, no consensus could be reached in the meeting and MOWR was informed accordingly.

Subsequently, a meeting was held on 26.5.2011 under the Chairmanship of Secretary, MoWR for resolving the issue. However, no solution could be arrived as State of Tamil Nadu insisted that no new project in Palar River Basin in AP should be taken up. Secretary, MoWR concluded that in view of the rigid stand taken by the party States,

there was no possibility of any negotiated solution and Hon'ble Supreme Court would be apprised of the same.

10.1.6 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, vide MoWR (Pen. Riv.) O.M. dated 24th October 2013, three member Supervisory Committee with the following composition was constituted:

(a) Member, CWC. - Chairman ex-officio
(b) Principal Secretary to Government(Projects), Irrigation & CAD Deptt., Govt. of A.P. - Member ex-officio
(c) Principal Secretary, WRD, Govt. 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 06.10.1975.
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 for 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.

The Supervisory Committee will have its office at Nanded Irrigation Circle Office, Nanded, Maharashtra. First meeting of the Supervisory Committee under the Chairmanship of Member (WP&P), CWC & Chairman ex-officio Supervisory Committee was held on 27th February, 2014 in Mumbai. The Committee in its meeting directed Maharashtra to release 0.6 TMC of water to A.P. from 11.00 A.M. on 1st March, 2014. Accordingly 0.6 TMC of water has been released on 1st March,

2014 between 11:45 A.M. to 3:00PM to the State of Andhra Pradesh by State of Maharashtra through Babhali Barrage.

10.2 Inter-State Projects- Control Boards/ Committees

10.2.1 Bansagar Control Board

In pursuance of an interstate agreement among the Chief Ministers of Madhya Pradesh, Uttar Pradesh and Bihar, the Bansagar Control Board was constituted vide resolution of earst-while Ministry of Agriculture & Irrigation in January, 1976 for efficient, economical and early execution of Bansagar Dam and connected works. The head quarter of the Board is located at Rewa (Madhya Pradesh).

The Union Minister of Water Resources is the Chairman of the Board and the Union Minister of Power, Union Minister of State for Water Resources, Chief Minister and Minister in charge of Irrigation and Finance of the concerned three states and Minister-in-charge of Electricity of Madhya Pradesh are its members. Chairman, CWC is the Chairman of the Executive Committee of Bansagar Control Board.

Bansagar Dam on Sone River, a joint venture of the states of Madhya Pradesh, Uttar Pradesh and Bihar is being executed by Water Resources Dept., Madhya Pradesh under the directions of the Bansagar Control Board. Execution of the canal works in respective territorial jurisdiction is being carried out by the concerned states independently and work of Power Houses is being executed by MPEB. The benefits and cost of the dam including land acquisition and rehabilitation are to be shared by Madhya Pradesh, Uttar Pradesh and Bihar in the ratio of 2:1:1(MP : UP : Bihar).The latest estimated cost of project is Rs. 1582.94 crores at 2009 price level. The total expenditure for an amount of Rs.1642.906 crores up to Feb.2014 has been incurred on the project.

The work on the Dam including Crest Gates has been completed in June 2006 and the reservoir has been filled up EL341.64m against FRL 341.65 m on 08.10.2013.Power generation is 2056 Million Unit up to 31.3.2014 in financial year 2013-14.

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 U.P. and Bihar. The catchment area up to Dam site is 18,648 sq. Km. The rainfall in the upper part of the catchment area

isfairly high and river has sizeable water resources. The quantity of water available, however, has so far not been utilized for irrigation except for the irrigation developed in Bihar under the sone canal systems and development of power and Rihand Dam in Uttar Pradesh.

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 M.P., Mirzapur district of U.P. and Palamau district of Bihar.

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

The project will provide annual irrigation to 2.49 lakh hectares in Madhya Pradesh. 1.5 lakh hectares in Uttar Pradesh & 0.94 lakh hectares in Bihar towards stabilizing its existing Sone canal system. The State Government of Madhya Pradesh, Uttar Pradesh and Bihar fund the project in the ratio of 2:1:1. The details of share due/received in relation to the expenditure incurred as on 28.02.2014 of Rs.1643.59 Crore.

Status of contribution of fund as on 28.02.2014

(` In Crore)

Up to 31.03.2013	Total Expenditure	SHARE DUE			SHARE RECEIVED			BALANCE SHARE		
		MP	UP	BIHAR	MP	UP	BIHAR	MP	UP	BIHAR
	1602.434	801.217	400.6085	400.6085	814.604	398.268	389.562	(+) 13.387	(-) 2.3405	(-) 11.0465
During 2013-14 up to 02/2014	40.472	20.236	10.118	10.118	(+) 40.472	-----	------	(+) 20.236	(-) 10.118	(-) 10.118
Total as on 28.02.2014	1642.906	821.453	410.7265	410.7265	855.076	398.268	389.562	(+) 33.623	(-) 12.4585	(-) 21.1645

This year i.e. 2013-14 due to normal rainfall in the catchment the reservoir got filled upto its full reservoir level F.R.L 341.64m. The full reservoir level will provide irrigation to an area of 5.00 lakh hectare in three states, besides hydropower generation of 125 MW in addition to providing domestic and industrial water supply.

The last 74th meeting of Executive Committee of BCB was held on 28.11.2013. In its last meeting it was observed that the project is almost complete and the party states requested to Executive Committee of BCB 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 E in C of all three co-basin states would finalise the project construction cost.

10.2.2 Betwa River Board

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

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

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

The Rajghat Dam with appurtenant structures has been constructed across river Betwa to provide Irrigation facilities to 1.38 lakh ha. in Uttar Pradesh and 1.21 lakh ha. in Madhya Pradesh with power generation of 45 MW through Rajghat Hydro Electric Project at the toe of dam on left bank. The cost as well as benefits of the project is to be shared equally by both the States. The Project was completed in June 2005. 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 U.P. and 31 villlages in M.P. state. Compensation in M.P. area is completed. In U.P. the District Administration, Lalitpur had paid the land compensation of 25 villages and for balance 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 2013-14. The three units of Power House have been tested and commissioned during 1999-2000. Power generation was 611 lakh unit during 2013-14.
So far 87th meeting of the Executive Committee was held on 22.04.2013.The Committee discussed/ decided the financial, technical and administrative matters of the Board.

10.2.4 Ghaggar Standing Committee

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

10.2.5 Yamuna Standing Committee

The Yamuna Standing Committee was constituted to study the interest of Delhi, its suburbs and the Northern railway bridges and other studies on Yamuna at Delhi against undue increase in maximum flood level in Yamuna at Delhi on account of flood control works upstream, to safe guard the interest of Haryana, UP and Delhi against adverse effect of flood control works in any of these areas and to ensure that adequate water way is provided in any new structure built across the Yamuna river.
The members of the committee are from GFCC, Northern Railway, Central Water Commission, Ministry of Surface Transport and Irrigation Department of States of Haryana, UP and NCT of Delhi.

The 82nd and 83rd meetings of the Committee were held on 19.07.2013 and 27.09.2013 respectively under the chairmanship of Member (RM), CWC. The minutes of the meeting were finalized and circulated among the members of the committee.

10.2.6 Committee on Special Remedial Works for Flood Protection Embankment on riversSutlej 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

10.3.2

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 Act2014, 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 Operational Protocol for Projects in Krishna Basin:

MoWR requested CWC to furnish feedback on Operational protocol with respect to the of the Handri Niva, Telugu Ganga, Galeru Nagiri, Veligonda, Kalavakurthi, and Nettempadu Lift Irrigation Schemes of A.P. A note on water allocation to the above projects was prepared in CWC and sent to MoWR on 19.03.2014.

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 andbrought out this publication in March, 2014.**

CWC is also compiling of information on Submergence, R&R Issues of Major & Medium Projects Monitored by field Organization of CWC and also as the information received from various State Governments. Till now the information received in respect of ***50***Major and Medium Irrigation Projects have been compiled.

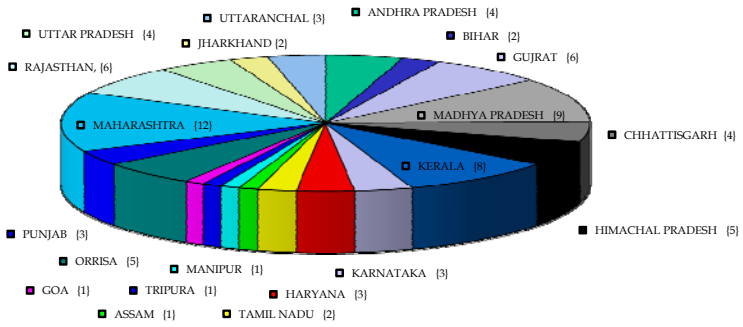
A National Environmental Monitoring Committee for River Valley Projects (NEMCRVP) has been setup by the Ministry of Water Resources to monitor implementation of Environmental Management Plan and observance of

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 ***15***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.

STATEWISE PROJECTS MONITORED BY NEMCRVP (TOTAL: 85 PROJECTS)



ANDHRA PRADESH {4}	BIHAR {2}	GUJRAT {6}	MADHYA PRADESH {9}
CHHATTISGARH {4}	HIMACHAL PRADESH {5}	KERALA {8}	KARNATAKA {3}
HARYANA {3}	TAMIL NADU {2}	ASSAM {1}	MANIPUR {1}
TRIPURA {1}	GOA {1}	ORRISA {5}	PUNJAB {3}
MAHARASHTRA {12}	RAJASTHAN, {6}	UTTAR PRADESH {4}	JHARKHAND {2}
UTTARANCHAL {3}			

Fig.1

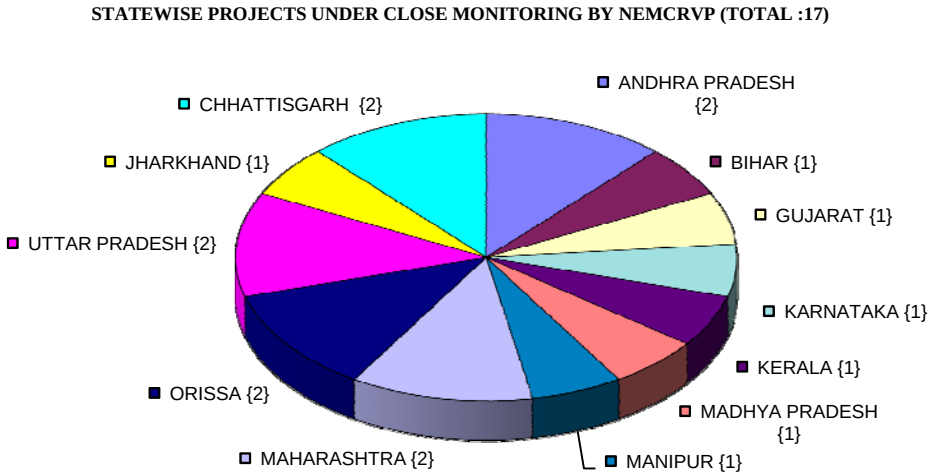


Fig.2

11.1.2 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).

