Annual Report

2023-24

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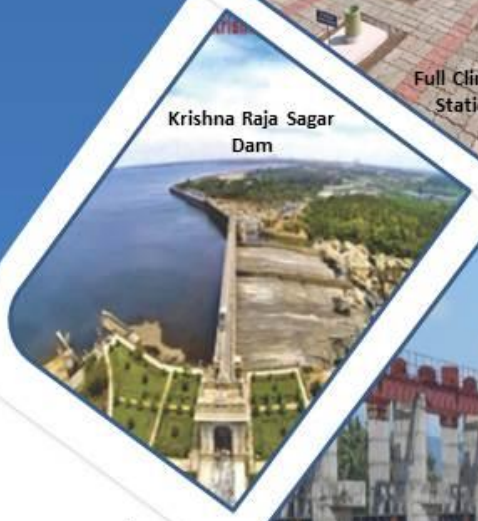

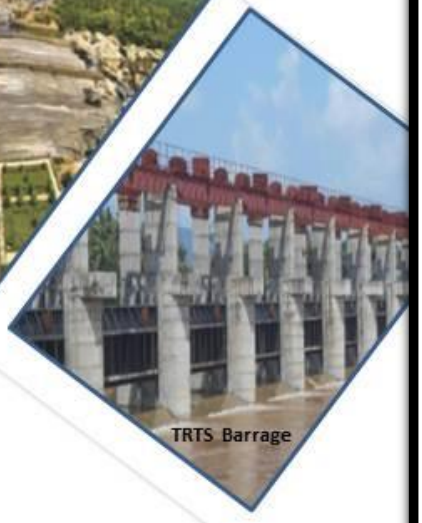

CENTRAL WATER COMMISSION

Department of Water Resources, River Development & Ganga Rejuvenation, Ministry of Jal Shakti

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FROM CHAIRMAN's DESK

We are pleased to present the Annual Report of the Central Water Commission (CWC) for the year 2023-24. This report provides an overview of the organizational structure, functions, and activities of the CWC, highlighting its contributions to the development and management of water resources both within the country and abroad.

Since its formation in 1945, CWC has been a cornerstone in guiding the development of the water resources sector in India. It has also played a crucial role in supporting the Department of Water Resources, River Development, and Ganga Rejuvenation under the Ministry of Jal Shakti on technical and policy matters, including inter-state water issues, water-sharing arrangements with neighboring countries, bilateral treaties, and Memorandums of Understanding (MoUs). Also CWC officers actively participated in several committees, contributing significantly to addressing various issues.

During the year, the CWC has undertaken regular activities such as the appraisal of major and medium irrigation projects and other water resource development schemes, monitoring of major, medium, and extension/renovation/modernization (ERM) projects, addressing environmental issues related to these projects, designing hydraulic structures, conducting hydrological observations and studies, and providing flood forecasting services.

During the period of report year, CWC provided design consultancy for the preparation of Detailed Project Reports (DPRs) and construction of 92 water resource development projects in India and neighboring countries, including Bhutan and Nepal. Technical examinations were carried out for 93 hydro-electric projects, 26 irrigation projects, and 9 multipurpose projects.

In 2023-24, 36 major and medium irrigation projects and 5 drinking water projects were under appraisal at CWC. The Technical Advisory Committee approved 29 projects, including 11 major/medium irrigation and multipurpose projects and 18 flood control projects.

During the year, CWC has released a Central Assistance of Rs. 504.34 Crores to 14 Projects, out of 99 (and 7 phases) and 7 newly included priority projects, under PMKSY-AIBP. Total Central Assistance released under PMKSY-AIBP since 2016-17 to March 2024 is Rs. 14743.56 Crore. Under a Special Package, Central Assistance amounting to ₹699.99 crore was released to projects in Maharashtra during 2023-24.

During the Water Year 2023-24, CWC added 4 reservoirs to its monitoring network, bringing the total to 150 reservoirs with a combined live storage capacity of 178.784 BCM, approximately 69.35% of the country's estimated live storage capacity of 257.812 BCM. This activity has supported states in planning water utilization during the non-monsoon period. To date, CWC has completed 183 sedimentation assessment studies through both in-house efforts and outsourcing.

CWC also provided flood forecasting services at 340 stations (including 140 inflow forecasting stations) across 20 major river systems in the country, issuing 339 flood forecasts during the year.

During this period, two additional Water Quality Laboratories of the Central Water Commission (CWC) received accreditation from the National Accreditation Board for Testing and Calibration Laboratories (NABL) for chemical testing. As of April 2024, a total of 22 River Water Quality Laboratories under CWC have been accredited by NABL.

Through the National Water Academy (NWA), the Central Water Commission (CWC) conducted 101 training programs, including residential sessions at NWA and other locations, as well as distance learning (DL) and hybrid modes. These programs benefited 9,313 officers from Central and State Governments, Central and State Public Sector Undertakings (PSUs), academic institutions, schools, NGOs, and other organizations.

Under the Publication Registration System, a total of 91 publications were registered during the period.

Since its inception, the Central Water Commission (CWC) has been dedicated to delivering quality services to the nation in the field of water resource development and management, and it remains committed to continuing this mission in the future.

I am confident that this report will provide valuable insights into the role, functions, and achievements of CWC over the past year.

In conclusion, I extend my heartfelt appreciation to everyone who has contributed to the preparation of this Annual Report and to the success of Central Water Commission in effectively fulfilling its role.

(Dr. Mukesh Kumar Sinha)
Chairman
Central Water Commission

केंद्रीय जल आयोग
CENTRAL WATER COMMISSION

मिशन वक्तव्य

अत्याधुनिक प्रद्योगिकी और सक्षमता का उपयोग करके और सभी पणधारियों का समन्वय करके भारत के जल संसाधनों के एकीकृत और दीर्घकालिक विकास और प्रबंधन को बढ़ावा देना|

Mission Statement

To Promote integrated and sustainable development and management of India's water resources by using state-of-the-art technology and competency and by coordinating all stakeholders.

HIGHLIGHTS OF CWC FOR THE FY YEAR 2023-24

❖ Design of Water Resource Projects

- CWC provided design consultancy to States / Project Authorities for 92 water resources development projects involving detailed designs and preparation of drawings of various types of hydraulic structures.
- During 2023-24, many special studies regarding Dam Break Analysis and GLOF have been carried out.
- Construction of Punatsangchhu-I H.E. Project (Bhutan), Punatsangchhu-II H.E. Project (Bhutan) is in full swing and design & drawings are issued as per the construction schedule of the projects. The no. of construction stage drawing for various projects e.g.Parwan (Raj.), Chelligada (Odisha), Isarda (Rajasthan), Indroka, etc. were issued. In addition, DPR stage drawings were also issued.
- During the year 2023-24, technical examinations of hydrological aspects of DPRs in respect of 128projects have been carried out.
- During 2023-24, Technical evaluation of 25 Site Specific Seismic reports has been carried out by CWC.
- Techincal examintion of 93 Hydro-Electric projects, 26 Irrigation projects and 9 Multi-Purpose Projects have been carried out.
- During 2023-24, 14 Nos. of draft standards/amendments to IS Codes have been approved by Chairman, CWC.
- International Conference on Dam Safety 2023 was organized in Jaipur during 14-15 September 2023. It was inaugurated by Hon'ble Vice President of India, in presence of Hon'ble Union Minister of Jal Shakti and various other Dignitaries. About 800 delegates participated in this Conference, and 51 technical papers were presented by leading experts of various domains.

❖ RIVER MANAGEMENT in the country

- Carried out hydrological observations at 1543(1522 operational & 21 under review) sites and meteorological observation at 187 sites in different basins spread over the entire country.
- Provided Flood Forecasting Service at 340 flood forecasting stations (including 140 inflow forecasting stations) spread over 20 major river systems in the country.
- During the flood season 2023, 6339 flood forecasts (4567 level forecast and 1772 inflow forecasts) were issued, out of which 5952 (93.89%) forecasts were within prescribed limits of accuracy. Daily flood bulletins and weekly flood news letters were also issued during the flood season.
- The continuation of FMBAP scheme for the period FY 2021-2026 has been approved by Cabinet in Februray, 2024 with outlay of Rs. 4100 Cr.
- As on April 2024, 22 River Water Quality Laboratory of CWC had accredition by National Accreditation Board for Testing and Calibration Laboratories (NABL) in the discipline of chemical testing.
- CWC has continued coastal data collection activity for 9 coastal parameters viz. Wave, Tide, Current, Coastal Sediment, Meteorological data, Riverine Data, Bathymetry, Beach Profile & Shoreline Change at 8 no. of Coastal Management Information System (CMIS) sites along Indian coastline.
- Upto Mar 2024, 1121 Telemetry stations have been installed.

❖ WATER PLANNING

- During the year 2023-24, 36 major/ medium irrigation projects and 05 drinking water projects were under appraisal in CWC. 29 projects comprising 11 Major and Medium Irrigation Projects/ Multipurpose Project and 18 Flood Control Projects were accepted by the Technical Advisory Committee.
- Under PMKSY-AIBP programme, out of 99 priority projects, 58 projects have been reported completed and 23 projects have progress more than 90%.

- During the year 2023-24, 87 monitoring visits to the projects were carried out by CWC. Also during 2023-24, 10 monitoring visits wre carried out for Special Package Irrigation Projects of Maharashtra and 1visits was carried out for Special Package Projects of Punjab.
- Central Assistance amounting to Rs. 699.99 Crores has been released to Maharashtra Projects under Special Package during 2023-24.
- Central Assistance totalling to Rs. 504.34 Crores has been released to 14 Projects, out of 99 (and 7 phases) and 7 newly included priority projects, under PMKSY-AIBP during 2023-24.
- A total of 35 Final reports of "Reservoir Sedimentation studies using hydrographic survey" under NHP in Phase-II are finalized in all respects. Also, 183 nos. of Sedimentation Assessment studies have been completed using Remote Sensing technique both in-house and by out sourcing.
- During Water Year 2023-2024 (1st June, 2023 – 31st May 2024), Central Water Commission (CWC) has added 4 more reservoirs under CWC monitoring. The total live storage capacity of 150 reservoirs is 178.784 BCM which is about 69.35% of the live storage capacity of 257.812 BCM which is estimated to have been created in the country.
- During the year 2023-24, 37 major irrigation/ multipurpose projects and 14 medium irrigation projects have been appraised.

❖ HUMAN RESOURCE MANAGEMENT/ Capacity Building

- During the year 2024, 101 training programmes (residential – in NWA & Outside NWA; DL; Hybrid) were conducted as given in table below benefitting 9313 officers from Central/ State Governments, Central & State PSUs, Academic Institutions, Schools, NGOS, etc.
- Vigilance Awareness Week 2023 (VAW 2023) was observed in CWC (Headquarters) alongwith all its field offices from 30th October 2023 to 5th November 2023 with the theme of "Say no to corruption; commit to the Nation/ **भ्रष्टाचार का विरोध करें; राष्ट्र के प्रति समर्पित रहें**".
- During 2023-24, total of 12 nos. of Jalansh - Monthly Newsletters (from April-23 to March-2024) were published.
- Under Publication Registration System a total of 91 publications were registered during April, 2023 to March, 2024.

1 AN OVERVIEW

1.1 HISTORY OF CWC

Central Water Commission (CWC), an apex organization in the country in the field of Water Resources came into existence as "Central Waterways, Irrigation and Navigation Commission" vide Department of Labour Resolution No. DW 101(2) dated 05.04.1945. In the year 1951, it was renamed as "Central Water and Power Commission" (CW&PC) after its merger with the "Central Electricity Commission". Following the changes in the Ministry of Agriculture and Irrigation, in the year 1974, Water Wing of CW&PC was separated as "Central Water Commission", which continues till date. At present Central Water Commission functions as an "Attached Office" of the Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti and is its main technical arm. It is mainly manned by the officers of Central Water Engineering Services (CWES) cadre, the only organised service of the Ministry of Jal Shakti, Department of Water Resources, River Development and Ganga Rejuvenation.

1.2 ORGANIZATION

CWC is headed by a Chairman, having the status of Ex-Officio Secretary to the Government of India. The work of the Commission is divided among 3 wings namely, Designs and Research (D&R) Wing, Water Planning and Projects (WP&P) Wing and River Management (RM) Wing. Allied functions are grouped under respective wings and each wing is placed under the charge of a full-time Member having 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 them. Officers of the rank of Chief Engineer, Director/Superintending Engineer, Deputy Director/Executive Engineer, Assistant Director/Assistant Executive Engineer; other technical and Non-technical officers and supporting staff working in headquarter and various regional organizations, assist the members in discharge of necessary responsibilities. There is a separate Human Resources Management Unit headed by a Chief Engineer, to deal with Human Resources Management/Development, Financial Management, Training and Administrative matters of the Central Water Commission. National Water Academy located at Pune is responsible for training Central and State in-service engineers and functions directly under the guidance of Chairman, CWC. Broad duties and responsibility of Chairman and Members are as under:

CHAIRMAN

CWC is headed by a Chairman, with the status of Ex-officio Secretary to the Government of India. Head of the Organization is responsible for overseeing the various activities related to overall planning and development of water resources of the country and management of the Commission as a whole.