11.1.3 Constitution of NEMCRVP

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

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

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

11.2.1 Empowered Steering Committee of NGRBA

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

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

11.2.2 Functions of the Empowered Steering Committee of NGRBA

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

11.3 Environmental Impact Assessment (EIA)

Studies on Environmental (including social) impacts of completed Water Resources Projects have been taken up by EIA Directorate through Consultants, under R&D Scheme of the Ministry of Water Resources. Such studies of two projects viz., Mahanadi Delta Project (Orissa) and Mahi Bajaj Sagar Project, (Rajasthan) which have been taken up during the year 2008-09 were completed and final reports circulated to the respective State Governments for needful action in the matter. Action initiated for taking up environmental evaluation studies of additional four identified projects for the State of Gujarat, Chhattisgarh and Bihar for which necessary concurrence and an undertaking for implementation of outcome of the study have been obtained.

Activities in the North East Region:-

Central Water Commission CWC has also taken up Cumulative Impact & Carrying Capacity studies of Subansiri and Siang Sub Basins in Arunachal Pradesh based on the recommendation of an Inter- Ministerial Group through consultancy. The study of Siang sub basin has already been completed. The final report of Siang sub basin has already been circulated to Ministry of Environment & Forests, Ministry of Water Resources, Ministry of Power and concerned State Governments for needful action.
The revised Interim Report of Subansiri sub basin was considered by Expert Appraisal Committee of MoEF during its 68th meeting held on 24.09.2013 and offered comments for compliance. The consultant M/s IRG System South Asia Pvt Ltd, New Delhi is to submit draft final report incorporating the compliance to the observations of Expert Appraisal Committee.

Environment Management Organization, CWC has initiated process of carrying out Cumulative Impact & carrying Capacity studies of Kameng and Dibang sub basins in Arunachal Pradesh.The finalized ToR's of both the basins were provided by Ministry of Environment and Forests (MoEF). The Proposal for awarding work for conducting Cumulative Impact & Carrying Capacity study of Kameng sub basin to M/s WAPCOS Ltd, Gurgaon was sent to MoWR for Administrative Approval which is still awaited.
For Dibang sub basin, Expression of Interest was published in the daily news paper on 02.02.2014 and short listing of consultants and Request for Proposal documents for the study are under finalization.

Appraisal of EIA reports.

Draft report on Comprehensive Environmental Impact Assessment Studies of Damanganga – Pinjal Link Project and the report on Dam break analysis of EIA studies of Par-Tapi-Narmada Link Project submitted by NWDA, Valsad have been examined and comments offered. The modified inception report of "Giri Medium Irrigation Project" and Inception report on "Krishnagiri Medium Irrigation Project" have been examined from an environmental angle and comments offered. The Inception report of Post Project Performance Evaluation study of Jayakwadi Stage-I was examined from environmental angle for techno- economic appraisal and offered comments. Dealt with various aspects of Standardization in the field of Environmental assessment, evaluation and management relevant to water resources projects Sectional Committee WRD-24 of Bureau of Indian Standards.

CHAPTER-XII

EXTERNAL ASSISTANCE

12.1 External Assistance for Development of Water Resources

External assistance flows to the country in various forms; as multilateral or bilateral aid, loan, grants and commodity aid from various foreign countries and other donor agencies. The main source of external assistance in irrigation sector has been the International Bank of Reconstruction and Development (IBRD) commonly known as the World Bank and its soft lending affiliate, the International Development Association (IDA). In addition to the World Bank, other funding agencies such as Japan Bank of International Cooperation (JBIC) and Asian Development Bank (ADB) have also been providing assistance for implementation of irrigation projects. The Ministry of Water Resources and its organizations assist the State Governments in tying up the external assistance from different funding agencies to fill up the resources gaps, both in terms of funds and technological update for rapid development of country's water resources.

12.1.1 Role of Central Water Commission

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

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

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

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

12.1.2 Techno- economic appraisal & clearance of projects

One major project proposed for World Bank funding, two major projects proposed for JBIC (JICA) assistance and one major project proposed for Asian Development Bank Assistance were under appraisal in CWC during 2012-13. Details of the project are given in table 12.1, 12.2 and 12.3.

Table 12.1

Major projects proposed for World Bank Assistance

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

Table 12.2

Projects proposed for JICA Assistance

SI.No.	Name of Project	Estimated cost (Rs. crore)
1.	AP Irrigation and Livelihood Improvement Project, Ph-II*	1154.86
2.	ERM proposal of Tawa Irrigation Project, M.P.	2366.00

Table 12.3

Major projects proposed for Asian Development Bank Assistance

SI.No.	Name of Project	Estimated cost (Rs. Crore)
1.	Karnataka Integrated and Sustainable Water Resources Management Investment Programme (KISWRMIP)-Tranche-I	118.75

12.2 World Bank Assistance

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

12.2.1 Water Sector Restructuring Projects

Water Sector Restructuring Project is the latest concept in water resources development and management and are the latest generation irrigation projects being financed by World Bank. Water Sector restructuring projects are planned with the objective to take care of water sector reforms, proper implementation of state water policy, creation of apex water institutions and strengthening of multi sector water resources and environment capacity. At present five such projects are being taken up with the assistance of the World Bank in the state of Rajasthan, Madhya Pradesh, Uttar Pradesh and Maharashtra and Andhra Pradesh.

The main objectives of WSRP are:-

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

12.2.2 Closed Credit/Loan Agreements

Out of 44 World Bank aided projects, 40 projects have been closed and the assistance utilized is as shown in Table 12.4

Table 12.4

Details of Closed Agreements

SI. No.	State	No. of Projects	Assistance in million US $	
			As per SAR	Utilised
1.	Andhra Pradesh	6	995.30	802.62
2.	Bihar	2	142.00	158.61
3.	Gujarat	7	921.50	805.82
4.	Haryana	3	519.00	505.98
5.	Karnataka	2	451.00 2	291.96
6.	Kerala	1	80.00	79.08
7.	Madhya Pradesh	2	360.00	318.18
8.	Maharashtra	4	453.00	480.75
9.	Orissa	5	544.90	457.55
10.	Punjab	2	294.00	290.06
11.	Rajasthan	1	**XDR 97.75 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	**40**	**5226.60+XDR 185.02M**	**4584.73+XDR 166.36 M**

12.2.3 On-going Credits / Loans Agreements

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

Table 12.5

External Assistance to Projects (World Bank)

S. No.	Name of Project	Credit No/Loan No.	Agency	Time Slice		Est. Cost (Rs.Million)		Assistance	
				Starting month	Closing month	Total as per SAR	Latest	Total	Utilized ending 03/14
1	2	3	4	5	6	7	8	9	10
1.	Maharashtra Water Sector Improvement Project	Ln4796-IN	IBRD	08-2005	3-2014	18595.58	18595.58	310.00 M, USD	290.77 M, USD
2.	Madhya Pradesh Water Sector Restructuring Project	Ln4750-IN	IBRD	11-2004	6-2015	20402.23	20402.23	387.40 M, USD	265.65 M, USD
3.	Andhra Pradesh Water Sector Improvement Project	LR7897-IN	IBRD	08-10	7-2016	44444	44444	450.60 M, USD	140.98 M, USD
4.	Uttar Pradesh Water Sector Restructuring Project Phase-II	5298-IN	IDA	10-2013	10-2020	-----	-----	239.4 M, XDR	6.13 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 (Rs. Million)	Total Assistance (M Yen)	Assistance utilized ending 03/13 (M yen)	Remarks
			Starting Date	Closing Date				
1.	Rengali Irrigation Project	ID-P-210	03/10		19583.4	3047	3047	-----
	Rengali Irrigation Project–(III)*	ID-P-210A	03/10	11/15		25.00	20.75	Ongoing
2.	AP Irrigation and Livelihood Improvement Project	IDP 181	3/07	07/16	11377	23974	9917.92	Ongoing
Total						27046	12985.67	

* 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 (Rs. Million)	Total Assistance (M Yen)	Assistance utilized ending 03/13 (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	12.14	On-going

CHAPTER-XIII

INTERNATIONAL COOPERATION WITH NEIGHBOURING COUNTRIES

13.1 Introduction

The three major river systems of India, namely, Ganga, Brahmaputra and Indus cross international borders. The Ministry of Water Resources (MoWR) is responsible for strengthening international co-operation on matters relating to these rivers by way of discussions with neighbouring countries concerning river waters, water resources development projects and operation of related international treaties.

13.2 Cooperation with Nepal

Most of the rivers, which cause floods in the States of UP and Bihar originate from Nepal. These rivers are Ghaghra, Sarda, Rapti, Gandak, Burhi Gandak, Bagmati, Kamla, Kosi and Mahananda. In order to make flood forecasting and advance warning in the flood plains of the above rivers, a scheme namely, "*Flood Forecasting and Warning system on rivers common to India and Nepal*" which includes 42 meteorological/ hydro-meteorological sites in Nepal and 18 hydrological sites in India has been in operation since 1989. The data collected is helpful for formulating the flood forecasts and issue of warnings in the lower catchments.

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

The JCWR has met 7 times so far and last meeting was held on 24-25 January, 2013.

The JSTC has met four times so far and the last meeting of Joint Standing Technical Committee (JSTC) was held on 12-13 September, 2013 at New Delhi in which all outstanding technical issues between the two countries were discussed.
JCWR headed by Water Resource Secretaries of both countries has been functioning with the mandate to act as an umbrella Committee for all committees and groups. In order to prevent spilling of flood waters from Lalbekeya, Bagmati, Khando and Kamla rivers from Nepal side into Bihar, India and Nepal have agreed to extend the embankments along these rivers. Financing of works in Nepal is done through Ministry of External Affairs and on the Indian side, through MoWR. In this connection, a Standing Committee on Embankment Construction (SCEC) has been constituted which is responsible for planning, design and construction of these embankments. In pursuance of the decision taken during the 4th meeting of the India-Nepal Joint JCWR held on 12-13 March, 2009 Joint Committee on Inundation and Flood Management (JCIFM) with Member(C), GFCC, Patna as Team Leader from India side was constituted replacing erstwhile bilateral committees namely, Standing Committee on Inundation Problem (SCIP), Standing Committee on Flood Forecasting (SCFF), High Level Technical Committee (HLTC), Sub Committee on Embankment Construction (SCEC), Joint Committee on Flood Management (JCFM). JCIFM implements the decisions of JSTC in inundation and flood management issues and address the issues related to flood management and inundation. It can form task group(s), if required. The JCIFM shall monitor the progress of works and provide guidance to task group(s) and report to JSTC. The JCIFM met Seven times and the last meeting was held on 19-24 March, 2013.

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

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

Field investigation studies and preparation of DPR for Sapta Kosi High Dam Multipurpose Project and Sun Kosi Storage-cum-Diversion Scheme have been taken up jointly by Govt. of India and HMG Nepal. A Joint Project Office (JPO) has been set up in Nepal for investigation of the projects. DPR stage design engineering for these projects is to be carried out by Central Water Commission. Preliminary studies of Sapta Kosi High Dam Multipurpose Project envisages construction of a 269 m high dam to divert river waters through a dam toe power house with an installed capacity of 3000 MW (at 50% load factor) and irrigation of 15.22 lakh ha. gross Command Area

through construction of a barrage, 1 km downstream of the dam. An additional capacity of 300 MW is further contemplated by construction of three canal type power houses along the canal system. Based on the preliminary studies carried out so far, four alternatives proposals for present study by JPO/SKSKI have been selected for Sun Kosi Storage-cum-Diversion Scheme. An optimal option amongst the four alternatives is required to be investigated in detail. CWC has furnished the investigation stage layout for power house related components and has also provided alternative barrage alignment.

MoWR vide its Order F.No. 16/7/2012-Ganga/3840-74 dated 03.10.2013 has conveyed Administrative approval and expenditure sanction of the revised cost estimate & extension of time for carrying out field investigations, studies and preparation of Detailed Project Report (DPR) of the SaptaKosi High Dam Multipurpose Project and Sun Kosi Storage-cum-Diversion Scheme (Nepal) jointly with Government of Nepal (GoN) at an estimated cost of Rs. 10477.63 lakh, with a time frame for completion of all works by 28th February 2015 as per the terms and condition stated in the aforesaid order.

The 14th meeting of the India-Nepal Joint Team of Experts on SaptaKosi high dam Multipurpose Project and Sun Kosi storage-cum-diversion scheme is proposed to be heldin the month of April - May, 2014 atNew Delhi to review the status of JPO-SKSKI works and finalise the modalities for completion of works within stipulated time.

II. Pancheshwar Multipurpose Project

A Treaty on Integrated Development of Mahakali (Sharda) River including Sharda Barrage, Tanakpur Barrage and Pancheshwar Multipurpose Project was signed between Government of India and Government of Nepal in February 1996, which came into force in June, 1997 (Mahakali Treaty). The Treaty is valid for a period of 75 years. Pancheshwar Multipurpose Project is the Central piece of Mahakali Treaty. Required field investigations for the Pancheshwar Multipurpose Project having an installed capacity of 5600 MW at Pancheshwar with irrigation and incidental flood control benefits and a re-regulating structure to primarily meet irrigation requirements downstream in Uttar Pradesh, have been completed. The Detailed Project Report (DPR) is to be finalized after mutually resolving the pending issues.During the 5 th meeting of JCWR held on 20-22 November, 2009 at Pokhara, Nepal, the Committee

finalized the TOR of Pancheshwar Development Authority (PDA) and discussed several issues pertaining to PDA. The Indian side again reiterated its request to the Nepalese side to provide sufficient security arrangements at all sites, so that the investigations may be resumed immediately. As per the finalized TOR of PDA, it was agreed that Chief Executive Officer (CEO) will be appointed from India or Nepal and the Headquarter of PDA would be located at Mahendranagar (Nepal).

During the 4th meeting of JSTC held on 12-13 September 2013 at Kathmandu (Nepal), it was informed by Government of Nepal that the concerned Clause 17 of ToR related to exemption of taxes and duties on various equipment and materials has been redrafted taking into consideration Government of India concerns and was reverted to Government of India for further response. A Note for consideration of Cabinet Committee on Security (CCS) for PDA is being finalized after incorporating and accommodating views/comments received from all concerned Ministries/ Departments.

In this context, MoWR has already written letter to MEA on 12.12.2013 for their comments on ToR of PDA. Government of Nepal vide their letter dated 31.12.2013 has also requested for expediting the approval of ToR of PDA. Recently Secretary, MoWR has requested Foreign Secretary, MEA and Revenue Secretary, MoF for early finalization of ToR of PDA.. It was also proposed to send a study team to the Pancheshwar and Rupaligad dam site in order to carry out necessary hydrological and geotechnical field studies. Nepalese side proposed two suspension bridges across the Mahakaliriver, the details of locations and specifications of these suspension bridges would be prepared by them and sent to Govt. of India for further action. The proposal for sending the study team is under process.

13.2 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, the Republic 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) –In accordance with India-China Joint Declaration of November, 2006, both sides have set up an Expert Level Mechanism to discuss interaction and cooperation on the provision of flood season hydrological data, emergency management and other issues regarding trans-border rivers.The Indian side of Joint Expert Level Mechanism (JELM) is headed by Commissioner (B&B), MoWR and Chief Engineer (FM), CWC is member of JELM. The JELM has so far met seven times. The last meeting (7th meeting) was held at Bejing on 14-18 May, 2013, wherein the draft of MoU for Brahmaputra was finalized which was signed on 20.05.2013 at New Delhi.

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

During the visit of the Chinese Premier to India in April, 2005, Memorandum of Understanding was signed for supply of hydrological information in respect of Sutlej River (LangqenZangbu) also in flood season. Chinese side is providing hydrological information in respect of their Tsada station on river Sutlej (LangqenZangbu) from the monsoon of 2007. Implementation Plan was signed in this regard during April, 2008. The MoU in respect of Sutlej river expired in April, 2010. During the visit of Hon'ble Prime Minister of China to India during December, 2010, a new MoU upon provision of hydrological information of Sutlej/LangqenZangboriver in flood season by China to India with a validity of five years has been signed with China on 16.12.2010.

The Implementation Plan containing technical details of provision of hydrological information, data transmission method and cost settlement in respect of the MoU on Sutlej was signed between the two countries during the 5th ELM held in April, 2011 at Beijing, China. The hydrological information during the flood season, 2013 was received in terms of the signed Implementation Plan.

13.3 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.

Under bilateral arrangements, India provides the flood data of Farakka & Sahibganjfor 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 Juriand 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 Bangladeshon continuous basis during the Monsoon of the year 2013.

13.4 Cooperation with Bhutan

A scheme titled "Comprehensive Scheme for Establishment of Hydro-meteorological and Flood Forecasting Network on rivers common to India and Bhutan" is in operation

since 1979. The network consists of 33 hydro-meteorological/ meteorological stations located in Bhutan maintained by Royal Government of Bhutan (RGoB) with funding from India. Central Water Commission utilizes the data received from these stations for formulating the flood forecast. A Joint Team of Experts (JTE) consisting of officials from the Government of India and Royal Government of Bhutan regularly reviews the progress and other requirements of the scheme.The 29th meeting of Joint Expert Team (JET) India and Bhutan on Comprehensive Scheme "Establishment of Hydrological and Flood Forecasting Network on River common to India and Bhutan " was held at Thimphu, Bhutan from 24-27 October, 2013.

The matter relating to problem of floods created by the rivers originating from Bhutan and coming to India was taken up with the Royal Government of Bhutan. A Joint Group of Experts (JGE) on Flood Management has been constituted between India and Bhutan to discuss and assess the probable causes and effects of the recurring floods and erosion in the southern foothills of Bhutan and adjoining plains in India and recommend appropriate and mutually acceptable remedial measures to both Governments. The India side of JGE is headed by Commissioner (B&B), MOWR.The JGE has meet 5 times so far and the 5th meeting was held 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 also constituted. JGE reconstituted JTT with Chief Engineer, CWC, Shillong as its team leader (Indian Side). The 1st meeting of reconstituted JTT was held in Bhutan on 13 -16 September' 2010. Thereafter, the 2nd meeting of JTT was held in India on 22-23 December' 2011. The 3rd (last) meeting of JTT was held on 5-6 February' 2013 at Phuentsholing, Bhutan.

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 Water Resources Information System (WRIS)

CWC & ISRO has jointly undertaken the work of development of web-enabled Water Resources Information System (WRIS) during 11th plan. The estimated cost of the project is Rs. 78.3164 crores. The MoU was signed between CWC and ISRO during the month of December 2008 and the project is to be completed in 4 yrs time period i.e. December 2012. The project comprises of 30 major GIS layers (viz. River network, basins, canal network, water bodies, hydro meterological network, administrative layers etc.) of the country at a scale of 1: 50000. The First full version of website of INDIA WRIS has been launched on 07 Dec, 2010 in New Delhi by Hon' ble Minister Water Resources. 2nd version INDIA WRIS was launched by Chairman, CWC on World Water Day i.e. 22nd Mar' 2012.

Further, the development of Information System is under progress and in continuation of above, following achievements have been made till March 2014.

i. River Basin Atlas of India was released by Hon'ble Minister of Water Resources on 01 Nov 2012.
ii. The updated version i.e 3rd version (that includes live telemetry data in respect of CWC hydrological stations, Mobile Application version 1.0 for Android platform, Climate Trend analysis, 2D-3D linked view) was launched by Hon'ble Minister of Water Resources on 04 Dec. 2012 at MoWR, SS Bhawan,New Delhi.
iii. All unclassified data of CWC G&D stations has been uploaded on WRIS website in July 2013 as per Hydro-meteorological data dissemination policy 2013.
iv. The final version (ver 4.0) has been launched in March, 2014.

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

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

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

India has a total geographical area of 329 Mha having an annual precipitation of 4000 BCM with wide temporal and spatial variation. From river basin point of view the country has been divided into 20 river basins. The collection of hydro-meteorological data for all the river basins in scientific manner is essential for various uses viz. planning and development of water resources projects, climate change studies, water availabilities studies, flood/inflow forecasting, solving of international & inter-state issues, morphological studies, inland waterway development, reservoir situation studies, research related activities, etc.

This activity is carried out by Central Water Commission, an attached office of Ministry of Water Resources. At present, CWC is operating a network of 954 hydrological observation stations (including 76 exclusive meteorological observation stations) in different river basins of the country to collect (i) Water Level (gauge), (ii) Discharge, (iii) Water Quality and (iv) Silt along with selected metrological parameters including snow observations at 27 key stations. The hydrological data collected from sites are scrutinized, validated and published in the form of Water Year Book, Water Quality Year Book and Sediment Year Book, etc by CWC.

During the year 2013-14, hydro-meteorological data from all 954 sites have been observed and 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 equipment in the laboratories. Also monitoring of glacial lakes/Water bodies in Himalayan Region have been undertaken and model for snowmelt runoff forecasting has been developed through collaboration of NRSC, Hyderabad.

14.3 Coastal Management Information System (CMIS):

For proper coastal protection, understanding of various coastal processes and causes of erosion vast set of data on sediment transport, wave, tides, bathymetry, geological data, satellite imageries etc. is required to analyse the problem. Hence, there is a need for comprehensive Coastal Management Information System (CMIS) with all consolidated coastal data on national level, including updated shoreline, effects of

climate changes, already protected areas, vulnerable areas, geological /geo-morphologic characteristics.

The Coastal Protection and Development Advisory Committee (CPDAC) (erstwhile Beach Erosion Board) provides a common platform to all maritime States/UTs to discuss and solve their coastal erosion problems.

The 14th CPDAC meeting was held in Goa during 27-28th Feb, 2014. Important decisions/actions taken during the meeting were in relation to:

a. Acceptance of new coastline length for maritime States/UTs as computed by National Hydro graphic Office (NHO), Dehradun
b. Acceptance for publication of Shoreline Change Atlas of Indian Coast based on the satellite data of two time-frames i.e. 1989-91 and 2004-06 along with the protection measures undertaken, prepared by Space Application Centre (SAC), Ahmedabad with Central Water Commission
c. Preparation of Inventory of coastal data being collected by various agencies
d. Timeline for completion of updating of manual namely "Protection and Control of Coastal Erosion in India" by NIO, Goa
e. Amendments to composition of the Committee
f. Timeline for completion of "Status Report on Coastal Protection and Development in India"

Earlier to above, the inter-departmental Expert Team of Coastal Protection & Development Advisory Committee (CPDAC) under leader-ship of Chief Engineer (Flood Management), CWC visited the Lakshadweep Islands during 16-20th April, 2013 in connection with Anti-Sea Erosion Measures in Lakshadweep Islands and submitted its report including recommendations to Lakshadweep Administration. The recommendations of expert team inter-alia includes review of existing design parameters for protection works, development of proper maintenance protocol for existing protection structures, better co-ordination for construction activities in coastal zone, piloting of offshore structures for coastal protection etc.