MEMBER

The work of the Commission is divided among 3 wings namely, Water Planning and Projects (WP&P) wing, Designs and Research (D&R) Wing and River Management (RM) Wing. 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

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, 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 AIBP etc.

The incumbents to the posts of Chairman and Members of Central Water Commission during the year 2023-24 were:

1.	**Chairman CWC**	**Sh. Kushvinder Vohra (01/01/2023 to 31/03/2024)**
2.	**Member (D&R)**	**Sh. Sanjay Kumar Sibal (01/02/2023 to 31/03/2024)**
3.	**Member (RM)**	**Sh P M Scott (26/06/2022 to 31/03/2024)**
4.	**Member (WP&P)**	**Sh Navin Kumar (01/02/2023 to 31/03/2024)**

BROAD FUNCTIONS

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

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

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

Program (AIBP), and Command Area Development (CAD) program are also undertaken;

- To advise the Government of India and the concerned State Governments on the basin-wise development of water resources;
- To undertake necessary surveys and investigations, as and when 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, to the State Governments concerned/project authorities whenever requested for.
- 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, the State Governments (Commissions, Corporations or Boards that are set up), whenever requested for, 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 collect and analyse the coastal data and causes of coastal erosion ;
- 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 the irrigation sector;
- To conduct and coordinate research on the various aspects of river valley development schemes such as flood management, irrigation, navigation, water power development, etc., and the connected structural and design features;
- To promote modern tools and techniques such as remote sensing technology for water resources development, flood forecasting and development of related computer software;
- To conduct studies on dam safety aspects for the existing dams and standardize related instrumentation for dam safety measures;
- To carry out morphological studies to assess river behaviour, bank erosion and advise the Central and State Governments on all such matters;
- To promote and create mass awareness on the progress and achievements made by the country in the water resources development, use and conservation.

HEADQUARTERS

There are sixteen organizations, each headed by a Chief Engineer at CWC headquarters, New Delhi. Out of this, eight organizations are under WP&P wing, five 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.

1.3 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 14 regional offices, each

headed by a Chief Engineer. The offices are located at Bangalore, Bhopal, Bhubaneswar, Chandigarh, Coimbatore, Delhi, Gandhi Nagar, Guwahati, Hyderabad, Kolkata, Lucknow, Nagpur, Patna and Shillong.

1.4 Important Schemes and Programmes

1.4.1 PMKSY - Accelerated Irrigation Benefits Programme

The PMKSY-Accelerated Irrigation Benefits Programme (AIBP) is being implemented by DoWR,RD&GR. Central Water Commission has been assigned with the responsibility to comprehensively monitor the projects receiving Central Assistance.

Government of India launched the Pradhan Mantri Krishi SinchayeeYojana (PMKSY) during 2015 with the motto of 'Har Khet Ko Pani' ensuring access to some means of protective irrigation to all agricultural farms in the country, to produce 'per drop more crop', thus bringing much desired rural prosperity. The ongoing programmes as being implemented by the Government of India, viz Accelerated Irrigation Benefits Programmes (AIBP), Repair, Renovation and Restoration (RRR) of Water bodies and Command Area Development and Water Management (CADWM) have been subsumed in Pradhan Mantri Krishi Sinchayee Yojana (PMKSY).

In order to overcome the bottlenecks faced in completion of project under AIBP, DoWR,RD&GR identified 99 (108 including phases) priority projects from amongst the 149 on-going projects as on 01.04.2016 under AIBP for early completion. Under the dedicated funding mechanism i.e. Long Term Irrigation Fund (LTIF), a special window has been created in NABARD which could be utilized by the Central and State Governments to bridge the requirement of funds for completion of the 99 (108 including phases) priority projects including CAD works for central assistance as well as state share component. Out of these 99 priority projects, 58 projects have been reported completed and 23 projects have progress more than 90%.

Further details regarding this scheme covered in subsequent chapters.

1.4.2 Special package for drought prone areas of Maharashtra

Government of India has sanctioned a special package for completion of Irrigation Projects to address agrarian distress in Vidarbha, Marathwada and other chronically drought prone areas of Maharashtra during July, 2018. The package consists of 8 Major and Medium Irrigation (MMI) Projects approved by TAC of Erstwhile MoWR, RD & GR and 83 Surface Minor Irrigation (SMI) Projects. The balance estimated cost of projects of Maharashtra to be completed under this package is Rs 13651.61 Cr as on 01.04.2018, with Rs 3831.41 Cr being the Central Assistance (CA) by Government of India. On completion of the balance works of these projects, additional Irrigation Potential of 3.77 Lakh Ha would be created. Central Assistance amounting to Rs. 699.99 Crores has been released to Maharashtra Projects under Special Package during 2023-24.

Further details regarding this scheme covered in subsequent chapters.

1.4.3 FLOOD MANAGEMENT AND BORDER AREAS PROGRAMME (FMBAP)

A comprehensive scheme titled "Flood Management and Border Areas Programme (FMBAP)" with an outlay of Rs. 3342.00 Cr (FMP-Rs 2642 Cr & RMBA-Rs 700 Cr) for period 2017-2020 with merged components from the existing Flood Management Programme (FMP) and River Management in Border Areas (RMBA) schemes during XII Five Year Plan was approved by the Union Cabinet on 07-Mar-2019 and aimed at completion of the on-going

projects already approved under FMP. The scheme was extended till March, 2021.

The continuation of FMBAP scheme for the period FY 2021-2026 has been approved by Cabinet in Februray, 2024 with outlay of Rs. 4100 Cr. Funding ratio has been kept as 90:10 (for special category States) and 60:40 (for general States) under Flood Management Programme (FMP) component of FMBAP scheme.

Further details regarding this scheme covered in subsequent chapters.

1.4.4 Development of Water Resources Information System (DWRIS)

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

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

1.4.5 National Projects

Government of India is implementing the scheme of National Projects since XI Plan with a view to expedite completion of identified National Projects for the benefit of the people. So far, Central Government has declared 16 water resources projects as National Project.

The provision of financial assistance for National Projects has been included in the recently launched PMKSY. The proportion of Central share has now been revised to 60% except in case of projects in eight North Eastern States and three Himalayan States which will continue to obtain central assistance at 90% of the cost of the project.

Further details regarding this scheme covered in subsequent chapters.

1.5 Use of E-Gov in CWC

E-Gov facility is progressively being used in CWC for up-keeping and maintenance of personal records of employees working in CWC. Different modules under this system include e-Office, APAR Management System (APARMS), Sparrow and CWES Bio-data Information System etc. The details of the systems are as under:

1.5.1 Unique Employee ID for employees of CWC

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

1.5.2 Use of e-Office in CWC

E-office was launched in CWC in August 2017 by implementing the same in 06 Directorates of CWC. The same has been gradually implemented in other Directorates at CWC-HQ as well as Regional Office. During 2023-24, 6631 nos. of files were created, out of which 6623 are being presently handled in CWC

1.5.3 Use of SPARROW for management of APAR for Group-A Officers

SPARROW has been implemented successfully in CWC for all the CWES Group 'A' officers during the period 2017-18. SPARROW has also

been implemented for all the officers of CWES Group 'B' Gazetted and CWES Group 'B' Non-Gazetted during the period 2018-19. Implementation of SPARROW for all the officers of Group C is under process.

1.5.4 APAR Management System (APARMS)

Annual Performance Appraisal Management System (APARMS) is operational in CWC to facilitate proper up-keep and maintenance of records related to APAR of employees of CWC other than CWES Group-A Officers. As per latest guidelines issued by DoPT, APAR of all Government employees are to be communicated to them.

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

1.5.5 Implementation of eHRMS (DoPT version) in CWC

eHRMS (DoPT version) Software developed by DoPT is being implemented in CWC along with its customization. Most of the employees have been on-boarded in the portal and major modules will be implemented shortly.

1.5.6 Implementation of AIPR in e-office

Annual Immovable Property Return (AIPR) is being submitted through e-office (SPARROW) in r/o all the Officers (Gr 'A', Gr 'B' and Gr 'C') of Central Water Commission.

1.5.7 Development of 04 portals under DGQI

The work of re-development of 04 portals viz. DHARMA, ePAMS, Budget Management System and Human Resource Development Support System has been awarded in compliance to DGQI guidelines and the work has started as on 31.03.2023.

1.6 Aadhaar Enabled Biometric Attendance System (AEBAS)

The Biometric Based Attendance Management System (BBAMS) was introduced in Central Water Commission Head Quarter, Sewa Bhawan, New Delhi in December, 2010. In view of the guidelines issued by the Government of India, the system has been switched over to Aadhaar Enabled Biometric Attendance System (AEBAS) in association with NIC in December, 2014. AEBAS is also being implemented in Regional Offices of Central Water Commission. 100% of employees at CWC Headquarter have been successfully registered under AEBAS.

1.7 Central Water Commission Library

The library & Information Bureau, CWC was initially established in Shimla under Central Board of Irrigation in year 1931. This library was shifted to Central Waterways, Irrigation & Navigation Commission at New Delhi in 1955. The library & Information Bureau, CWC is one of the most prestigious technical reference library on the subject of Water Resources Engineering and other related subject. The function of the Library and Information Bureau is to develop the extensive information system in the field of Water Resources Development. This library at present have collection of aprox. 79,558 technical books/references along with 1,00,000 journals which is updated with latest publications every year. The Library is regularly subscribing journals and other publications and

the Library stock is arranged in a manner to make retrieval of desired publication fast and easy. The library is located in a dedicated building. The work for Modernization and Development of CWC Library is in progress which includes listing of all the available books/reference books on NIC-e Granthalaya portal for easy and remote access and user-Friendly search facility to users for available books in public domain for larger benefit. Online Membership/Login/No dues provided at all levels of Officers/staff at CWC HQ after getting duly filled physical form and signature from concerned officer in charge. The link of CWC Library has been created on CWC Website has facilitated the listing of the available books in Library. The Map Record Section is also a unit of Library and Information Building. It has collection of approximate eight thousand topo-sheet, state map, rail map, political map etc. An auditorium, which is a part of Library Building, has been made operational since January 2014. Other facilities in the premises includes conference hall for organizing training, seminar, meeting etc.

1.8 Progressive Use of Hindi in Official Work

A Hindi Section under the control of Central Secretariat Official Language Service, Department of Official Language, M/o Home Affairs is functioning at CWC Headquarter which is working tirelessly to ensure the proper compliance of Officials Language Act, 1963 and other rules and regulation related thereto. Continuous measures are being taken for increasing progressive use of Hindi for official purpose.

The Official Language Implementation Committee of the Commission under the Chairmanship of the Chairman, CWC, has met regularly to review the progress on quarterly basis. Various measures required for progressive use of Hindi are discussed and timely action has been taken on the decisions of the meetings. Workshops have been organized on quarterly basis. Incentive Scheme for Hindi Noting and Drafting has been implemented. Hindi Pakhwada was organized.

The inspection of total 06 regional offices of CWC, New Delhi were carried out by the Second sub-committee of the Parliamentary committee on Official Language. These inspections by Parliamentary Committee on Official Language were highly successful and the efforts made by the organization were duly appreciated by the committee.

Inspections of Field Offices and Headquarter are carried out regularly. Officers have been sent for training on Hindi Language in the Central Hindi Training Institute. As on March 2023, One Hundred twenty (120) Field Offices of CWC have been notified under Rule 10(4) of Official Language Rules, 1976. Further, seventeen (17) Administrative Sections of CWC have been notified under Rule 8(4) of Official Language Rule 1976 to work only in Hindi. Central Water Commission has made all out efforts to achieve the targets fixed by the Department of Official Language in the Annual Programme 2023-24. So far, significant progress has been made in the implementation of the Official Language Act and Rules in the Commission.