In addition to above, the 1st meeting of Sub-Committee of Coastal Protection & Development Advisory Committee (CPDAC) on Coastal Data Collection, Compilation and Publication was held under chairman-ship of Chief Engineer (FM), CWC on 7th October, 2013 at CWC- HQ, New Delhi to discuss various issues on Coastal Data Collection. The sub-committee discussed and finalized the list of parameters,

frequency, methodology & schedule of observations for coastal data to be collected and format for compilation of selected parameters.

Besides, under ADB aided Sustainable Coastal Protection and Management Project, two projects namely Ullal Coastal Erosion & Inlet Improvement Project in Karnataka and Mirya Bay Coastal Erosion and Protection project in Maharashtra are under implementation.

14.4 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 data base 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.

14.5 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.

14.6 Computerisation Activities in CWC

Software Management Directorate of CWC is operating the Plan Scheme Component "Data bank & Information System-software management in CWC" outlay of Rs. 20 Crore which is part of plan Scheme "Development of Water Resources Information System" (DWRIS) for XII Plan" approved with total cost of Rs 1370 Crore.

In the course of operation of the plan scheme, SMD has procured hardware, software and networking items. It has also provided for maintenance of IT items at CWC Head Quarter. In the financial year 2013-14 training for various software like Abaqus and Mike-II were arranged.

Development of new web based application for tenders and circulars have been taken up. Process for implementation of e-procurement in entire CWC is ongoing. In the financial year 2013-14 payment of pending bills for 247 numbers upgraded computers and ARC GIS was made. During the year 2013-14 up to March 2014, the expenditure was Rs. 2.24 Crores.

CHAPTER-XV

TRAINING

15.1 Training

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

15.2 National Water Academy

National Water Academy is imparting training to in-service engineers from Central and State Organizations in various aspects of water resources development planning and management and also developing institutional capabilities at the national level for imparting training in new and emerging fields in water resources sector on continued basis.

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

NWA conducts long term as well as short-term training courses on regular basis and also holds national level seminars and workshops on the emerging technical areas in the field of water resources development and management. In addition, the academy is one of the nodal agencies for conducting training programmes under World Bank aided Hydrology Project. Induction training to Assistant Directors recruited through UPSC (CWES-Gr A) and for newly promoted Asstt. Directors of CWC are also conducted by National Water Academy at Pune.

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 Organization (WMO).

During the year 2013-14, As against RFD target of 32 programs, 37 number of training programmes including Workshop/Seminar have been conducted. This include regular training programs of NWA, programs conducted under Hydrology Project-II, programs conducted in association with World Meteorological Organisation, programs sponsored by ISRO etc. During the year 877 number of officers from various states/central Govt. organizations, PSUs were trained.

15.2.1 Initiatives during the year 2013-14

In the year 2013-14, NWA took initiatives in conducting the following new programs apart from the regular training programs.

i) The Induction Training Program for newly appointed Assistant Directors is now of one year's duration which includes 9 months training at NWA and 3 months field attachment. Many new modules like MIKE-11, Mike Hydro, Water Resources Assessment etc. were added.

ii) Training Program on eWater Sources was conducted at NWA during 18-29 November 2013. This was the first of its kind program. 24 participants from various organizations attended this program.

iii) Training Program on Water Law was conducted at NWA during 27-29 November 2013. Various legal aspects related to water resources sector were covered during this program. 18 officers from various organizations attended this program.

iv) Training Program on "Digital Surface Modelling & Watershed Modelling" and "Project Monitoring using open Source GIS" were conducted at NWA during 02-13 December 2013. These programs were also first of its kind.

v) NWA conducted first International Distance Learning Program on "Basics of Hydrological Sciences" in association with World Meteorological Organisation (WMO) during 8th July to 23rd August 2013. 43 officers from 14 Asian countries participated in this training program.

vi) The third Training of Trainers Program under National Water Mission on "Increasing Water Use Efficiency in Irrigation Sector" was conducted by National Water Academy, Pune jointly with WALAMTARI at Hyderabad during 17-21 June 2013. The program was attended by 28 participants drawn from the State of Andhra Pradesh of the level of Superintending Engineer, Executive Engineer, Deputy Executive Engineer etc.

vii) The Fourth Training of Trainers Program under National Water Mission on "Increasing Water Use Efficiency in Irrigation Sector" was conducted by National Water Academy, Pune jointly with Haryana Irrigation Management Institute (HIRMI) at Kurukshetra during 10-14 March 2014. The program was attended by 28 participants drawn from Haryana State of the level of Superintending Engineer, Executive Engineer, Deputy Executive Engineer etc. This program was concluded with an open house discussion wherein NWA and HIMRI faculty participated and several issues pertaining to Water Use Efficiency emerged. This event was covered by various local newspapers.

viii) As an initiative of capacity building in the state, a training program on "Basin Water Yield Using Geo-Spatial tools Studies" was conducted for Kerala Government officers at Thiruvananthpuram during 29-31 July 2013.

ix) A special 3 day off-campus training program on "Preparation of Detailed Project Report for ERM of Irrigation Projects" for the officers of Govt. of Tamil Nadu was conducted at IMTI, Trichi during 26-28 August 2013. This program was also first of its kind. 20 officers participated in this program.

x) In view of the importance of the Pumped Storage Scheme in supplying clean and reliable peak power, a training program on "Pumped Storage Hydroelectric Projects" was organized at NWA during 27-31 January 2014. 36 officers from various organizations participated in this program. This program was first ofits kind conducted by NWA.

xi) On the request of Ministry of Water Resources a special 4 day module was developed for enhancing the domain knowledge of officers of MoWR, two programs on "Overview of Water Resources Sector for officers of MoWR" were conducted at NWA during 26-29 June 2013 and 10-13 September 2013 respectively.

15.2.2 Other Important Activities

i. A half day training workshop on "Water Conservation Year -2013" was organized at NWA on 14th June 2013.

ii. The NWA celebrated 25 years of its academic excellence on Wednesday, 10 July 2013 at Khadakwasla, Pune. Hon'ble Union Minister of Water ResourcesShri Harish Rawat was the Chief Guest of the function. A souvenir depicting the journey of growth of NWA was released at the hands of Hon'ble Union Minister of Water Resources.

iii. As a part of Water Conservation Year – 2013 and Silver Jubilee function, a half-a-day Conference in the afternoon on the topic of "Water Conservation" was organized by the Academy on 10 July 2013. Dr C D Thatte, Former Secretary to the Government of India delivered the key-note address

iv. 2 day workshop on "Reviewing performance of Telemetry and Flood Forecasting Models" was held at NWA during 6-7 January 2014. The workshop had participation of SE/EE working level officers from all field offices/ HQ of CWC. Further, a training on e-SWIS (e-SWDES and FF Modules) was organized during 8-10 January 2014 for these officers.

15.2.3 Activities for North Eastern Regions

NWA Off-campus training program on "Increasing Water Use Efficiency (WUE) under National Water Mission" was conducted at NERIWALM, Tezpur during 20-24 May 2013 specifically for the officers of North Eastern States. The Program had participation of 33 officers from 6 North Eastern State.

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. During the year 2013-14, the Advisory Board meeting was held on 9th October 2013. In this meeting, training calendar of 2013-14 was

reviewed and important decisions were taken regarding re-designation of Chief Engineer, NWA, reconstitution of Advisory Board, training in non-technical area etc.

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. Programs scheduled during 1st quarter of 2014-15
vi. Issues of technological up gradation of core faculty of NWA.

15.2.6 Infrastructure Development during the year 2013-14

i. Construction of two lecture halls in the Office Annexe Building and extension of new Krishna Hostel have been completed in the year 2013-14. Furnishing of these newly constructed buildings is also almost complete. This required the staff to work beyond office hours.

ii. Construction of Jogging Track - The work of extension of boundary wall and horticulture development around jogging track was also completed during the year. All these activities were undertaken and completed on time.

Various training courses, workshops and seminars organized by Training unit of CWC and by NWA, Pune during 2013-14 are given at **Annexure -15.1**&**Annexure -15.2** respectively.

CHAPTER-XVI

VIGILANCE

16.1 Disciplinary Cases

The Vigilance/Disciplinary cases and complaints received against officers & staffs of CWC were given proper and prompt attention. During the year 2013-14, 6 complaints were received and 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:

S. No.	Particulars	Category of officers/staff			
		Gr. A	Gr. B	Gr. C (LDC/UDC)	Gr. D (MTS)
a)	No. of cases pending at the beginning of the year	25	19	11	5
b)	No. of cases added during the year	4	1	1	0
c)	No. of cases disposed of during the year	14	1	0	0
d)	No. of cases pending at the end of the year (a+b-c)	15	19	12	5

Out of the above, 9 cases have been forwarded to MOWR. Vigilance Awareness Week was observed at CWC headquarters from 28th October to 2nd November, 2013.

CHAPTER-XVII

REPRESENTATION OF CENTRAL WATER COMMISSION IN VARIOUS COMMITTEES

17.1 Committees Represented by CWC Officers

Chairman, Central Water Commission and Members represent CWC in Technical Committees of various Organisations either as the Chairman or as a Member. List of various Committees on which Chairman, CWC and Member (D&R), CWC represent are given below:

Sl. No.	Name of Committees/Boards/Panel of Experts/Technical Groups etc.	Representation of CWC	
		Officer	Position in the Committee
1	2	3	4
1.	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
7.	Indian National Committee on Hydrology (INCOH)	Chairman, CWC	Chairman
8.	Governing Body of National Institute of Hydrology	Chairman,	Member

		CWC	
9.	Technical Advisory Committee of National Institute of Hydrology.	Chairman, CWC Member(D&R)	***Chairman*** Member
10.	Executive Committee of Bansagar Control Board	Chairman, CWC	Chairman
11.	Executive Committee of Betwa River Board	Chairman, CWC	Chairman
12.	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
13.	Committee of Technical Experts of Bhakra Beas Management Board (BBMB)	Chairman, CWC	Chairman
14.	Board of Consultants of Ranjit Sagar Dam	Chairman, CWC	Member
15.	Committee of International Commission on large dams, India (INCOLD)	Member (D&R)	Member
16.	Governing Council for Central Soil & Materials Research Station.	Chairman, CWC Member (D&R)	Member Member
17.	Governing Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
18.	General Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member
19.	Research Advisory Committee (RAC) of National Council for Cement and Building Materials.	Member (D&R)	Member
20.	Board of Consultants to inspect Koyna Dam and its appurtenant works and generating equipment / machinery including Koyna Power House	Member (D&R)	Member
21.	National Committee on Seismic Design Parameters of River Valley Projects (NCSDP)	Member (D&R)	Chairman
22.	Standing Advisory Committee(SAC) for R&D Programme	Member (D&R)	Chairman
23.	National Level Steering Committee (NLSC) for Dam Rehabilitation and Improvement Project (DRIP)	Member (D&R)	Member
24.	Technical Committee (TC) for Dam Rehabilitation and Improvement Project (DRIP)	Member(D&R)	Chairman

25.	World Meteorological Organization	Member (D&R)	Principal Representative
26.	Committee to assess Quantum on Excess Ravi Water Flowing Across International Border and suggest its diversion	Member (D&R)	Chairman
27.	Sectional Committee of BIS, WRD-15	Member (D&R)	Chairman
28.	Board of Directors of Tehri Hydro Development Corporation	Member (D&R)	Part Time Director
29.	Technical Advisory Committee of the Farakka Barrage Project.	Member (D&R)	Chairman
30.	Technical Co-ordination Committee (TCC) for Tala HE Project, Bhutan.	Member (D&R)	***Co-Chairman***
31.	Farakka Barrage Project Advisory Committee	Member (D&R)	Co-Chairman
32.	Board meeting of Tala H.E. Project Authority (THPA)	Member (D&R)	Special Invitee
33.	Board meeting of Punatsangchhu-I H.E. Project Authority (PHPA)	Member (D&R)	Permanent Invitee
34.	Technical Coordination Committee (TCC) for Punatsangchhu - I H.E Project, Bhutan	Member (D&R)	Co-Chairman
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
38.	Committee for monitoring structural aspects of proposed Tipaimukh Multipurpose Project	Member (D&R)	Chairman
39.	Tender Committee of Farakka Barrage Project	Member (D&R)	Chairman
40.	Expert Group for finalization of Specifications for relining of Rajasthan and Sirhind Feeder	Member (D&R)	Chairman

17.2 Activities of Some Important Committees for R&D

17.2.1 Indian National Committee on Surface Water (INCSW)

The Indian National Committee on Surface Water (INCSW) is recently constituted by 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 12 members representing MoWR/CWC, CSMRS, CWPRS, NIH, DST, and Min.ofAgr. 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 2013-14:

- Presently, over 75 research schemes are under progress. Out of these, Service requests from PIs of 29 ongoing Research schemes were processed and sent to MoWR for release of funds. Service requests of balance schemes are under process.
- Preliminary examination of 24 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.

17.2.2 Indian National Committee on Ground Water (INCGW)

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

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

17.3 Activities of Some Other Important Committees

17.3.1 Technical Advisory Committee of NIH

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

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

39th meeting of Working Group of NIH was held on 21st& 22nd October, 2013 at NIH Roorkee.

The 66th meeting of TAC was held on 29.07.2013 at New Delhi.

17.3.2 Technical Advisory Committee of Farakka Barrage Project

TAC of Farakka Barrage Project is headed by Member (D&R), CWC, which generally meets once every year and takes decisions about various works to be executed for efficient and safe functioning of the project. Various problems, special studies and related design work were referred to D&R wing from time to time. Member (D&R) held discussions with the Farakka Barrage Project authorities from time to time and chaired the Technical Advisory Committee meeting of Farakka Barrage Project. The jurisdiction of Farakka Barrage Project has also been extended 40 Km on upstream and 80 Km on downstream of Farakka Barrage for carrying out the erosion protection works of River Ganga. The emergent TAC meeting of Farakka Barrage Project headed by Chairman, TAC of FBP & Member, D&R, CWC was held on 28.07.2013 at Farakka (W.B.).109TH meeting of TAC of FBP was held from 19th to 21th December 2013 at Farakka, West Bangal.

17.3.3 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 29th meeting of STAC was held on 18.04.2013 at New Delhi under the Chairmanship of Member (D&R), CWC.

17.4 Association with Bureau of India Standards (BIS)

Central Water Commission being an apex technical body in the water resources sector, has been playing an important role in the formulation of standards in the field of Water Resources Development & 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 16 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 and Director (FE&SA) is Nodal Director for related works, the approval of draft codes for adoption and printing/approval of amendments to IS Codes are processed in FE&SA Dte. and approval of Chairman is communicated to BIS.

(a) In 2013-14, 3 draft standards and 6 amendments to IS Codes have been approved by the Chairman, CWC for adoption and printing.

(b) 16th Meeting of WRDC held on 28.06.2013.

(c) 16th Meeting of WRD – *05 "Geological Investigation and Sub-Surface exploration"* held on 27.09.2013.

17.5 Formulation of ISO STANDARDS

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

1. ISO/FDIS 772: Hydrometry – Vocabulary & Symbols,

2. ISO/DIS 6421: Hydrometry – Methods for assessment of reservoir sedimentation,

3. ISO/DIS 4377: Hydrometric determination – Flow measurement in open channels using structures flat V-weirs,

4. ISO/TR 9212:2006 Hydrometry – Measurement of liquid flow in open channel – Methods of measurement of bed load discharge, and

5. ISO/DIS 1100-1: Hydrometry- Measurement of liquid flow in open channels- Guideline for selection, establishment and operation of gauging station etc.

17.6 International Commission on Irrigation and Drainage

International Commission on Irrigation and Drainage (ICID) is a non-governmental organisation with representation from more than 80 countries, with headquarters at New Delhi. India is one of the founding Members of the ICID. The mission of the ICID is to stimulate and promote the development of arts, science, techniques of engineering, agriculture, economics, ecology and social sciences in managing irrigation, drainage, flood control and river training applications including research and development and capacity building, adopting comprehensive projects and promote state-of-the-art techniques for sustainable agriculture in the world. CWC is associated with various activities of ICID.

17.7 World Water Council

The World Water Council (WWC) is an International Organisation, which makes and approves the Policy on water. The CWC is a Member of this organisation. A 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 2660 numbers composed pages and 1, 06,121 numbers of copies of various Publications/forms were printed during the year. The press also carried out binding/trimming works for Publications and Reports etc. which were completed during the period from 01.04.2013 to 31.03.2014. Some of the noteworthy and important Publications relating to Water Resources and administrative aspects of Central Water Commission which were brought out during the above period are mentioned below :

Sl. No.	Name of the Job	Nodal Agency	No. of composed pages	No. of copies
1.	Annual Report Hindi 2011-2012	TC Dte.	126	50
2.	Printing of APAR forms in respect of Director and Chief Engineer	Estt. I	16x400 =6400	400
3.	Annual Draft Report of Betwa River Board, Jhansi	Control Board	87	1
4.	Printing of Functions of CWC (Book)	O & M	236	50
5.	Summary Record of the Fourteenth Meeting of the National Water Board of NWRC	NWP Dte.	40	150
6.	Bhagirath (Hindi) Oct--Dec. 2012	Bhagirath (Hindi Section)	60	2300
7.	Printing of Report on Employment Generation in Major & Medium Irrigation Project during Operation & Maintenance	P&M Dte.	159	300

8.	Printing of Legal Instruments on Rivers in India (Volume-II)	ISM Dte.	128	100
9.	Bhagirath (English) July-Dec. 2012	Bhagirath Eng. Section	Approx. 64	2300
10.	Bhagirath (Hindi) January-June. 2013	Bhagirath (Hindi Section)	68+4	2300
11.	Printing of APAR for Central Water Engineering Group 'A' Officers	Estt. II	16	1000
12.	Printing of APAR for Central Water Engineering Group 'A' Officers	Estt. III	16	1000
13.	Printing of Book Powers available to CWC Officers	O&M Dte.	231	50
14.	Printing of Seniority List of LDC as on 01.01.2014	Estt. VII	05	750
15.	Binding of two Books • Comprehensive Plan of flood Management for Ganga Sub-Basin. • Comprehensive Plan of Flood Control for the Ganga Sub-Basin.	P&D	1050	2
16.	Summary Record of Discussions for Meetings of Yamuna Standing Committee	FM-1	517	100
17.	Bhagirath (Hindi) July-September 2013	Bhagirath (Hindi Section)	56+4	2300
18.	Printing of CWC Annual Report (English) 2012-13	T.C. Dte.	162	250
19.	Printing of the Guidelines for Computing Water Use Efficiency (WUE)	IPO Dte.	32	100
20.	Summary Record of Discussions for Meetings of Yamuna Standing Committee	FM-1	517	100
21.	Printing of the Guidelines for Computing	IPO Dte.	32	100

	Water Use Efficiency (WUE)			
22.	Printing & Binding of Compilation of data regarding Major & Medium Water Resources Project	EM Dte.	291	50

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 December 2013' 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
- 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. Hand Book on Water Related Information:

The annual publication titled 'Hand Book on Water Related Information January 2014' 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
- State Wise Water Rate for Flow Irrigation and Lift Irrigation

iii. 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 2014 containing data up to 2011-12 is in progress and will be up-loaded on the website of CWC on its finalization.

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

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

The present publication was uploaded on CWC website on 12.06.2013.This publication contains the following information for the period from 1998-99 to 2010-11 at State and UT level.

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

18.2 Journals

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

18.3 Azo Prints

Nearly 3773 number of Azo prints were developed from the tracings of drawings / documents pertaining to various Directorates of CWC / MOWR at Ferro-printing Units of T.D. Directorate.

18.4 Publicity and Mass Awareness

- As per Media Plan 2012-13 of Ministry of Water Resources, CWC participated in the 12 issues of CWC Administrative News Bulletin were brought out on monthly basis to cover period from April, 2013to March, 2014.
- Bhagirathi (English) Journal up to April-June 2012 were printed.
- Bhagirathi (Hindi) Journal up to Jan-June 2013 were printed.
- New papers clipping on Water Resources Development were prepared from 16- Newspaper and periodicals for perusal of Chairman & Members CWC.

- **C**o-coordination of the works of Information, Education & Communication (IEC) activities during 2013-14 and for activities for observance of Water Conservation Year-2013..

The following Activities were undertake in CWC for observance of Water Conservation Year 2013:

- Banners/Posters showing popular slogans on water conservation were displayed.
- Pamphlets on Water Conservation were distributed.
- Massages on water conservation were displayed on electronic media at prominent places.
- Presentations on water conservation have been conducted.
- Live telecast on Doordarshan Channel on Water conservation activities of MoWR was delivered.
- Video shows on Water Conservation were conducted.
- 'Pad Yatra' were conducted on Water conservation at different places.
- Mass awareness programmes were organized at different places.
- Cultural programmes by folk artists were conducted.
- Workshops on special Awareness campaign were organized.
- Seminars were conducted on Water conservation.
- A Conference on Water conservation was held at NWA Pune.
- Drawing & Painting competition and Essay competitions on Water conservation were conducted for school children
- Debate competitions on Water conservation were organized for school children.