Following initiatives in regard to progressive use of Hindi were undertaken during the year 2023-24:

a) 27 Regional Offices of CWC and 30 Section/Directorates of CWC (Hq) were inspected to review the progressive use of Hindi and also to keep a watch on the compliance of orders, instructions etc. and effective measures were taken for rectifying short- comings noticed during the inspection.

b) As per the Annual Programme of the Department of Official Language four meetings of Official Language Implementation Committee were held and four Hindi Workshops were organized during the year. Further, four Hindi workshops were also organized at Central Water Commission (Headquarter) to generate awareness about the use of Hindi language, the provisions under Official Language Act and incentive schemes for use of Hindi etc.

c) The progress made by all Directorates, Sections and Regional Offices in the implementation of important instructions issued by the Department of Official Language regarding progressive use of Hindi for official purpose, the Official Language Act, 1963 and the Official Language Rules, 1976 have been monitored regularly through the quarterly progress report. Necessary instructions were issued to continue the effective implementation of these rules.

d) "Hindi Pakhwada" was organized from 14 to 29 September 2023. During this period, various competitions like Hindi Noting/Drafting, Translation competition, calligraphy competition for MTS, Hindi Typing competition, Poem Recitation competition for Hindi and non-Hindi officials, Technical Speech competition for Hindi and non-Hindi officials and Essay Competition were organized, and total 60 winners were awarded cash prizes and certificates. Prizes and Certificates were also awarded to 12 officials who did their maximum official works in Hindi under the Annual Noting & Drafting and Hindi dictation Scheme. A sum of Rs. 2,50,000/- against the allocation of Rs. 2,50,000/- was spent on this occasion.

e) A grand One-day official language seminar was organized in CWC(Hq) on 18.03.2024 under the joint aegis of Central Water Commission and Kendriya Sachivalay Hindi Parishad.

f) Raj Bhasha Shields of CWC for the year 2023-24 were awarded to the Field Offices of Central Water Commission situated in regions, A, B and C to Narmada Besin Organization, Bhopal, National Water Academy, Pune and Teesta and Bhagirathi-Damodar Basin Organization, Kolkata respectively. Rajbhasha Shield for Directorates and Sections at Headquarters were awarded to Design and Research Coordination Directorate and Establishment-II Section for doing maximum work in Hindi during the year.

g) Hindi books were purchased for the Central Water Commission Library as per the targets fixed in the Annual Program of the Department of Official Language.

1.9 Welfare Measures and Incentives

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

1.9.1 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 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.

1.9.2 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 Department of Water Resources, River Development and Ganga Rejuvenation, Central Water Commission, Central Soil & Materials Research Station, Department of Power, Principal Pay & Accounts Office of the Erstwhile Ministry of Water Resources and Pay & Accounts Office, Central Water Commission.

It provides its member loans to the extent of Rs. 4,00,000/- and emergency loan of Rs. 20,000/- recoverable in 60 and 10 monthly instalments respectively at a rate of interest of 9% per annum. The Society pays gratuity to retiring members and writes off outstanding loans against deceased members from the members' welfare fund. An amount of Rs. 6,78,641/- was paid as gift cheques to members who retired during 2023-24 and loan amount of Rs. 1,69,141/- was waived off/ settled for the members who deceased during 2023-24. The society also awards the meritorious wards of Members of the society for excellence in Class-12th and Class-10th examination. During 2023-24 society cash award was given to 11 children. As on 31.03.2024, the society's bank account holds a total of Rs. 6,29,798.50/- with 909 members contributing.

1.9.3 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 2023-24 are as under:

- The CWC Hockey team won the **Bronze Medal** in the Inter-Ministry Hockey Tournament 2023-24.
- Shri Shriballabh Goswami, A.D.-II won the third prize in Light Classical Music in the Inter Ministry Cultural Programme 2023-24.
- Shri R. Suresh, MTS, CWC Library was selected to attend the coaching camp for the Central Secretariat Volleyball Team for the All India Civil Services Volleyball Tournament 2023-24.
- CWC teams also participated in Inter Ministry Cricket, Football, Chess, Badminton, Table Tennis, Volleyball and Athletics tournaments during 2023-24.

Besides the above, there is a Gym, a Table Tennis room and a Recreation room with Carom and Chess facilities at West Block –I, 1st Floor for CWC employees.

1.10 Employees Strength under various categories

The representation of OBC, SC & ST and PWD (OH/VH/HH) officials in different grades is given in Table 1.1 and Table 1.2

Table 1.1

Representation of OBC, SC & ST Officials in Different Grades (As on 1.1.2024)

Category	No. of Filled Posts	No. of SCs	No. of STs	No. of OBCs
Group A	617	97	37	103
Group B	831	122	79	195
Group C	2331	486	239	690
Total	**3779**	**705**	**355**	**988**

Table 1.2

Representation of PWD (OH/VH/HH) Officials in Different Grades (As on 1.1.2024)

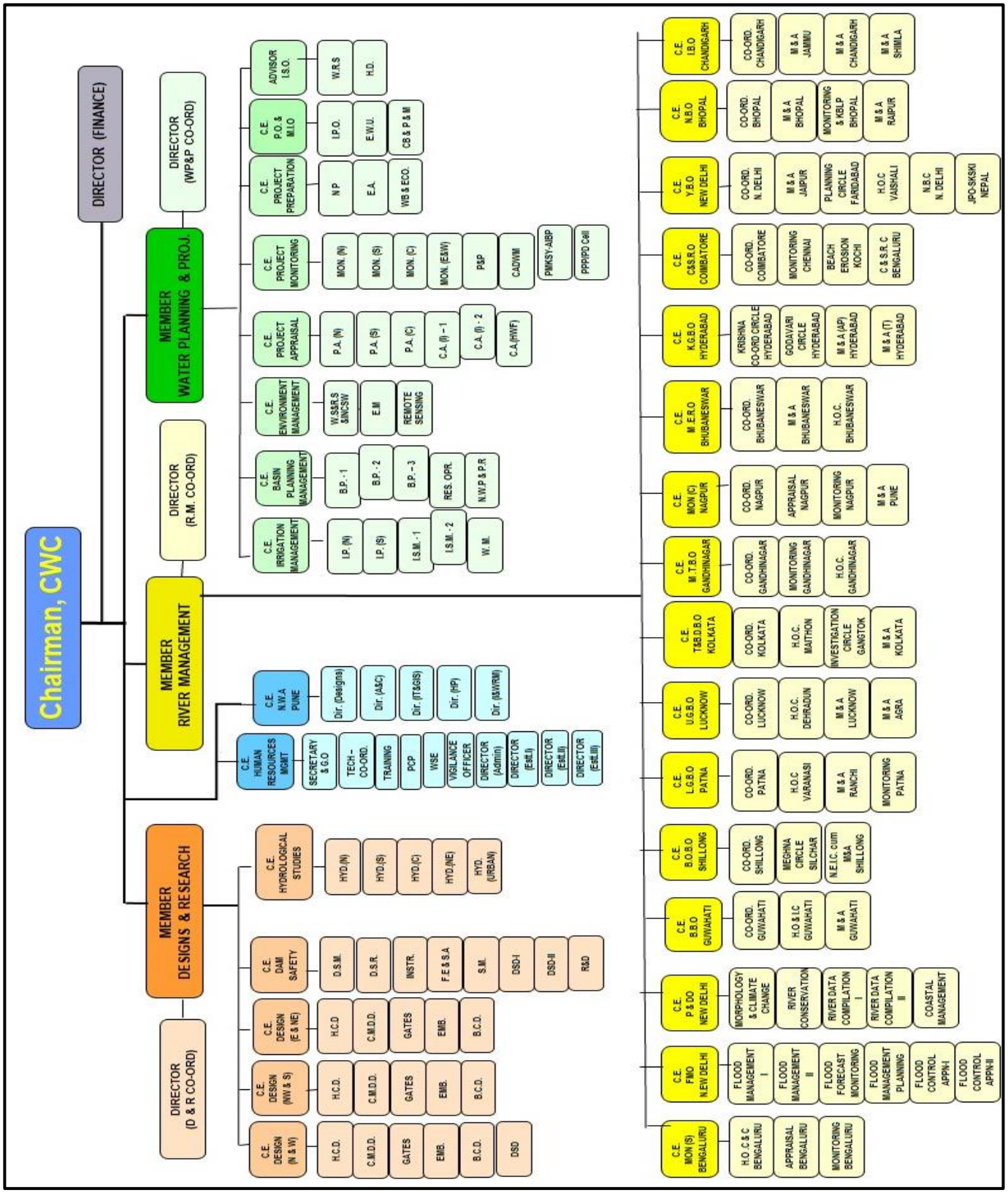
Category	Orthopedic Handicapped (OH)	Visually Handicapped (VH)	Hearing Handicapped (HH)	TOTAL
Group A	2	6	5	13
Group B	2	2	11	15
Group C	6	4	10	20
Total	**10**	**12**	**26**	**48**

1.11 Citizen's Charter for CWC

As per the guidelines issued by Department of Administrative Reforms & Public Grievances (AR&PG), a Task Force under the Chairmanship of Member (WP&P), CWC and Chief Engineer (BPMO), CWC as Member-Secretary & Nodal Officer was constituted for formulating Citizen's Charter for CWC. The Citizen's Charter was finalized with the concurrence of DoWR,RD&GR, MoJS and has been uploaded on CWC website.

1.12 Right to Information Act

The Right to Information Act enacted by Parliament on 15th June, 2005 came into force on the 12th October, 2005 (120th day of its enactment). CWC has implemented the provisions of the Act. Information in respect of Central Water Commission in compliance of Right to Information Act ' 2005 has been put in public domain through its official website at http://www.cwc.gov.in. Total of 765 nos. of RTI requests & 59 nos. of appeals were received during 2023-24 and 100% of them were disposed off within the prescibed period.


Chairman, CWC
DIRECTOR (FINANCE)
DIRECTOR (WP&P CO-ORD)
DIRECTOR (R.M. CO-ORD)
DIRECTOR (D & R CO-ORD)
MEMBER WATER PLANNING & PROJ.
MEMBER RIVER MANAGEMENT
MEMBER DESIGNS & RESEARCH
ADVISOR I.S.O.
W.R.S
H.D.
C.E. P.O. & M.I.O
I.P.O.
E.W.U.
CB & P & M
C.E. PROJECT PREPARATION
N.P
E.A.
WB & ECO.
C.E. PROJECT MONITORING
MON. (N)
MON. (S)
MON. (C)
MON. (E&W)
P&P
CADWM
PMKSY-AIBP
PPP/PD Cell
C.E. PROJECT APPRAISAL
P.A. (N)
P.A. (S)
P.A. (C)
C.A. (I) - 1
C.A. (I) - 2
C.A.(HYF)
C.E. ENVIRONMENT MANAGEMENT
W.S&R.S &INC-SW
E.M
REMOTE SENSING
C.E. BASIN PLANNING MANAGEMENT
B.P. - 1
B.P. - 2
B.P. - 3
RES. OPR.
N.W.P & P.R
C.E. IRRIGATION MANAGEMENT
I.P. (N)
I.P. (S)
I.S.M. - 1
I.S.M. - 2
W. M.
C.E. HUMAN RESOURCES MGMT
SECRETARY & G.O
TECH - CO-ORD.
TRAINING
PCP
VIGILANCE OFFICER
DIRECTOR (Admin)
DIRECTOR (Estt.I)
DIRECTOR (Estt.II)
DIRECTOR (Estt.III)
C.E. N.W.A PUNE
Dir. (Designs)
Dir. (A&C)
Dir. (IT&GIS)
Dir. (HP)
Dir. (I&WRM)
C.E. HYDROLOGICAL STUDIES
HYD.(N)
HYD.(S)
HYD.(C)
HYD.(NE)
HYD. (URBAN)
C.E. DAM SAFETY
D.S.M.
D.S.R.
INSTR.
F.E & S.A
S.M.
DSO-I
DSO-II
R&D
C.E. DESIGN (E & NE)
C.E. DESIGN (NW & S)
C.E. DESIGN (N & W)
H.C.D.
C.M.D.D.
GATES
EMB.
B.C.D.
DSO
C.E. I.B.O CHANDIGARH
C.E. N.B.O BHOPAL
C.E. Y.B.O NEW DELHI
C.E. C&S.R.O COIMBATORE
C.E. K.G.B.O HYDERABAD
C.E. M.E.R.O BHUBANESWAR
C.E. MON (C) NAGPUR
C.E. M.T.B.O GANDHINAGAR
C.E. T&D.B.O KOLKATA
C.E. U.G.B.O LUCKNOW
C.E. L.G.B.O PATNA
C.E. B.O.B.O SHILLONG
C.E. B.B.O GUWAHATI
C.E. P & DO NEW DELHI
C.E. FMO N.EW DELHI
C.E. MON (S) BENGALURU
CO-ORD. CHANDIGARH
M & A JAMMU
M & A CHANDIGARH
M & A SHIMLA
CO-ORD. BHOPAL
M & A BHOPAL
MONITORING & KBLP BHOPAL
M & A RAIPUR
CO-ORD. N. DELHI
M & A JAIPUR
PLANNING CIRCLE FARIDABAD
H.O.C VAISHALI
N.B.C N. DELHI
JPO-SKSKI NEPAL
CO-ORD. COIMBATORE
MONITORING CHENNAI
BEACH EROSION KOCHI
C & S.R. C BENGALURU
KRISHNA CO-ORD CIRCLE HYDERABAD
GODAVARI CIRCLE HYDERABAD
M & A (AP) HYDERABAD
M & A (T) HYDERABAD
CO-ORD. BHUBANESWAR
M & A BHUBANESWAR
H.O.C. BHUBANESWAR
CO-ORD. NAGPUR
APPRAISAL NAGPUR
MONITORING NAGPUR
M & A PUNE
CO-ORD. GANDHINAGAR
MONITORING GANDHINAGAR
H.O.C. GANDHINAGAR
CO-ORD. KOLKATA
H.O.C. MAITHON
INVESTIGATION CIRCLE GANGTOK
M & A KOLKATA
CO-ORD. LUCKNOW
H.O.C. DEHRADUN
M & A LUCKNOW
M & A AGRA
CO-ORD. PATNA
H.O.C VARANASI
M & A RANCHI
MONITORING PATNA
CO-ORD. SHILLONG
MEGHNA CIRCLE SILCHAR
N.E.I.C. cum M&A SHILLONG
CO-ORD. GUWAHATI
H.O & I.C GUWAHATI
M & A GUWAHATI
MORPHOLOGY & CLIMATE CHANGE
RIVER CONSERVATION
RIVER DATA COMPILATION I
RIVER DATA COMPILATION II
COASTAL MANAGEMENT
FLOOD MANAGEMENT I
FLOOD MANAGEMENT II
FLOOD FORECAST MONITORING
FLOOD MANAGEMENT PLANNING
FLOOD CONTROL APPH I
FLOOD CONTROL APPH II
H.O .C & C BENGALURU
APPRAISAL BENGALURU
MONITORING BENGALURU