Annexure – 5.1

List of Active Consultancy Projects in D&R Wing during the Year 2013-14

Sl. No.	State/ name of projects	Sl. No.	State/ name of projects
Andaman & Nicobar Islands		**Manipur**	
1	Kamsarath Water Supply Scheme (Const.)	38	Dholaithabi barrage Project (Const.)
Andhra Pradesh		39	Khuga M.P Project(Const.)
2	Indira Sagar (Polavaram) Project (Const.)	40	Thoubal M.P. Project (Const.)
Arunachal Pradesh		41	Ganol HE Project (Const.)
3	Jiadhal M.P. Project (DPR)	**Meghalaya**	
4	Nao Dehing HE Project(DPR)	42	New Umtru H.E. Project (Const.)
5	Kameng HE Project (Const.)	43	Kulsi HE Project(DPR)
Assam		44	Killing Dam Project(DPR)
6	Amjur Drainage Development Scheme (Const.)	**Mizoram**	
7	Barbhag Drainage Development Scheme(Const.)	45	Tuichyang HE Project (DPR)
8	Rukini Irrigation Project (Hyd)	46	Tuipui HE Project(DPR)
9	Sonai Irrigation Project (Hyd)	47	Tuirial HE Project (Const.)
Bihar		**NPCIL(A.P & Gujarat)**	
10	Durgawati Reservoir Project (Const.)	48	Estimation of design flood and safe elevation of Nuclear Power Station (Hyd)
Goa		**Orissa**	
11	Opa Barrage Project (Const.)	49	Anandpur Barrage Project (Const.)
Gujarat		50	Rangali Right Canal in Brahmani Left Basin (DPR)
12	Garudeshwar Weir Project (Const.)	51	Chheligada Irrigation Project (DPR)
Himachal Pradesh		**Uttar Pradesh**	
13	Rampur H. E. Project (Const.)	52	Arjun Sahayak Pariyojna (Const.)
14	Pong Dam (Hyd)	**Uttarakhand**	
15	Thana Plavan HEP (DPR)	53	Koteshwar HEP (Const)
16	Pandoh Dam (Hyd)	54	Loharinag Pala & Tapovan Vishnugad Project - NTPC (Const.)
Jammu & Kashmir		55	Lakhwar Multi Purpose Project (Const.)
17	Ujh Multipurpose Project (DPR)	**Rajasthan**	
18	Kirthai II HE Project (Hyd)	56	Lhasi Medium irrigation project (Const)

Jharkhand		57	Kalisindh Dam Project (Const)
19	Kharkai Barrage Project (Const.)	58	Gararda Dam Project
20	Icha Dam Under Subernrekha (Const)	59	Khetri Copper Tailing Dam (Const.)
21	Kanhar Irrigation Project (Hyd)	**Punjab**	
Madhya Pradesh		60	Review of Design flood of Bhakra. (Hyd)
22	Lower Goi Project (Const.)	**Sikkim**	
23	Bargi Diversion Project (Const.)	61	Stntaley HE Project(DPR)
24	Rani Avantibai Lodhi Sagar Project (Const)	62	Kalezkhola HE Project(DPR)
25	Jobat Project. (Const.)	**West Bengal**	
26	Pench Diversion storage Project (Const.)	63	Turga Pumped Storage (Const.)
27	Pench Valley Project (Const.)	64	Farakka Barrage Project.
28	Gulab Sagr (Mahan) project (Const.)	65	purulia Pumped Storage Extension Project
29	Ken Betwa Link Project Phase-II (DPR)	**Gujarat & Maharashtra**	
30	Bansujara Project	66	Par-Tapi-Narmada link Project (DPR)
31	Saheed Bhima Nayak Sagar (Const.)	67	Damanganga - Pinjal link Project (Const.)
32	Raghavpur – Rosara – Basania (RRB) Multi-purpose Project (DPR)	**Projects for General Consultancy**	
33	Man Project(Const.)	68	Vetting of design under ranking studies for 50,000 MW HE Projects in the country identified by CEA
34	Mohanpura Project (Const.)		
35	Chinki Multipurpose Project (Const.)		
36	Halon Irrigation Project (Const.)		
37	Bansagar Dam Project (DPR)		
Sp. Problem Projects			
Andhra Pradesh			
1	Srisailam Left Bank H. E. Project (Const.)		
Rajasthan			
2	Garadha Earth Dam (EMB)		
Uttrakhand			
3	Loharinag Pala HEP (600 MW) (completed)		
4	Koteshwar HEP (400 MW)		
Foreign Projects			
Afghanistan			

1	Salma Dam Project(Const.)		
Bhutan			
2	Punatsangchu Stage-I HE Project (Const.)		
3	Punatsangchu Stage-II H.E. Project (Const.)		
Nepal			
4	Sapta Kosi & Sunkosi Multipurpose Project (DPR)		
5	Kamla Dam (Hyd)		

Annexure-7.1

List of the projects accepted by the Advisory Committee during 2013-14

Sl. No.	Project Name	Name of the State	Major/ Medium	Est. Cost Rs. crore	Irrigation Benefits in ha
1	Dhansiri Irrigation Project	Assam	Major - Revised	567.05 (PL-2011-12)	83366
2	Singda Multipurpose Project	Manipur	Medium-ERM	34.62 (PL-2011-12)	3000
3	Lift Canal system of Upper Indravati Irrigation Project	odisha	Major - New	986.71 (PL-2012-13)	43047
4	Lower Indra Irrigation Project	odisha	Major - Revised	1624.49 (PL-2012-13)	38870
5	Ret Medium Irrigation Project	odisha	Medium - Revised	433.39 (PL-2012)	9775
6	Parwan Irrigation cum drinking water supply scheme	Rajasthan	Major - New	2435.93 (PL-2011-12)	99864
7	ERM of Narayanpur Left Bank Canal System, Karnataka	Karnataka	Major-ERM	3752.18 (PL-2012-13)	408703 (Restoration 142580)
8	Upper Tunga Project	Karnataka	Major-New	2561.88 (PL-2012-13)	94,698
9	Rukura Medium Irrigation Project	Odisha	Medium-Revised	256.09 (2013)	5,750
10	Loktak Lift Irrigation Scheme	Manipur	Major-ERM	25.56 (2011)	24000 (Restoration 12600)
11	Mahi Irrigation Project	Madhya Pradesh	Major-Revised	834.24 (2009)	28,127
12	Karanja Irrigation Project	Karnataka	Major-Revised	635.18 (2012-13)	29,227
13	Kanupur Irrigation Project	Odisha	Major-Revised	1801.25 (2013)	47,709
14	Rengali Irrigation Sub Project - Right Bank Canal	Odisha	Major-Revised	1962.33 (2013)	1,43,490
15	Subarnarekha Irrigation Project	Odisha	Major-Revised	5561.57 (2013-14)	1,87,462
16	Thoubal Multipurpose Project	Manipur	Major-Revised	1694.27 (2011)	35,160

17	Karnataka Integrated and sustainable Water Resources Management Investment Program (KISWRMIP), Tranche-1	Karnataka	Medium ERM	118.75 (2012-13)	7,500

Annexure-7.2

List of the Flood Control schemes accepted by the Advisory Committee During 2013-14

Sl. No.	Project Name	Name of the State	Est. Cost Rs. crore	Flood Protection
1	Scheme for Extension of Embankment from Manoubar to Phuhia with protection work at vulnerable points and brick Soling Road on top of embankment in between 96.50 km to 110.48 km of Right Kamla Balan embankment in Darbhanga, Saharsa and Samastipur Districts in Bihar.	Bihar	56.65 (PL-Oct,2012)	Area = 0.46 lakh ha Population =225000
2	Bagmati Flood Management Scheme Phase-IV (a)	Bihar	73.45 (PL-Oct,2012)	Area = 4.39 lakh ha Population =340000
3	Anti-Erosion work for Restoration of Spur No.2,3,4,5 & 7: Boulder Revetment at toe of embankment in upstream and downstream of Spur No.6 in a length of 800m with 4 Nos. additional Spur in Ismailpur - Bindtoli Embankment on left bank of river Ganga.	Bihar	38.83 (PL-Oct,2012)	Area = 42428 ha. Population =200000
4	Bagaha Town Protection scheme (Phase-II) on the left bank of river Gandak in West Champaran district of Bihar	Bihar	59.46 (PL-Oct,2012)	Area = 2500 ha. Population =100000
5	Project for construction of studs and marginal bund for protection of population and agricultural land of villages situated at Banks of river Ganga in District Haridwar	Uttarakhand	34.85 (PL-2012-13)	Area = 4344 ha. Population =12360
6	Swan River Flood Management Project from Daulatpur bridge to Gagret bridge in main	Himachal Pradesh	922.485 (PL-	Area = 7163.49 ha. Population

	Swan river & all tributories joining main Swan river from Gagret bridge to Santokhgarh bridge		March,2013)	=235834
7	Project for Channelisation of Chhounchh Khad in Tehsil Indora, District Kangra, Himachal Pradesh	Himachal Pradesh	179.59 (PL-March,2013)	Area = 1740.30 ha. Population =8175
8	Flood Management of River Dikrong along with river training works on both banks Embankment in Lakhimpur Districts of Assam.	Assam	105.96 (PL-2011-12)	Area = 9998 ha. Population =210700
9	Flood Management of river Ranganadi along with River Training works on both bank embankments in Lakhimpur District (Assam)	Assam	361.42 (PL-2011-12)	Area = 21056 ha. Population =398275
10	Flood Protection works to be executed along Indo Pak border on river Ravi & it's tributary Ujh, to check land erosion for the safety of village Abadies, border fencing and other defense installations	Punjab	161.05 (PL-Dec,2011)	Area = 55597 ha. Population =18000
11	Proposed Flood Protection works along left bank of river Yamuna in district Baghpat and Ghaziabad	Uttar Pradesh	44.89 (PL-Nov,2012)	Area = 5600 ha. Population =120000
12	Anti-Erosion Work along the bank of river Haura for protection of vulnerable locations from Chapaknagr to Baldakhal under Sadar Sub-Division of West Tripura District	Tripura	42.96 (PL-2011)	Area = 1959 ha. Population =18337
13	Anti- Erosion Work along the bank of river Khowai for protection of vulnerable locations from Netajinagar (Brahma Cherra) to Banglahour under Teliamura Sub Division and from South L.N.Pur to Paharmura Bridge under Khowai Sub Division of West Tripura District.	Tripura	91.02 (PL-2011)	Area = 4256 ha. Population =38693
14	Anti- Erosion Work along the bank of river Gumti for protection of vulnerable locations from Dalak Samatal Para to Durgapur under Amarpur, Udaipur and Sonamura Sub Division of South Tripura & West Tripura District	Tripura	54.99 (PL-2011)	Area = 2209 ha. Population =25326
15	Flood Protection Scheme to Protect Villages,	Uttarakhand	31.21	Area= 500 ha,

	Canals and Roads from River Koshi in Betal ghat Block, District Nainital		(2011-12)	Population-10,000
16	Project for Flood Protection Work along River Song and its Tributaries from D/S of the Confluence of River Jakhan and River Song upto Ganga river in Doiwala Block of District Dehradun	Uttarakhand	34.26 (2012-13)	Area = 181.3 ha, Population-4725
17	Project Report for River Jakhan from village Rani Pokhari to Confluence with Song River in Doiwala Block of District Dehradun	Uttarakhand	33.95 (2012-13)	Area = 229.50 ha, Population-4725
18	Flood Protection Work of Bindal River from Cantt. Road to Mothronwala in District Dehradun	Uttarakhand	46.4216 (2012-13)	Area = 57.55 ha, Population-25,000
19	Project for Flood Protection Work along Suswa River in Doiwala Block of District Dehradun	Uttarakhand	98.00 (2012-13)	Area = 1865 ha, People-40,000