2 WATER RESOURCES DEVELOPMENT

2.1 Water Resources in India

CWC has been periodically assessing the country's overall water resources development. The water resources potential of the country, which occurs as a natural runoff in the rivers is about 1999.20 Billion Cubic Meters (BCM). It constitutes a little over 4% of the total river water of the world. However, due to various constraints of topography and uneven distribution over space and time, only about 1139 BCM of the total annual water potential can be used beneficially. This can be achieved by use of 690 BCM of utilizable surface water and 449 BCM through ground water.

Water supply for drinking purpose has been accorded top most priority in water allocation and its various uses, but major utilization is for irrigation purpose. As on 2011-12, Ultimate Irrigation Potential (UIP) estimated for the country is 139.89 Mha, out of which the assessed potential through major and medium irrigation projects is 58.47 Mha. Besides this, an additional irrigation potential of about 35 Mha can be created by inter basin transfer of water from surplus to deficit basins. The Irrigation Potential Created (IPC) in the country, which stood at 12.9 Mha in 1951, has risen to 113.53 Mha by end of XI plan period. Reassessment of UIP, IPC & IPU of the country, project wise for MMI projects, and source wise i.e. Surface and Ground water, for MI projects has been taken up for updating this data and are under progress.

In order to appropriately address the present and future water and food security Government of India has been implementing various measures. The following thrust/priority areas, for further water resources development, have been identified by the Government.

- Improving the overall water use efficiency in irrigation and drinking water supply system;
- Adoption of piped distribution system in place of open canal system to reduce the conveyance water lose
- Command area development by implementing more micro irrigation system and participatory irrigation management;
- Flood management and erosion control using new tools and techniques;
- Protection from coastal erosion by creation of proper costal data collection and management network;
- Dam safety, dam rehabilitation and performance improvement;
- Repair, Renovation and Restoration of existing water bodies use for irrigation, drinking water supply, cultural activities, etc;
- Construction of more minor irrigation structures to achieve the goal of Appropriate regulation and improvement in management of ground water;
- Increasing the ground water availability by various Ground water recharge techniques;
- Inter basin transfer of river water by inter-linking of rivers;
- Improving the rural drinking water supply system and sanitation;

Central Water Commission has been thriving for sustainable development of water resources of the country, by directly and indirectly contributing in achieving the objectives of these thrust/priority areas.

2.2 Highlights of Water Resources Sector

As the variability over space and time of rainfall over the country is well known, the development of water resources for irrigated agriculture received high priority in the different Plan periods. This enabled the achievement of food security and export of surplus food grains. Expansion of irrigation facilities to ensure irrigation water for every agriculture land, along with consolidation of the existing systems, has been the main strategy for increasing production of food grains.

Irrigation water has been provided through Major, Medium and Minor Irrigation Projects and command area development. Out of UIP of 139.89 Mha, the cumulative Irrigation Potential is Created **136.46 Mha** up to the year 2023. (**shown in Fig. 2.1**).

2.2.1 Irrigation Potential: Major & Medium Irrigation Sector

The UIP of the country from Major and Medium Irrigation Projects is assessed as **58.47 Mha**. Irrigation Potential Created in the country from Major and Medium Irrigation Projects, which stood at 9.7 Mha in 1951, has risen to **47.62 Mha** at the end of year 2023.

2.2.2 Major and Medium Irrigation Projects

In 1951, during launching of the First Five Year Plan, there were 74 major and 143 medium irrigation projects in the country. As per information provided in "National Register of Major and Medium Irrigation Projects in India", **1720** Major and Mediuam irrigation projects have been included in this Register. Among them, 449 Major & 874 Medium projects had been completed at end of year 2023 and the remaining 207 Major & 190 Medium Irrigation Projects are still ongoing.

Out of 167 ERM projects, 108 ERM projects had been reported complete by end of year 2023 and remaining 59 ERM Projects are stll ongoing.

Number of Major, Medium and ERM projects completed and Ongoing are shown in **Fig 2.2, and 2.3 respectively**.

Figure 2.1 : Cumulative Irrigation Potential Created

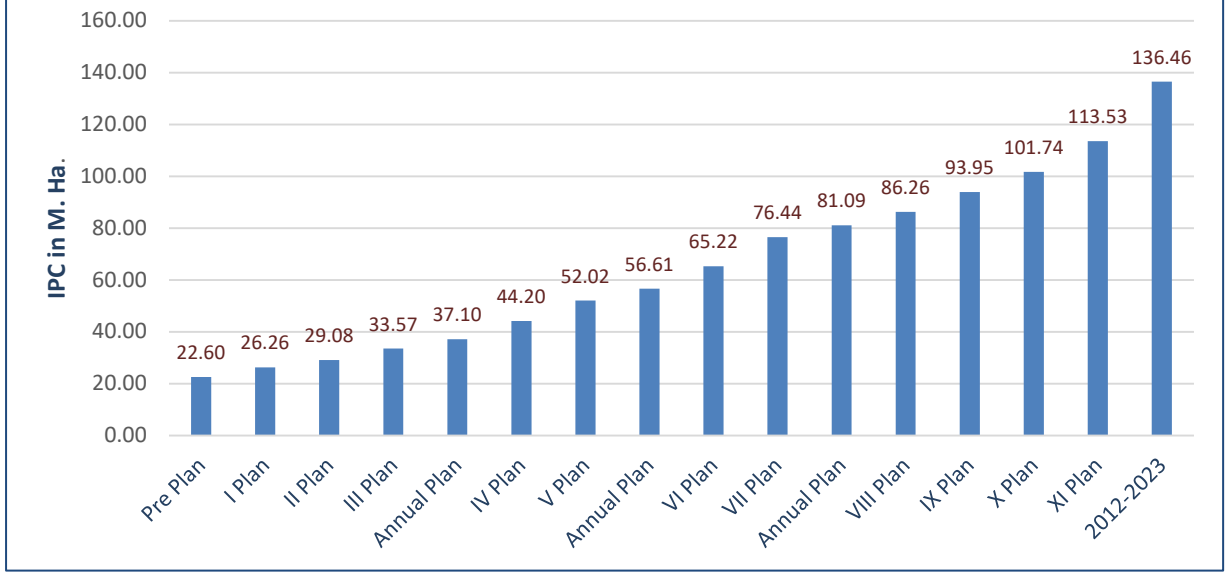


Figure 2.2: Status of MMI Projects in India

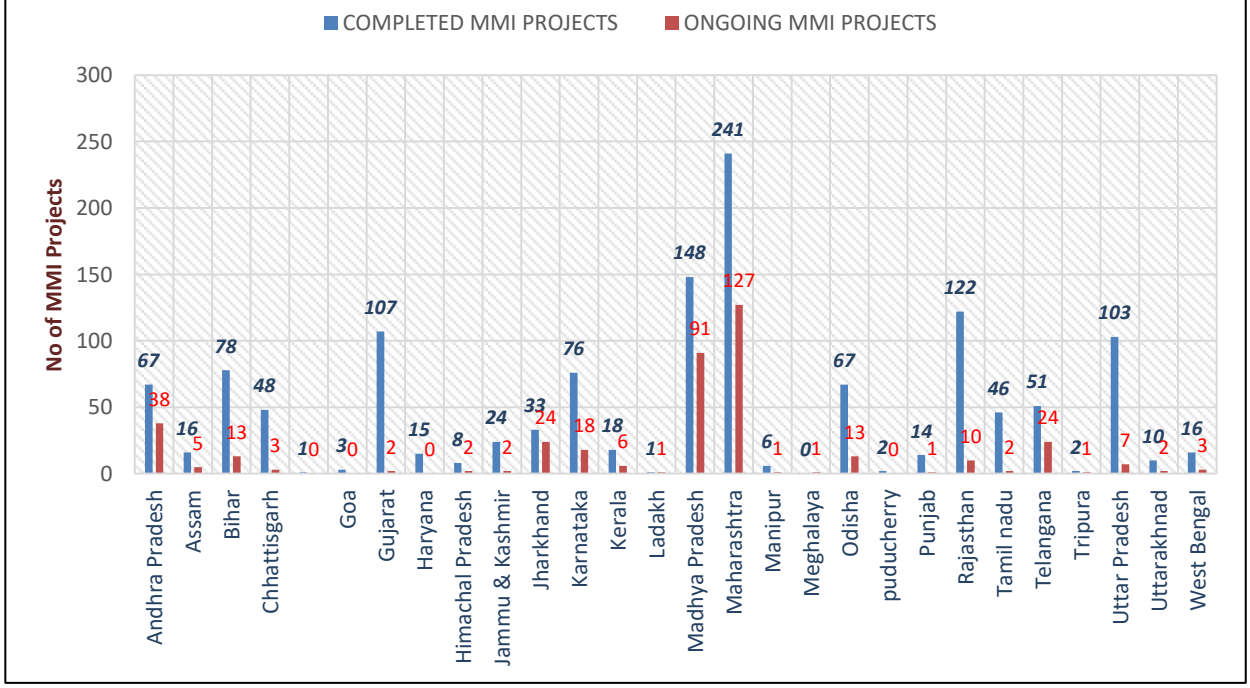
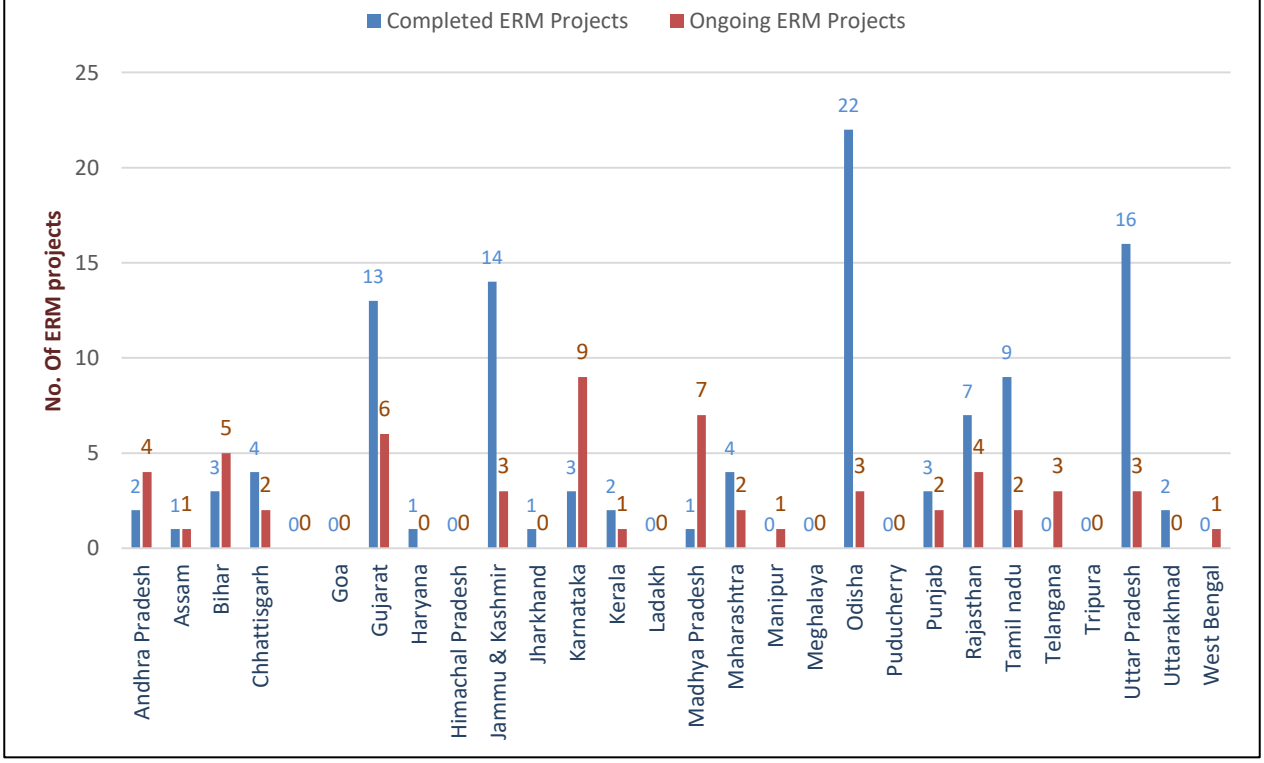


Figure 2.3: Staus of ERM Projects In India



2.3 Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)

2.3.1 AIBP

The Accelerated Irrigation Benefits Programme (AIBP) was launched by Union Government in 1996-1997, to provide Central Assistance in the form of Loan to State Governments to complete those ongoing irrigation projects which were costing Rs 1000 Crore or above and were in advance stage of completion. Subsequently the AIBP Guidelines were changed from time to time so as to include all categories of projects i.e. Major, Medium and Surface Minor Irrigation (SMI) Projects to bring a regional balance. From 2005-06 onwards, Central Assistance is provided in form of grant. Since inception altogether 297 Major and Medium Irrigation Projects have been included under AIBP out of which 143 Projects have been completed and five Projects have been deferred, leaving 149 projects as ongoing as on 2015-16. A total sum of Rs 55601.11 Cr was provided to State Governments in the form of Central Assistance till March 2016 for Major and Medium Irrigation Projects under AIBP and an Irrigation Potential of 9089.29 Th. Ha. has been created upto March 2016.

2.3.2 PMKSY-AIBP

Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) was launched by Government of India during the year 2015-16, with an aim to enhance physical access of water on farm and expand cultivable area under assured irrigation, improve on farm water use efficiency, introduce sustainable water conservation practices etc. It is the umbrella scheme with the motto of providing 'HarKhetKoPani' ensuring access to some means of protective irrigation to all agricultural farms in the country, and to produce 'per drop more crop', thus bringing much desired rural prosperity. Under PMKSY-AIBP, a dedicated funding mechanism i.e. Long Term Irrigation Fund (LTIF) a special window has been created in NABARD which could be utilized by the Central and State Governments to bridge the requirement of funds for completion of the priority projects under PMKSY including CAD works for central assistance as well as state share component.

The objective of the scheme is to lead to substantial increase in agricultural production

Fig. 2.4: Thoubal Multipurpose Project, Manipur (Project under PMKSY-AIBP)

and productivity thereby enhancing farm income. The components of the scheme are: (i) Accelerated Irrigation Benefit Programme (AIBP); (ii) Har Khet ko Pani; (iii) Per Drop More Crop and (iv) Watershed Development.
Har Khet ko Pani (HKKP) component, in turn consists of four sub-components, being Command Area Development (CAD), Surface Minor irrigation (SMI), Repair, Renovation and Restoration (RRR) of Water Bodies, and Ground Water (GW) Development component. However, CAD&WM sub-component of HKKP is being implemented pari-passu with AIBP.

Two major components, namely, Accelerated irrigation Benefits Programme (AIBP) and Har Khet Ko Pani (HKKP) are being implemented by DoWR,RD&GR, Ministry of Jal Shakti. Per Drop More Crop (PDMC) component is being implemented by Department of Agriculture, Cooperation and Farmers Welfare, Ministry of Agriculture & Farmers Welfare. Watershed Development (WD) component of PMKSY is being implemented by department of Land Resources, Ministry of Rural Development.

Under the PMKSY-AIBP, Ninety-Nine (99) out of the 149 ongoing Major/Medium Irrigation projects (and 7 phases) spread in 17 States and two Union Territories (Jammu & Kashmir and Ladakh) were prioritised with an estimated balance cost of Rs. 77,595 crore with Central share of Rs. 31,342 crore to complete them in a time bound manner. Out of 99 projects and 7 phases (total -106), 58 MMI projects have been reported as completed upto March, 2024. The Ultimate Irrigation Potential of these 99 projects is 76.03 Lakh Ha., out of which 41.39 Lakh Ha. was created upto March, 2016. Out of balance 34.63 Lakh Ha, additional potential of 25.803 Lakh Ha has been created through these projects during 2016-2024.

2.3.3 EXTENSION OF PMKSY-AIBP

Further in December, 2021, Extension of PMKSY for the period 2021-22 to 2025-26 has been approved by Government of India with an outlay of Rs. 93,068.00 Crore with a Central Assistance of Rs. 37,454.00 Crore. However, approval of Ground Water component under PMKSY-HKKP has been provisionally approved for 2021-22 (extended subsequently for completion of ongoing works and liabilities), as on date, Per Drop More Crop component is now no longer under the PMKSY.

Under the continuing scheme of PMKSY-AIBP, it is planned to provide financial assistance for completion of 60 ongoing Major/Medium Irrigation projects under PMKSY-AIBP, 85 ongoing CADWM projects and financial assistance to new Major/Medium irrigation projects including ERM projects. Eight (08) newly MMI/ERM projects have been included in the scheme during FY 2021-22 to 2023-24 (upto March, 2024). The irrigation potential created from the newly included projects under PMKSY-AIBP during 2021-2024 is 0.31 lakh Ha.

INDIA – LAND AND WATER RESOURCES: FACTS

•	Geographical Area & Location	328.7 M ha Latitude; $08^{0}0$4'N to 37^{0} 06' N Longitude: 68^{0} 7'E to 97^{0} 25' E
•	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 total catchment area 253 Mha
•	Medium River Basin (Catchment Area between 2000 and 20,000 Sq km)	46 nos. having total catchments area 25 Mha
•	Total Navigable Length of Important Rivers	14464 Km

WATER RESOURCES

•	Average Annual Rainfall (1985-2015)	1105 mm (3880 BCM)
•	Annual Rainfall (2022)	1257 mm
•	Average Annual Water Resources Availability	1999.2 BCM
•	Total Utilisable Water	1139 BCM
•	Estimated Utilisable Surface Water Potential	690 BCM
•	Total Annual Ground Water Recharge (2022)	449 BCM
•	Net Ground Water Availability (2013)	411 BCM
•	Ultimate Irrigation Potential	139.9 Mha
	From Surface Water	76 Mha
	From Ground Water	64 Mha
•	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

(Source: Indian Meteorological Department / Basin Planning Directorate, CWC)

LAND RESOURCES

•	Total Cultivable Land	180.112 M ha
•	Gross Sown Area (2021-22)	219.125 M ha
•	Net Sown Area (2021-22)	141.007 M ha
•	Irrigation Potential Created (upto 2012)	113.5 M ha
•	Gross Irrigated Area (2021-22)	120.380 M ha
•	Net Irrigated Area (2021-22)	77.916 M ha

(Source: Land Use Statistics Report of MoA & FW / Project & Planning Directorate, CWC)

HYDRO-POWER

•	Ultimate Hydropower Potential	133410 MW
•	Potential Developed by 31.3.2020 (Installed Capacity of plants above 25 MW)	46850.15 MW

(Source: Central Electricity Authority)

3 RIVER MANAGEMENT

3.1 Systematic Collection and Compilation of Hydrological Data

India has a total geographical area of 329 Mha having an annual precipitation of 4000 BCM with wide temporal and spatial variation. From river basin point of view, India has been divided into 23 river basins. The collection of hydro-meteorological data for all the river basin in a scientific manner is essential for achieving various objectives viz. planning and development of water resources projects, studies related to assessment of impacts due to climate change, water availability studies, design flood and sedimentation studies, flood level/inflow forecasting, solving of International & Inter-State issues, river morphology studies, Reservoir siltation studies, development of inland waterways, research related activities etc.

As on April 2024, Central Water Commission is maintaining a network of 1543 Hydrological Observation (HO) stations (1522 operational and 21 under rview) in different river basins of the country to collect (i) water level, (ii) discharge, (iii) water quality and (iv) silt. This includes 717 new stations opened during the XII five year plan. In addition to this, Meteorological parameters including snow observations are also recorded at some key stations. This will help in addressing the data requirement of the country more precisely and in better scientific manner.

The basin-wise distribution 1522 operational HO stations is detailed below in Table 3.1.

Table 3.1
Basin-wise number of 1522operational Hydrological Observation Stations

Sl.	Name of Basin	No. of Sites
	Brahmani-Baitarni Basin	24
	Cauvery Basin	54
	East Flowing rivers between Mahanadi and Godavari	18
	East Flowing rivers between Pennar and Cauvery	29
	Ganga	558
6	EFR between Krisna & Pennar	2
7	EFR South of Cauvery	8
8	Godavari Basin	137
9	Indus Basin	59
10	Krishna Basin	65
11	Mahanadi Basin	55
12	Mahi Basin	17
13	Minor rivers draining into Bangladesh	6
14	Minor rivers draining into Myanmar	10
15	Narmada Basin	71
16	Pennar Basin	12
17	Sabarmati Basin	13
18	Subarnarekha Basin	15
19	Tapi Basin	40
20	West Flowing Rivers from South of Tapi	72
21	Barak & Other basin	67
22	West flowing rivers of Kutchh and Saurashtra including Luni	18
23	Brahmaputra basin	173
	Total	**1522**

CWC also operates 81 exclusive meteorological observations stations in various basins in the country.

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

Planning & Development Organization at CWC headquarter at New Delhi maintains hydrological

data pertaining to all rivers of India. The data is provided to the bonafide users on request by following a set procedure and as per 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.

3.1.1 Water Quality Monitoring

Central Water Commission is monitoring water quality also at 657 key hydrological observation stations covering all the important river basins of India. Also, water quality samples are being collected from 125 Water Quality Sampling stations. CWC is maintaining a three tier laboratory system for analysis of the physio-chemical parameters of the water. The Level-I laboratories are located at 427 field water quality monitoring stations on major rivers of India where physical parameters such as temperature, colour, odour, electrical conductivity, pH and dissolved oxygen of river water are observed. There are 18 Level–II laboratories located at selected division offices throughout India to analyses 25 nos. of physio-chemical characteristics and bacteriological parameters of water. 5 Level-III laboratories are functioning at Varanasi, Delhi, Hyderabad, Coimbatore and Guwahati where 41 parameters including heavy metals / trace & toxic parameters and pesticides are analysed. As on April 2024, out of 23 laboratories in CWC, 22 laboratories got accredited by National Accreditation Board for Testing and Calibration Laboratories (NABL) in accordance with Standard ISO/IEC 17025:2017 and accreditation of 3 laboratories are under process. Details of NABL Accreditation status of 23 Water Quality Laboratories of CWC are given in the Table 3.2.