Annexure-7.3

Present status of projects declared as National Projects

S. No.	Name of the Project	State	1) Irrigation (ha.) 2) Power (MW) 3)Storage (MAF)	Year-wise Central Assistance released under Scheme of National Project (`crores)
1.	Gosikhurd	Maharashtra	1) 2.50 lakh 2) 3 MW 3) 0.93 MAF	2008-09(450.00) 2009-10(720.00) 2010-11(1412.94) 2011-12(NIL) 2012-13(405.00) 2013-14(NIL) Total= 2987.94
2.	ShahpurKandi	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) 2013-14(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) 2013-14(NIL) Total= 178.20
4.	Renuka	HP	1) Drinking water 2) 40 MW 3) 0.44 MAF	-
5.	LakhwarVyasi	Uttarakhand	1) 0.49 lakh 2) 420 MW 3) 0.325 MAF	-
6.	Kishau	HP/ Uttarakhand	1) 0.97 Lakh 2) 600 MW 3) 1.04 MAF	-
7.	Ken Betwa	Madhya Pradesh	1) 6.46 lakh 2) 72 MW 3) 2.25 MAF	-

8.	Bursar	J&K	1) 1 lakh (indirect) 2) 1230 MW 3) 1 MAF	-
9.	Gyspa project	HP	1) 0.50 lakh ha 2) 240 MW 3) 0.6 MAF	-
10.	2nd Ravi Vyas Link	Punjab	Harness water flowing across border of about 3 MAF	-
11.	Ujh multipurpose project	J&K	1) 0.32 lakh 2) 280 MW 3) 0.66 MAF	-
12.	Kulsi Dam Project	Assam	1) 23,900 ha. 2) 29 MW 3) 0.28 MAF	-
13.	Noa-Dehang Dam Project	Arunanchal Pradesh	1) 8000 ha. 2) 75 MW 3) 0.26 MAF	-
14.	Upper Siang	Arunanchal Pradesh	1) Indirect 2) 9500 MW 3) 17.50 MAF 4) Flood moderation	-
15.	Saryu Nahar Pariyojna	Uttar Pradesh	1) 4.86 lakh (additional) 2) - 3) Barrage	2012-13 (67.98) 2013-14 (380.75) Total = 448.73
16.	Indirasagar Polavaram	Andhra Pradesh	1) 2.91 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.

Annexure 8.1

PROGRAMME OF MONITORING VISITS DURING 2013-14			
General Monitoring			
S.No.	**Name of Project**	**Major/ Medium/ ERM**	**Remarks**
	ANDHRA PRADESH		updated
1	1-Peddagedda Reservoir Project	Medium	
2	2-Godavari Lift Irrigation	Major	
3	3- KLRS Pulichintala Project &Krishna Delta Modernization Scheme including Pulichintala Dam Project (New)	Major	
4	4-Pulivendula Branch Canal	Major	
5	5-Tungabhadra high level canal stage -II	Major	
	TOTAL- 05		
	BIHAR		updated
6	1-North Koel Reservoir	Major	
7	2-Bateswar Asthan Ganga Pump Canal Phase-I	Major	
	TOTAL- 02		
	GUJARAT		
8	1-Und-II	Medium	
	Total-01		
	HIMACHAL PRADESH		updated
9	1-Phina Singh Irrigation Project	Medium	
10	2-Nadaun Area Medium Irrigation Project	Medium	
	TOTAL-02		
	JHARKHAND		updated
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		updated

17	1-Hirehalla	Medium	Hippargi project has been deleted
18	2-Amarja	Medium	
19	3-Bennathora	Major	
20	4-Lower Mullamari	Medium	
21	5-Sri Rameshwara Lift Irrigation	Major	
	Total-05		
	KERALA		updated
22	1-Idamalayar Irri. Project	Major	
	Total-01		
	Maharashtra		
23	1-Wakod Irrigation Project	Medium	
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	
31	9-Urmodi Irrigation Project	Major	
32	10-Tembhu Lift Irrigation Project	Major	
33	11-Bodwad Parisar Sinchan Yojna	Major	
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	
	TOTAL-14		
	Meghalaya		
37	1-Rongoi Valley	Medium	
	Total-01		
	NAGALAND		
38	1-D'zuza irrigation scheme	Medium	
	TOTAL_01		

	Rajasthan		updated
39	1-Takli Irrigation Cum Drinking Water Project	Medium	
40	2-Gagrin Irrigation Project	Medium	
41	3-Piplad Irrigation Project	Medium	
42	4-Lhasi Irrigation Project	Medium	
	TOTAL-04		
	UTTAT PRADESH		updated
43	1-Bhupali Pump Canal	Major	
44	2-Kanhar Irrigation Project	Major	
45	3-Restoring capacity of Western Gandak Canal system – ERM	Major	
	TOTAL-03		
	West Bangal		updated
46	1-Beko Irrigation scheme	Major	
47	2-Khairabera Irrigation Scheme	Major	
	Total-02		

AIBP MONITORING

S.No.	**Name of Project**	**Major/ Medium/ ERM**	**Remarks**
	ANDHRA PRADESH		updated
1	1-Yerrakalva Res.	Med.	
2	2 Indiramma-FFC of SRSP	ERM	
3	3- SRSP St.II	ERM	
4	4-Tadipudi LIS	Maj.	
5	5-Pushkara LIS	Maj.	
6	6-Ralivagu Reservoir	Med.	
7	7-Gollavagu Reservoir	Med.	
8	8-Mathadivagu Reservoir	Med.	
9	9-Peddavagu at Jagannathpur	Med.	
10	10-Gundlakdamma	Maj.	
11	11-J. Chokka Rao LIS	Maj.	
12	12- Peddavagu at Neelwai	Med.	

13	13-Sri Komaram Bheem	Med.	
14	14-Thotapally Barrage	Maj.	
15	15-Tarakarama thirtha Sagaram	Med.	
16	16-Palemvagu Res. Project	Med.	
17	17-Musurumilli Reservoir	Med.	
18	18-Rajiv Bhima LIS	Maj.	
19	19-Indira Sagar (Polavaram)	Maj.	
20	20-Meddigedda Res. Project	Med.	
	Total-20		
	ASSAM		
21	1-Dhansiri	Maj.	
22	2-Champamati	Maj.	
23	3-Borolia	Med.	
24	4-Burhi Dihing lift	Med.	
25	5-Mod. of Jamuna	ERM	
	Total-05		
	BIHAR		updated
26	1-Western Kosi canal Project	Maj.	
27	2-Durgawati Reservoir project	Maj.	
28	3-Batane Reservoir Project	Med.	
29	4-Punpun Barrage Project	Maj.	
	Total-04		
	CHATTISGARH		
30	1-Kelo Project	Maj.	
31	2-Kharung	ERM / Maj	
32	3-Sutiapat	Med.	
33	4-Maniyari Tank (ERM)	Major	
	Total-04		
	GOA		updated
34	Tillari	Major	
	TOTAL-01		
	GUJARAT		
35	Sardar Sarovar (Narmada)	Major	
	TOTAL-01		
	HIMACHAL PRADESH		updated
36	1-Shahnahar Irrigation Project*	Major	
37	2-Sidhata Irri. Project	Medium	
38	3-Balh Valley(Left Bank)Medium Irrigation Project.	Medium	

	Total-03		
	Jammu		updated
39	1-Rajpora Lift	Med.	
40	2-Tral Lift	Med.	
41	3-Prakachik Khows Canal	Med.	
42	4-Restoration & Mod. Of Main Ravi Canal	ERM / Maj	
	Total-04		
	JHARKHAND		updated
43	1-Gumani	Med.	
44	2-Kansjore	Med.	
45	3-Sonua	Med.	
46	4-Surangi	Med.	
47	5-Upper Sankh	Med.	
48	6-Panchkhero	Med.	
49	7-Subernarekha Multipurpose	Maj	
	Total-07		
	KARNATAKA		updated
50	1-Upper Krishna St.I Phase-III	Maj.	Four projects have been deleted
51	2-Malaprabha	Maj.	
52	3-Upper Krishna St.II	Maj.	
53	4-Varahi	Maj.	
54	5-Dudhganga	Maj.	
55	6-Mod. Canal System of Bhadra Reservoir Canal System (ERM)	ERM	
56	7-Hipparagi LIS	Maj.	
57	8-Restoration Bhimasamundra Tank	ERM/ Med	
58	9-Guddada Malapura Lift	Med	
59	10-Bhima LIS	Maj.	
60	11-Karanja	Major	
	Total-11		
	KERALA		updated
61	1-Muvattupuzha Valley Irrigation Project	Maj.	
62	2-Karapuzha Irrigation Project	Med.	
63	3-Kanhirapuzha Irrigation Project	Med./ ERM	
64	4-Chitturpuzha Irrigation Project	Major (ERM)	
	Total-04		

	MADHYA PRADESH		updated
65	1-Kelo	Maj.	
66	2-Kharung	Maj.	
67	3-Sutipat	Maj.	
68	4-Manyari	Maj.	
69	5-Indira Sagar	Maj.	
70	6-Mahi	Maj.	
71	7-Bariarpur LBC	Maj.	
72	8-Bawanthadi	Maj.	
73	9-Omkareshwar Ph - I	Maj.	
74	10-Bargi Diversion	Maj.	
75	11-Pench Div-I	Maj.	
76	12-Upper Beda	Maj.	
77	13-Punasa lift	Maj.	
78	14-Lower Goi	Maj.	
79	15-Sagar(Sagad)	Maj.	
80	16-Singhpur	Maj.	
81	17-Sanjay Sagar (Bah)	Maj.	
82	18-Bansagar-II M&A	Maj.	
83	19-Sindh-II	Maj.	
84	20-Mahan Project	Maj.	
85	21-Jobat	Maj.	
	Total-21		
	MAHARASHTRA		
86	1-Gosikhurd	Maj.	
87	2-Waghur	Maj.	
88	3-Upper Manar	Med.	
89	4-Upper Pen Ganga	Maj.	
90	5-Bawanthadi [IS]	Maj.	
91	6-Lower Dudhna	Maj.	
92	7-Tillari	Maj.	
93	8-Lower Wardha	Maj.	
94	9-Khadakpurna	Maj.	
95	10-Dongargaon	Med.	