Table: 3.2: NABL Accreditation status of Water Quality Laboratories of CWC

Sl.	Name of Laboratory	Level	Location	Organisation	NABL Accreditation Status
1	Upper Brahmaputra Divisional Water Quality Laboratory	II	Dibrugarh	BBO, Guwahati	Non Accredited
2	Middle Brahmaputra Divisional Water Quality Laboratory	III	Guwahati	BBO, Guwahati	Accredited
3	Lower Brahmaputra Divisional Water Quality Laboratory	II	Jalpaiguri	T&BDBO, Kolkata	Accredited
4	Upper Cauvery Water Quality Laboratory	II	Bangalore	MSO, Bengaluru	Accredited
5	Lower Cauvery Water Quality Laboratory	III	Coimbatore	C&SRO, Coimbatore	Accredited
6	West Flowing Rivers Water Quality Laboratory	II	Kochi	C&SRO, Coimbatore	Accredited
7	East Flowing Rivers Water Quality Laboratory	II	Chennai	C&SRO, Coimbatore	Accredited
8	Upper Krishna Divisional Water Quality Laboratory	II	Pune	KGBO, Hyderabad	Accredited
9	Krishna & Godavari River Water Quality Laboratory	III	Hyderabad	KGBO, Hyderabad	Accredited

Sl.	Name of Laboratory	Level	Location	Organisation	NABL Accreditation Status
10	Chenab Divisional Water Quality Laboratory	II	Jammu	IBO, Chandigarh	Accredited
11	Middle Ganga Divisional-II Water Quality Laboratory	II	Patna	LGBO, Patna	Accredited
12	Lower Ganga Divisional Water Quality Laboratory	II	Berhampore	T&BDBO, Kolkata	Accredited
13	Mahanadi Divisional Water Quality Laboratory	II	Raipur	MERO, Bhubaneswar	Accredited
14	Eastern River Water Quality Laboratory	II	Bhubaneswar	MERO, Bhubaneswar	Accredited
15	Waingangā Divisional Water Quality Laboratory	II	Nagpur	MCO, Nagpur	Accredited
16	Narmada Divisional Water Quality Laboratory	II	Bhopal	NBO, Bhopal	Accredited
17	Tapi Divisional Water Quality Laboratory	II	Surat	MTBO, Gandhinagar	Accredited
18	Mahi Divisional Water Quality Laboratory	II	Gandhinagar	MTBO, Gandhinagar	Accredited
19	Upper & Middle Ganga River Water Quality Laboratory	III	Varanasi	LGBO, Patna	Accredited
20	Himalayan Divisional Water Quality Laboratory	II	Haridwar	UGBO, Lucknow	Accredited
21	Middle Ganga Divisional Water Quality Laboratory	II	Lucknow	UGBO, Lucknow	Accredited
22	Lower Yamuna Water Quality Laboratory	II	Agra	YBO, New Delhi	Accredited
23	National River Water Quality Laboratory	III	Delhi	YBO, New Delhi	Accredited

The water quality data generated is computerized in Database system and disseminated in the form of Water Quality Year Books, Status Reports and Bulletins. The data being so collected are put to various uses viz. planning and development of water resources projects, climate change studies, water availability studies, inter-State issues, research related activities etc.

3.1.2 Water Information Management System (WIMS)

During the Hydrology Project-I, the Central Water Commission had developed suites of software packages viz. Surface Water Data Entry System (SWDES), Hydrological Modelling Software (HYMOS) and Water Information System Data Online Management (WISDOM). These softwares were primarily being used for data entry, primary and secondary data validation, data processing, data storage and dissemination of Hydro-meteorological data. The application software was developed in a stand-alone environment and in the client server environment, integrating GIS, database and various systems software to provide client applications and a limited web service. Out of these, HYMOS software was the proprietary software.

To overcome the drawbacks which were encountered during the running of above

software, Central Water Commission has developed Online Surface Water Information System (e-SWIS) software under the Hydrology Project-II (HP-II). e-SWIS, (web and GIS-based Surface Water Information System) is being implemented in participating Agencies in Hydrology Project II, and potentially in all States and UTs of India. The main objective of development of the new software was to replace obsolete components of existing software, improve its system architecture and add some new components.

Central Water Commission and other Implementing Agencies operate an extensive network of hydrometric and hydro-meteorological measurement stations, from which data are collected on climate, river flows, and water quality. Moreover, seeing the importance of Integrated Information system with the concept of centralized database, which widens scope of data collection due to increase in nos. of agencies, Internet enabled surface water information system (e-SWIS) has been upgraded to Water Information Management System (WIMS) under National Hydrology Project-NHP.

Water Information Management System (WIMS) software is an up gradation and extension of e-SWIS software. WIMS is a web-based open-source software system for managing data entry, primary data validation, data processing, storage for Surface Water and Ground Water Resources. In WIMS data is very secure and only classified users can access the WIMS application. In WIMS, we can manage and create both kinds of station types i.e. Surface Water and Ground Water. WIMS stores all the information of a station for both station type (Surface Water/Ground Water) based on agencies. The user Management Module is the most important module and it can be managed by the Nodal Agency in WIMS. Earlier in e-SWIS software, the Groundwater module functionality feature was not present, but in WIMS Software, Ground Water module functionality is implemented and Ground Water station data can be fed in Ground Water Module.

Another feature of WIMS is telemetry management and live data from INSAT & GPRS.

The benefits of WIMS software are:

- It is based on web application.
- Surface as well as Ground Water data is available in WIMS.
- Telemetry Management is proper.
- Data from State and other implementing agencies coming to WIMS.
- Inclusion of Flood Forecasting and Water Quality Management.
- Easy access to information.
- Automatic backup procedure.
- Complete security control over data and functionality.
- Data can be entered from anywhere.
- Data access will be controlled and restricted to authorized users.
- Data Integration is automatic and there is no need to physically send the data for central depository.

However, all the works related to the development and maintenance of WIMS has been handed over to NWIC on 01.12.2020 on "As is where is Basis"

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 made a beginning in 1958 in India in a scientific manner 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 340 flood forecasting stations, of which 200 are level forecasting and 140 are inflow forecasting stations on major dams/ barrages, spread over 22 States viz. Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Sikkim, Tamil Nadu, Telangana, Tripura, Uttarakhand, Uttar Pradesh & West Bengal and 3 Union Territories Jammu & Kashmir, Daman and Diu and the National Capital Territory of Delhi. It covers 20 major river systems in the country.

On an average, over 10000 forecasts are being issued every year by Central Water Commission during the flood season. Normally, these forecasts are issued 6 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 observed at Hydrological Observation sites are used. A network of wireless stations is used for communication of data. Synoptic weather situations, weather forecast/ heavy rainfall warnings etc. are also being collected from Flood Meteorological Offices (FMOs) of IMD for the purpose.

The flood forecasting services is provided by CWC during a designated flood period in a year in order to cover pre monsoon and post monsoon incidents. The designated flood period was last reviewed in 2013 and accordingly the designated flood period for various basins as given below:

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

Depending upon the water level of the river, Central Water Commission has categorized the flood situations at a station into three different categories namely, Above Normal, Severe & Extreme flood situation. The details are as under, depending upon with reference to warning level, danger level, and highest flood level.

Above Normal: The River is said to be flowing in "**Above Normal**" at any station when the water level of the river touches or crosses the Warning Level, but remains below the Danger Level of the station.

Severe Flood Situation: The River is said to be flowing in "**Severe Flood Situation**" at any station when the water level of the river touches or crosses the Danger Level, but below the Highest Flood Level (HFL) of the station. Orange Bulletin is issued to the user agencies.

Extreme Flood Situation: The River is said to be flowing in "**Extreme Flood Situation**" at any station when the water level of the river touches or crosses the HFL of the station. A special "Red Bulletin" is being issued by the Central Water Commission to the users agencies which contains the details related to the flood situation.

3.2.1 Flood Forecasting Performance during 2023

During the year, the flood forecasting activity began from 1st May 2023. During the flood season of 2023 (May to December), 6339 flood forecasts (4567 level forecast and 1772 inflow forecasts) were issued out of which 5952 (93.89%) forecasts were found within accuracy limit (± 0.15 m for level forecast and ± 20% for inflow forecast). Using the web-based WIMS software, the hydrological data of all Hydrological Observation stations was entered by all Divisions of CWC on real time basis. Based on above data, the current status of the rivers has been monitored on real time basis.

The flood forecast & water level information were made available to common public through the website //ffs.india-water.gov.in on near real time basis. This service was widely followed up by the flood affected people. The appreciations/ suggestions regarding the service were received from various people during the monsoon season.

7-day Advisory Flood Forecasts based on mathematical modeling approach are being issued by CWC. During flood season, advisory Flood Forecast are available for all the 20 river basins online on the website https://aff.india-water.gov.in/. Also present flood situation information, forecast and advisories are being disseminated through FloodWatch India App. The user-friendly app is available on android and ioS platform With the availability of such

information on severe storms, CWC is now issuing specific advisories giving district-wise advise on anticipated floods to facilitate early NDRF/SDRF deployment and dam-wise advise for operation of reservoir gates and release of water from reservoir, wherever applicable.

CWC is issuing Daily Flood Situation Reports from May 2023 onwards till December 2023. In addition to reports containing the usual daily rainfall situation, rainfall forecast for the next 7 days, daily flood bulletin for the day and the flood situation and advisories for the next few days, GIS based Map indicating the districts affected by flood and reservoirs having inflow forecasts were also continued. Further the report was sent to all beneficiaries including State Governments as well as general public through Facebook (@CWC official FF), twitter (@CWC official FF) and Whatsapp group.

3.2.2 Significant Flood Situations during 2023

1. During the flood season of 2023, out of 200 level forecasting stations, Extreme Flood Situation was witnessed at 5 stations. Further, 61 more stations, where water level is being monitored by CWC, witnessed Extreme Flood Situation during the period.
2. 76 FF Stations flowed in Severe Flood Situation in the States of Assam, Bihar, Uttar Pradesh, West Bengal, Andhra Pradesh, Telangana, Odisha, Maharashtra, Jharkhand, Madhya Pradesh, Uttarakhand, Rajasthan and Gujarat during the period 1st May to 31st December 2023.
3. 47 FF Stations in Arunachal Pradesh, Assam, Bihar, Jammu & Kashmir, Rajasthan, Uttar Pradesh, Himachal Pradesh, Haryana, West Bengal, Madhya Pradesh, Maharashtra, Andhra Pradesh, Tamilnadu, Kerala, Odisha, Telangana, Tripura and Gujarat flowed in Above Normal Flood Situation during the period 1st May to 31st December 2023.
4. 79 reservoir received inflows above its threshold limit in Andhra Pradesh, Chattisgarh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Tamilnadu, Telangana, Jharkhand, West Bengal, Uttarakhand and Uttar Pradesh during the period from 1st May to 31st December 2023.

3.2.3 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 field formations of CWC. During the year 2023, 245 daily bulletins (once daily), 454 Orange Bulletins for Severe Flood Situation (every 6 hours) and 310 Red Bulletins for Extreme Flood Situation (every 3hours) were issued by CWC as per Standard Operating Procedure (SOP).

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

3.2.4 Communication System of CWC used for flood forecasting purposes

Various modes of communication namely, wireless, satellite, GSM/GPRS, VSAT, Telephone, Mobile, Fax and Internet were used by CWC for flood forecasting purposes. Since beginning, Central Water Commission has been operating wireless stations covering almost all river basins to transmit and receive manually observed data. Sensor based automatically collected data were transmitted from remote observation stations to Earth Receiving Stations (ERS) through Data Relay Transponder (DRT) of INSAT 3D and from ERS to Central Flood Control Room (CFCR) at CWC headquarter, New Delhi and/or Divisional Flood Control Room (DFCR) at Divisional offices of CWC through VSAT. Telephone, Mobile, FAX and E-mail are also used at all the DFCR and CFCR (under FFM Directorate, CWC) for transmission of data. The CFCR at FFM Dte, New Delhi operated on 24x7 basis during monsoon. The information regarding Severe and Extreme Flood Situation were also sent to concerned authorities in Erstwhile MoWR, RD&GR, CWC, National Disaster Management Authority (NDMA), Indian Meteorological

Department (IMD), National Disaster Response Force (NDRF) etc. through email. The forecast, water level and rainfall information were regularly uploaded on web site http://india-water.gov.in/wims during monsoon season.

3.2.5 Modernization of Flood Forecasting Services

Central Water Commission is making a constant endeavour in updating and modernizing the flood 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 broadly under following functions:

- Installation of telemetry system for automatic sensor based data collection and satellite based data communication.
- Development of mathematical model for forecast formulation using observed hydrological & hydro-meteorological data & rainfall forecast from IMD.
- Web-based system for forecast dissemination.

3.2.5.1 Installation of Telemetry System

In order to meet the requirement of real-time data collection, automatic data transmission and flood forecast formulation, expeditious data/information dissemination, the Central Water Commission has undertaken modernization of its data collection and flood forecast network.

The installation of Telemetry System with automatic sensor based data collection and satellite based data communication was initiated during IX Plan and it was installed at 55 stations in Chambal and Upper Mahanadi basins under the World Bank aided Dam Safety Assurance and Rehabilitation Project (DSARP) scheme.

During X Plan, telemetry system was installed at 168 stations in six river basins namely, Godavari (63), Krishna (41), Brahmaputra (21), Damodar (20), Yamuna (15) and Mahanadi (8).

During XI plan, telemetry system was installed at 222 stations in seven river basins namely, Indus (4), Ganga (63), Yamuna (25), Narmada & Tapi (76), Mahanadi (36), Brahmaputra (14) and Godavari (4).

Further, during XII Plan, telemetry system was installed at 495 stations in 14 river basins namely, Brahmaputra(67), Yamuna (51), Godavari(25), Pennar(5), Krishna(15), Eastern Rivers(30), Teesta Basin (30), Narmada (12), Ganga(153), Chenab(4), Mahi Tapi (24), Southern River (38), Cauvery (32) and Wainganga(9).

In order to receive and analyse data collected by the telemetry stations, Earth Receiving Stations and Modelling Centres have been installed in various parts of the country during different Plan periods. There are 3 Earth Receiving Stations (ERS) in the country at New Delhi, Jaipur and Burla. A total of **27** Modelling centres have been installed in the country till the end of XII Plan. The data reception from stations all over India is being monitored from Central Flood Control Room at CWC Headquarter, New Delhi.

Upto Mar 2024, 1121 Telemetry stations have been installed.

3.2.5.2 Development and use of Mathematical Model for Flood Forecasting

CWC is currently providing Seven-day advisory flood forecast on its web portal https://aff.india-water.gov.in by doing pan India rainfall-based mathematical modelling for 20 major river basins of the country covering 200 water level and 140 reservoir inflow forecast stations. This is a major paradigm shift from the conventional Gauge-to-Gauge correlation to a more scientific modelling technique for flood forecasting. The system is totally in-house developed using modelling software's (MIKE 11, ArcGIS etc) generating forecast which is updated every three hours for all the stations simultaneously in automatic mode.

It uses both the hydrologic (rainfall-runoff) and hydrodynamic modelling techniques for real-time water level and inflow prediction in the rivers

and reservoirs respectively. This new intervention has not only increased the lead time substantially to 7 days for all the stations but also standardised the forecast duration in a pattern similar to rainfall observation time. The Advisory Flood Forecast is generated using various available rainfall data products like forecasted rainfall data GFS (Global Forecast System) provided by IMD (India Meteorological Department), GSMaP (Global Satellite Mapping of Precipitation- JAXA product) & GPM (Global Precipitation Measurement- NASA & JAXA product), as a major input into the system.

3.2.5.3 Web-based system for forecast dissemination

The web based system for dissemination of flood forecast & water level information was operationalized in 2014. The information is available on near real time basis on website https://ffs.india-water.gov.in.

3.3 FLOOD MANAGEMENT AND BORDER AREAS PROGRAMME (FMBAP)

A comprehensive scheme titled "Flood Management and Border Areas Programme (FMBAP)" with an outlay of Rs. 3342.00 Cr (FMP-Rs 2642 Cr & RMBA-Rs 700 Cr) for period 2017-2020 with merged components from the existing Flood Management Programme (FMP) and River Management in Border Areas (RMBA) schemes during XII Five Year Plan was approved by the Union Cabinet on 07-Mar-2019 and aimed at completion of the on-going projects already approved under FMP. The scheme was extended till March, 2021. The continuation of FMBAP scheme for the period FY 2021-2026 has been approved by Cabinet in Februray, 2024 with outlay of Rs. 4100 Cr.

Brief about both components are as under:

3.3.1 Flood Management Program (FMP)

"Flood Management Programme (FMP)" a State Sector scheme amounting to Rs. 8,000 Cr. under Central Plan proposed by Erstwhile MoWR, RD & GR was approved by Government of India during XI Plan (Nov. 2007). The continuation of flood management programme was approved by the Government of India during XII Plan with an outlay of Rs. 10,000 Cr. An outlay of Rs. 2642 Cr. was kept for period 2017-21 under this component. The continuation of FMBAP scheme for the period FY 2021-2026 has been approved by Cabinet in Februray, 2024 with outlay of Rs. 4100 Cr.

A total 529 schemes costing Rs 15812.12 Cr were approved during XI Plan (420 projects costing Rs 7857.08 Cr) ~~and~~ XII Plan (102 projects costing Rs 5381.29 Cr) and FY 2021-26 (7 projects costing Rs 2573.76 Cr. Out of these 529 schemes, 427 schemes have been completed; 64 schemes foreclosed, dropped and shifted (47-foreclosed; 16-dropped & 1 shifted to RMBA component) and 38 schemes are ongoing.

Out of these 38 ongoing schemes; 18, 13 & 7 schemes are being monitored by CWC, GFCC & Brahmaputra Board respectively. Further out of 18 ongoing schemes (for UT of J&K -16, Himachal Pradesh-1 and Laddakh-1), being monitored by CWC, complete Central Assistance has been released for 8 ongoing schemes. These 427 completed schemes have given protection to an area of around 4.99 mha and protected a population of about 53.57 million.

3.3.2 River Management Activities & Works related to Border Areas (RMBA) Component

River Management Activities & Works related to Border Areas (RMBA) started as a Central Sector Scheme with an outlay of Rs 820 Cr in XI plan. The scheme with an outlay of Rs 740 Cr was also continued during XII Plan. An outlay of Rs 700 Cr was kept for period 2017-21 under this component. Under this component, outlay of Rs 1160 cr has been kept for the period of 2021-26

Following activities are being taken up under RMBA component of FMBAP:

Sl.	Activity
1	Hydrological observations and flood forecasting on common border rivers with neighbouring countries
2	Investigation of WR projects in

	neighbouring countries
3	Pre-construction activities for WR projects on common border rivers
4	Grant in aid to states for bank protection /anti erosion works on common border rivers and Union Territories for flood management /anti sea erosion measurers
5	Activities of Ganga Flood Control Commission (GFCC)

3.3.3 FMBAP (2021-26)

The continuation of FMBAP scheme for the period FY 2021-2026 has been approved by Cabinet in Februray, 2024 with outlay of Rs. 4100 Cr. Funding ratio has been kept as 90:10 (for special category States) and 60:40 (for general States) under Flood Management Programme (FMP) component of FMBAP scheme.

7 schemes costing Rs 2403.24 Cr (2 schemes from Arunachal Pradesh and 1 each from J&K, Himachal Pradesh, Assam, Manipur & Bihar) has been included under FMP component of FMBAP: 2021-26.

Funds released under the FMP as well as RMBA as grant in –Aid up to March, 2023 is presented in Table 3.3.

Table 3.3: Funds released under FMP and RMBA since XI Plan up to March,2024 (Rs. in crore)

Fund Releases	FMP	RMBA (Grant-in-Aid)	Total
XI PLAN	3566.00	340.41	3906.41
XII PLAN	1307.07	223.20	1530.27
Total (XI+XII)	4873.07	563.61	5436.68
FMBAP 2017-21: FY:2017-18	562.67	159.25	721.92
FMBAP 2017-21: FY:2018-19	428.20	256.48	684.68
FMBAP 2017-21: FY:2019-20	546.02	69.61	615.63
FMBAP 2017-21: FY:2020-21	37.79	42.49	80.28
Total FMBAP 2017-21	1574.68	527.83	2102.51
FMBAP 2021-26: FY:2021-22	239.7539	3.736	243.49
FMBAP 2021-26: FY:2022-23	325.28	88.96	414.24
FMBAP 2021-26: FY:2023-24	100.71	74.59	175.30
Total as on date since XI Plan	**7113.50**	**1258.73**	**8372.23**

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 by both Central and State Governments. Problems are aggregating mainly due to severe erosion of river banks and large quantity of silt/sediment being carried and deposited in its downstream reaches. This behaviour of the river needs to be thoroughly understood for evolving effective strategies to overcome the problem posed by it.

Consultancy works for morphological studies of 15 rivers (Ganga, Sharda, Rapti, Kosi, Bagmati, Yamuna, Brahmaputra, Subansiri, Pagladiya, Krishna, Tungbhadra, Mahananda, Mahanadi, Hoogli, &Tapti) by using remote sensing technology was awarded to IITs/NITs under the Plan Scheme "R&D Programme in Water Sector".

The details and status of these studies are given in Table 3.4 below.

Table 3.4: Status of Consultancy works for morphological studies

Sl	Institute	Name of Rivers	Status
1.	IIT Roorkee	Ganga, Sharda, Rapti	Completed
2.	IIT Delhi	Kosi, Bagmati, Yamuna	Under progress
3.	IIT Guwahati	Brahmaputra, Subansiri, Pagladiya	Completed
4.	IIT Madras	Krishna,Tungbhadra	Completed
5.	IIT Kharagpur	Mahananda, Mahanadi, Hooghly	Completed
6.	SVNIT Surat	Tapi	Completed

3.5 Coastal Erosion

Coastlines are dynamic landforms and are constantly subjected to erosion and/or accretion. Coastlines are modified by winds, waves, tides, currents, geomorphology, sediment supply to the coast and anthropogenic activities. Erosion occurs when material being removed, for deposition elsewhere, exceeds the rate of supply finally resulting in the landward shifting of the shoreline. The Indian coastline extends upto a length of about 7516 km (as per NHO). Almost all the maritime States/UTs are facing coastal erosion problem of various magnitudes. CWC is involved in following activities for providing assistance to the States:

3.5.1 Coastal Protection and Development Advisory Committee (CPDAC)

The Coastal Protection and Development advisory Committee (CPDAC) (erstwhile Beach Erosion Board) has been constituted by Erstwhile Ministry of Water Resources, Government of India in April 1995 under the Chairmanship of Member (RM), CWC. The CPDAC has been assigned very wide mandate by Govt. of India ranging from coordination related to Coastal Data Collection, organizing investigation and research in coastal protection, laying down principles in construction techniques of coastal protection measures, review of already executed protection works & evolve improved design condition based on the same and to interact with international agencies for technology transfer in field of coastal protection etc. MoEF & CC, Maritime States and various Central Institutions are Members of the above Committee.

Till March 2024, 18 meetings of CPDAC have been held. The 18th meeting of CPDAC was held in Mumbai, Maharashtra on 27.06.2023 under the Chairmanship of Shri P.M Scott, Member (River Management), CWC. Finalization of revised coastline length of Indian Coast is an important outcome of 18th CPDAC Meeting. CPDAC has urged the National Hydrographic Office (NHO) to coordinate with the Survey of India (SoI) for the early promulgation of the official length.

The work for the updation of Shoreline Change Atlas using recent LISS-IV data from 2019-21 is currently in progress.

There are various sub-committees under CPDAC. One such sub-committee was formed for performance evaluation of coastal protection works in 2004. Sub-committee held its 8th meeting on 28.10.2023 in Ratnagiri, Maharashtra for performance evaluation of coastal protection works done in Mirya Bay & Bhatye, Ratnagiri, Maharashtra.

A Draft data dissemination policy is under formulation in CWC under the aegis of Coastal Protection and Development Advisory Committee (CPDAC). Sub-committee to finalize data dissemination policy for coastal data collected under CMIS convenend its first meeting in Feb 2023.

CPDAC serves as a platform for states/UTs and institutions under the central government to initiate R&D projects aimed at developing sustainable, nature-based solutions for coastal management, moving away from reliance on hard structures.

3.5.2 Coastal Management Information System (CMIS)

Considering the importance of collection of data on coastal processes relevant for evolving plans and coastal protection measures, CWC has initiated development of "Coastal Management Information System (CMIS)" under the Plan Scheme "Development of Water Resources Information System (DWRIS)". The CMIS envisages setting up sites along the coast of the maritime States of India for collecting data of relevant coastal processes.

The activity of establishing a Coastal Management Information System is a field of activity wherein experience and expertise is needed. Hence, for implementation and creation of CMIS, it was decided that CWC would suitably associate with the maritime State/UT Governments and Institutes/Agencies who possess similar expertise and experience. In order to hear the views of the maritime State/UT Governments and Expert Institutes/Agencies, a "One day Brainstorming Workshop on Implementation and Creation of Coastal Management Information System (CMIS)" was organized by CWC on 13th May, 2014 at CWC HQ in New Delhi. During the discussions in the work-shop, the preferred implementation model for CMIS was decided to be through signing of a tripartite Memorandum of Understanding (MoU) wherein, CWC would be the 'Project Implementer', the expert agency would be the 'Project Executor' and the concerned State/ UT Government would be the 'Project Facilitator'. Data related to Wave, Tide, Current, Wind, coastal sediment, beach profile, bathymetry, shoreline change etc. are to be collected under this programme.

3.5.2.1 MoU between CWC & IIT Madras

A tripartite Memorandum of Understanding (MoU) between CWC as project implementer, Indian Institute of Technology, Madras as project executor and States of Tamil Nadu, Kerala and UT of Puducherry as project facilitator for Tamil Nadu, Kerala and Puducherry respectively was signed in October 2016 for establishment of one coastal data collection site in each participating State/UT (Devanari in Tamil Nadu, Karaikal inPuducherry and Ponnani in Kerala) over a period of 2 years which expired in June 2019. All the deliverables enshrined in the MoU were completed and intended targets achieved. All the remaining payments as per MoU were made to IITM, Chennai.