96	11-Gul	Med.	
97	12-Bembla	Maj.	
98	13-Sangola Branch Canal	Maj.	
99	14-Morna (Gureghar)	Med.	
100	15-Arjuna	Med.	
101	16-Lower Pedhi	Maj.	
102	17-Upper Kundalika	Med	
103	18-Wang Project	Med	
104	19-Lower Panzara	Med	
105	20-Aruna	Med	
106	21-Krishna Koyana Lift	Maj.	
107	22-Naradave (Mahammadwadi)	Med	
108	23-Gadnadi	Med	
109	24-Kudali	Med	
110	25-Tarali	Maj.	
111	26-Dhom Balakwadi	Maj.	
112	27-Punad	Maj.	
113	28-Nandur Madhameshwar -phase-II	Maj.	
	Total-28		
	MANIPUR		
114	1-Khuga	Maj.	
115	2-Thoubal	Maj.	
116	3-Dolaithabi Barrage	Med.	
	Total-03		
	ODISHA		updated
117	1-Upper Indravati(KBK)	Maj.	
118	2-Subernarekha	Maj.	
119	3-Rengali	Maj.	
120	4- Integrated Anandpur Barr. Project	ERM	
121	5-Lower Indra(KBK)	Maj.	
122	6-Lower Suktel(KBK)	Maj.	
123	7-Telengiri(KBK)	Maj.	
124	8-RET Irrigation(KBK)	Med.	
125	9-Kanupur Irrigation Project	Maj.	
126	10-Chheligada Dam	Med.	
127	11-Rukura Irrigation Project-Tribal	Med	
	Total-11		

	Punjab		updated
128	1-Extension of kandi Canal Stage-II	ERM	
129	2-Rehabilition of Ist Patiyala Feederand Kotla branch	ERM	
130	3-Relining of Rajasthan feeder canal &sirhind Feeder part -II	ERM	
131	4-Shahpur Kandi dam Project	Major	
	Total-04		
	RAJASTHAN		updated
132	1-IGNP Stage-II	Maj.	
133	2-Narmada Canal	Maj.	
134	3-Mod. of Gang Canal	ERM	
	Total-03		
	TRIPURA		
135	1-Manu	Med.	
136	2-Gumti	Med.	
137	3-Khowai	Med.	
	Total-03		
	UTTAR PRADESH		updated
138	1-Saryu Nahar Pariyojana	Maj	
139	2-Bansagar Canal	Maj.	
140	3-Restoring Cap of Sarda Sahayak	ERM	
141	4-Improving Irr. Intensity of Hardoi Branch System**	ERM	
142	5-Madhya Ganga Canal Ph-II	Maj.	not updated
143	6-Kachnoda Dam	Maj.	
144	7-Arjun Shyak	Maj.	
145	8-Mod. of Lachhura Dam**	ERM	
	Total-08		
	WEST BANGAL		updated
146	1-Patloi Irrigation	Medium	
147	2-Tatko Irrigation	Medium	
	TOTAL-02		

*** The project reportedly completed during 2013-14, Sl No.36**

**** Deletion from the AIBP is requested , Sl No. 141,145**

Annexure 8.2

Statewise Major & Medium Irrigation Projects Completed under AIBP

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
31	Minimata (Hasdeo Bango Ph. IV)	2007-08	2010-11
31	Koserteda	2002-03	2013-14
	GOA		
33.	Salauli	1997-98	2006-07
	GUJARAT		
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		
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
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
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 April 2013 - March 2014

Sl No.	Topics of Program	Date	Venue	Participants S/Sh
1	Training program on" Arc GIS Software"	18-22nd April,2013	NIIT,GISLtd,Madura Road, New Delhi.	15 Officers
2	Off- Campus training program on "Increasing water use efficiency (WUE) under National Water Mission"	20-24th May,2013	NERIWALM, Tezpur.	33 Officers.
3	Training Program on "Pre-Monsoon Structured Interaction among Junior Engineers & Senior Officers of CWC"	22-24th May,2013	Gandhi Nagar	28 participants
4	Hindi Workshop	4th June, 2013	New Delhi	38 participants
5	Training Module for the Officers of MoWR to enhance their domain knowledge in Water Sector.	11-14 & 18th June, 2013	New Delhi	63 Officers.
6	Core Area Trg. Program Civil/ Structural Design.	29th July, 2013 to 30th August, 2013	NWA Pune & CWC(HQ), New Delhi	8 Officers.
7	Training program for CWC on "Disciplinary proceedings".	05 to 08th August, 2013	ISTM	25 Officers.
8	An Off-campus training program on "Preparation of Detailed Project Report".	25 to 27thAugust, 2013.	IMTI.,Trichi.	20 participants
9	Hindi Workshop	23rd September, 2013	CWC(HQ) New Delhi	46 participants
10	Training program for Graduate Civil Engineers jointly Organised by CWC & CBIP, New Delhi	7-11th Octobers, 2013	CBIP, Chankyapuri, New Delhi	3 Officers
11	Orientation program in r/o newly promoted Assistant Director II/ SDE of CWC	11th Nov. 2013 to 10th Dec. 2013.	CWC(HQ), New Delhi	25 Officers
12	Training on Telementry, Hydrological observation, Flood forecasting, water quality,	18-22nd November, 2013	Patna	20 Officers

	sediment analysis, SWDES.			
13	Work shop on "Design flood Issues".	19-20th November 2013	CWC(HQ), New Delhi	43 Officers
14	Work shop on "National Disasters with special Reference to Uttarakhand".	20th November, 2013,	CBIP, New Delhi.	6 Officers
15	Training course on "Laboratory Assessment of Rock (With Practical Demonstration	09-10 December, 2013	CSMRS, New Delhi.	2 Officers
16	Training course on "Identication of Rockfill materials".	12-13th December, 2013	CSMRS, New Delhi.	1 Officer
17	Brain Storming Secession on "Hydrology Aspects of Cloudburst and flash floods in Himalayas".	10th Jan, 2014	Auditorium, CWC,(HQ), New Delhi	27 Officers
18	Training Course on "MIKE-Flood & MIKE- Basin".	20-24th Jan, 2014	NIT Rourkela	1 Officer
19	Short course on "River Training & Management".	29-31st Jan, 2014	CWPRS, Pune	1 Officer
20	Work shop on "Segmental Lining: Issues and challenges" Organised by CBIP, New Delhi	26th Feb, 2014	India Habitate Centre, CBIP, New Delhi.	3 Officers
21	Workshop on "Concrete in Underground Structure- Issues & Challenges Organised by CBIP, New Delhi.	27-28th Feb. 2014	India habitate Centre, CBIP new Delhi	6 Officers
22	Hindi Workshop	25th March, 2014	CWC(HQ) New Delhi	40 Participants
23	Training Program on "Water Convention, law & policy Issues".	25-27th March 2014	CWC(HQ), New Delhi	25 Participants

List of Officers deputed for training during April 2013 to March 2014

Sl No.	Topics of Program	Date	Venue	Participants S/Sh
1	Group training course on "Water Environment Monitoring under the Technical Coordination Program, Govt of Japan	01st September-19th October 2013	JAPAN	Dr.SandeepShukla, ARO, Wainganga Dn., Cwc, bhopal

Annexure - 15.2

National Water Academy, Pune

Details of Training Programs completed till **March 2014**

Sr. No.	*Details of the Programs*	*Dates*	*Duration in weeks*	*Number of officers Trained*	*Manweeks of training*
1	Workshop of Training Co-ordinators under HP-II	25-Apr-13	0.2	20	4
2	Induction Training Program for newly promoted Assistant Directors / Assistant Executive Engineers of CWC	22 April - 14 June 2013	8	16	128
3	Basin Water Yield Using Geo-Spatial tools Studies (for Kerala Officers) at Thiruvananthapuram - Phase I	08-11 May 2013	0.8	13	10.4
4	Increasing Water Use Efficiency in Irrigation Sector under National Water Mission for NE Region at NERIWALM Tezpur	20-24 May 2013	1	33	33
5	Preparation of Detailed Project Report	17-21 June 2013	1	26	26
6	Increasing Water Use Efficiency in Irrigation Sector under National Water Mission atWALAMTARI, Hyderabad	17-21 June 2013	1	28	28

7	Management Development Program for Non-Technical Officers of MoWR and its organsiation	24-28 June 2013	1	17	17
8	Overview of Water Resources Sector for officers of MOWR	26-29 June 2013	0.8	10	8
9	International Distance Learning Program in Hydrology : Basic Hydrological Sciences for Professionals from RA-II (Asian) countries in association with World Meteoreological Organisations	08 July - 23 August 2013	7	39	273
10	Basin Water Yield Using Geo-Spatial tools Studies (for Kerala Officers) at Thiruvananthapuram - Phase II	29-31 July 2013	0.8	13	10.4
11	Core Area Training : Civil /Structural Designs	29 July - 30 Aug 2013	5	9	45
12	Analysis and Design of Dams (Concrete and Masonry Dam)	29 July - 2 Aug 2013	1	9	9
13	Analysis and Design of Dams (Earth and Rockfill)	05 -08 Aug 2013	1	6	6
14	Induction Training Program for (ITP) for the officers of Central Water Engineering (Group A) Services - Part A	05 Aug - 01 Nov 2013	13	27	351
15	Design of Barrages and Canals	11-16 Aug 2013	1	24	24
16	Dam Safety and Instrumentation	19-23 Aug 2013	1	15	15
17	Hydel Civil Design	26-30 Aug 2013	1	22	22
18	Irrigation Water Management and Modernization	19-23 Aug 2013	1	26	26
19	Preparation of Detailed Project Report for ERM of Irrigation Projects **(At IMTI, Trichy)**	26-28 Aug 2013	0.6	20	12
20	Overview of Water Resources Sector for officers of MOWR	10-13 Sept 2013	0.8	11	8.8

21	Advancd Watershed Modelling in Water Resources (HP-II)	23-27 Sept 2013	1	27	27
22	Program on E-Water (under HP-II)	18-29 Nov 2013	2	24	48
23	Fundamental issues of Hydroelectric Projects	18-22 Nov 2013	1	26	26
24	Water Laws	27-29 Nov 2013	0.6	18	10.8
25	Digital Surface Modeling and Watershed Modelling **(under ISRO Funding)**	02-13 Dec 2013	2	15	30
26	Water resources of India	05-Dec-13	0.2	27	5.4
27	HDA2 : Estimation of Design Flood	16-21 Dec 13	1.2	24	28.8
28	Project Monitoring using open source GIS – **(Under ISRO Funding)**	30 Dec - 3 Jan 2014	1	20	20
29	Telemetry and FF Modelling	06-07 Jan 2014	0.4	58	23.2
30	Workshop on Telemetry, FF Modeling and e-SWIS	08-10 Jan 2014	0.6	58	34.8
31	HDA3 : Sediment Rate Estimation and SWAT Application	13-17 Jan 2014	1	19	19
32	Cost Engineering	20-24 Jan 2014	1	27	27
33	Pumped Storage HEP	27-31 Jan 2014	1	37	37
34	Induction Training Program for (ITP) for the officers of Central Water Engineering (Group A) Services - Part B	03 feb 2014 - 01 August 2014	8	25	200
35	Environmental, Economic & Social Aspects of Water Resources Projects	17-21 Feb 2014	1	10	10
36	International Distance Learning Program in Hydrology : Basic Hydrological Sciences in association with World Meteorological Organization	10 March – 25 April 2014	3	50	150
37	Increasing Water Use Efficiency in Irrigation Sector under National Water Mission (at HIRMI Haryana)	10-15 March 2014	1	28	28
	Total		**73**	**877**	**1781.6**

Note:

- Half-a -day Seminar on "Water Conservation in Domestic and Irrigation Sector" was organized during 14 June 2013
- Half-a-day Conference on "Water Conservation" was organized on 10 July 2013
- International DL program in Hydrology of seven weeks duration concluded on 25 April 2014.