Approval was received from DoWR,RD&GR for the project proposal of IIT Madras for extension of the implementation of Coastal Management Information System (CMIS) in the states of Tamil Nadu, Kerala and UT of Puducherry (CMIS) with an estimated cost of Rs. 4.143 crore for a period of one year. Accordingly, a tripartite Memorandum of Understanding (MoU) was signed in January 2020 between CWC, IIT Madras and the respective states of Kerala, Tamil Nadu and Puducherry. Establishment of three nos. of coastal data collection sites (Devanari-Tamil Nadu, Karaikal-Puducherry and Ponnani-Kerala) was completed and sites were taken over from the project executor, IITM, Chennai on 31.05.2021. Since then BED, CWC, Kochi is collecting coastal data from the aforementioned 3 CMIS sites.

3.5.2.2 MoU between CWC & CWPRS, Pune

The competent authority in DoWR,RD&GR approved a Project Proposal of CWPRS, Pune amounting to Rs.6.96 crore for the implementation of Coastal Management Information System (CMIS) at 2 sites, 1 in Gujarat and 1 in Northern Maharashtra, and a tripartite Memorandum of Understanding (MoU) among CWC as project implementer, CWPRS, Pune as project executor and States of Gujarat, and Maharashtra as project facilitator was signed in January 2019 for establishment of one coastal data collection site in each participating State/UT.

2 sites, one at Satpati in North Maharashtra and another at Nanidanti-Motidanti in South Gujarat have already been established under this project. However, all 9 parameters are not being

observed, at present, due to some technical issues.

3.5.2.3 MoU between CWC & NIO, Goa

A Tripartite MoU for implementation of Coastal Management Information System (CMIS) in Maharashtra (Southern Coast) and Goa at an estimated cost of Rs. 13.77 crore was signed between CWC as Project Implementer, National Institute of Oceanography (NIO), Goa as Project Executer and Govt. of Maharashtra and Govt. of Goa as Project Facilitator on 26th & 27th March 2019.

All three sites i.e, Tarkali-Malvan in South Maharashtra, Calangute-Baga coast in North Goa and Varca-Benaulim in South Goa have been established under this project.

3.5.2.4 Expansion of CMIS

Concurrence has been received from States for the establishment of 12 more CMIS Sites. Proposal for the establishment of 4 new CMIS sites during 2024-25 along with draft Model tender documents was prepared and submitted for approval of the competent authority in the Ministry. The proposal outlines the establishment of: Two sites in West Bengal. One site in Andhra Pradesh and One site in Odisha.

The development of online portal for data collected under CMIS is being taken up with NWIC and is under development stage.

3.5.3 Salinity Ingress Management Projects

On the direction of Hon'ble Prime Minister during a review meeting taken on 19.06.2014, a study was taken up by the Erstwhile Ministry of Water Resources, River Development and Ganga Rejuvenation (MoWR,RD&GR) to examine the issues of salinization of land along the coast in a scientific manner and to suggest suitable remedial measures for same.

Coastal land salinization and salt water ingress are major hazards encountered along the Indian coast which can hamper the rapid socio-economic growth of the coastal states and the economy of the country as a whole. As India has a lengthy sea coast spread over nine states and four union territories, the problem of salinity in coastal areas is a national problem. In coastal regions, which are in close proximity to the sea, salinization may lead to changes in the chemical composition of natural water resources, degrading the quality of water supply to the domestic, agriculture and industrial sectors, loss of biodiversity, taxonomic replacement by halo tolerant species, loss of fertile soil, collapse of agricultural and fishery industries, changes in local climatic conditions, and creating health problems; thus, affecting many aspects of human life and posing major hindrance to the economic development of the region.

A technical committee for providing broad outline of the measures to be taken to arrest or minimize the salinity ingress in the coastal States/Union Territories was constituted under the chairmanship of Chairman, CWC with Chief Engineer, HSO, CWC as Member-Secretary. A Report namely "Problems of Salination of Land in Coastal Areas of India and Suitable Protection Measures" was prepared and submitted in Aug, 2017.

A meeting to discuss the report was held under the Chairmanship of Secretary (WR,RD&GR) on 29th September, 2017. In the meeting it was decided that (i) CWC will prepare necessary guidelines in consultation with CWPRS, CGWB and other technical agencies for preparation of DPR for salinity ingress management projects including funding pattern and eligibility criteria for funding. (ii) CWC will prepare a comprehensive new scheme for salinity ingress management projects based on the DPRs received from the States/UTs as per guidelines prepared by CWC. (iii) A National Centre for Scientific Study of Salinity ingress in Delta regions will be set up as recommended in the report.

Further, a Committee was constituted for (i) preparation of DPR (ii) preparation of new scheme for Salinity Ingress Management Projects & (iii) setting up of National Centre for Scientific Study of Salinity Ingress in Delta Regions.

The draft guidelines for preparation of DPR were finalized and circulated to all the coastal states/UTs in October, 2021 for their comments/views. After several reminders and perusal from DoWR,RD&GR and CWC, the inputs/comments of most of the coastal states/UTs were received except the State of Goa, UT of Puducherry and the UT of Lakshadweep. The draft guidelines have been updated by suitably incorporating comments/views from coastal States/UTs and further recommended to the Ministry in November 2022 for further consideration and obtaining the approval of the competent authority.

3.6 National Hydrology Project (NHP)

The National Hydrology Project is being implemented by DoWR, RD&GR on pan India basis (48 IAs: 9 Central Government, 34 from States, 2 UT's and 3 River Basins) with an outlay of Rs 3,640 Crore, with World Bank Assistance to the tune of 50% of the project cost, having timeline of 8 years from 2016-17 to 2023-24 which has been extended for further 1 year. CWC is one of the Implementing Agency (IA) with an outlay of Rs 167.60 Crore having responsibility to comprehensively monitor the projects receiving Central Assistance. The objective of project is to improve the extent, quality, and accessibility of water resources information and to strengthen the capacity of targeted water resources management institutions in India.

The components of NHP are i) **Water Resources Monitoring Systems**: To establish & strengthen the monitoring networks in project states ii) **Water Resources Information Systems**- strengthening of national and sub-national water information centres with web-enabled WRISs iii) **Water Resources Operations and Planning Systems**- To develop and demonstrate tools for water resources assessment, hydrologic and flood inundation forecasting iv) **Institutional Capacity Enhancement**-To modernize the Institutions.

The major achievements/ initiatives of CWC under NHP are as under:

- Modernization of Hydrological Observation (HO): Established Real Time Data Acquisition System (RTDAS) in Narmada Basin for Narmada Control Authority (NCA) at 48 sites and in Arunachal Pradesh at 50 sites, procured 93 Nos Acoustic Doppler Current Profiler (ADCP) and 32 Nos Velocity Radar System (VRS) for modernization of discharge observations. Modernization of water quality analysis by procuring 05 Nos Gas Chromatography-Mass Spectrometry (GCMS) and 05 nos Inductively Coupled Plasma-Mass Spectrometry (ICPMS) equipment's for Level-III water quality laboratories of CWC.
- Finalization of Hydro-met Network of Implementation Agencies under NHP.
- Framework Agreement for Empanelment of Hydro-Meteorological and Water Quality Equipment's under NHP.
- To develop and demonstrate tools for water resources assessment, hydrologic and flood inundation forecasting, CWC has took up various consultancy service like a) Extended Hydrological Prediction (EHP) (multi-week forecast) for three river basins namely; Yamuna, Narmada and Cauvery [In progress], b) Physical Based Mathematical Modelling for Estimation of Sediment Rate and Sediment Transport in Seven (7) River Basins [Completed], c) Reservoir Sedimentation and Bathymetric Survey of Reservoirs [Phase-I 32 nos-completed, Phase-II 87 nos-In progress], d) Study of the issue of floods and siltation in river Ganga due to Farakka Barrage in the State of Bihar [Completed] e) Development of Decision Support System near to real time for Integrated Reservoir Operation System of Ganga Basin [Completed] f) Early Flood Warning System Including Inundation Forecast in Ganga Basin [In progress]
- Strengthening of training infrastructure at NWA Pune. A total of 50 courses benefitting 4716 officers, from CWC and other IAs of NHP, have already been conducted by NWA (2015-16- to till date), on variety of topics

including Hydrometry, Computer Skills, Surface Water Data Processing, Hydrology, Sacramento Model (HYMOS) for IWRM studies, RS-GIS, Python, Advanced HYMOS, ToT for RIBASIM & Basin planning, WISDOM software etc.

3.7 Flood Plain Zoning

In order to have a reasonable degree of protection, floods need to be managed through both structural & non-structural measures so as to reduce the losses. Non-structural measures are planned activities to modify susceptibility due to flood related damages. These are meant to keep people away from floods. Flood Plain Zoning is one of the main non-structural measures for management of floods worldwide.

A technical committee under the chairmanship of Member (RM) was constituted during November 2022 for formulation of 'Technical Guidelines on Flood Plain Zoning' . After due deliberations, the committee submitted the guidelines to Ministry during May 2023. The guidelines is presently under circulation to the states for their commente/review. Once implemented, these guidelines shall serve as a valuable document in guiding the states in framing their own legislation in protecting their rivers from future encrochments.

3.8 E-Flow Monitoring

Vide Gazette Notification dated 9th October, 2018, the Government of India has notified the minimum environmental flows for River Ganga that has to be maintained at various locations on the river. Environmental flows are the acceptable flow regimes that are required to maintain a river in the desired environmental state or predetermined state. The maintenance of minimum e-flow in the river would not only ensure sustenance of aquatic life but also go a long way in ensuring its continuous flow in the river. It will ensure that the river has at least the minimum required environmental flow of water even after the river flow gets diverted by projects and structures for purposes like irrigation, hydro-power, domestic and industrial use etc.

The above order will apply to the upper Ganga River Basin starting from originating glaciers and through respective confluences of its head tributaries finally meeting at Deva Prayag up to Haridwar and the main stem of River Ganga up to Unnao district of Uttar Pradesh. The compliance of minimum environmental flow is applicable to all existing, under construction and future projects. The existing projects which currently do not meet the norms will have to ensure that the desired environmental flow norms are complied with within a period of three years. The mini and micro projects which do not alter the flow characteristics of the river or stream significantly are exempted from these environmental flows.

Presently, e-flow monitoring for 11 River Valley Projects are being done by CWC. The quarterly report is being submitted to NMCG.

4 BASIN PLANNING

4.1 Assessment of Water Resources of India

With a view to address the climate change related issues; the National Action Plan on Climate Change (NAPCC) has been prepared by the Government of India. The NAPCC has laid down the principles and has identified the approach to be adopted to meet the challenges of impact of climate change through eight National Missions namely, (a) National Solar Mission, (b) National Mission for Enhanced Energy Efficiency, (c) National Mission on Sustainable Habitat, (d) National Water Mission, (e) National Mission for Sustaining the Himalayan Eco-system, (f) National Mission for a Green India, (g) National Mission for Sustainable Agriculture, and (h) National Mission on Strategic Knowledge for Climate Change.

One of the strategies identified for implementation under the Comprehensive Mission Document of National Water Mission was - 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

To further strengthen the National Water Mission goal, and in continuation of the water availability assessed in 2019, basin wise water availability assessment is undertaken by CWC for the succeeding years up to 2023.

The assessment of water availability in a basin is a complex and critical task that requires sophisticated modelling approaches to understand and predict the dynamics of water resources in response to changing climatic, environmental, and anthropogenic factors. In recent years, Python has emerged as a powerful and versatile programming language for hydrological model development, offering numerous advantages in terms of flexibility, scalability, and extensibility. An in house Water Resources Assessment tool was developed using Python Script. The tool estimates the basin annual model runoff or surplus with precipitation, actual evapotranspiration, land use land cover and soil datasets as major inputs. A snapshot of the tool interface is shown in Figure 4.1.

4.2 United Nations Sustainable Development Goals (SDG)

The 2030 Agenda for Sustainable Development, adopted by all United Nations Member States in 2015, provides a shared blueprint for peace and prosperity for people and the planet, now and into the future. At its heart are the 17 Sustainable Development Goals (SDGs), which are an urgent call for action by all countries - developed and developing - in a global partnership. The short titles of the 17 SDGs are No poverty, Zero hunger, Good health and well-being, Quality education, Gender equality, Clean water and sanitation, Affordable and clean energy, Decent work and economic growth, Industry, innovation and infrastructure, Reduced inequalities, Sustainable cities and communities, Responsible consumption and production, Climate action, Life below water, Life on land, Peace, justice, and strong institutions, and Partnerships for the goals. These 17 goals are further divided into 169 targets. These Goals recognize that ending poverty and other deprivations must go hand-in-hand with strategies that improve health and education, reduce inequality, and spur economic growth – all while tackling climate change and working to preserve our oceans and forests.

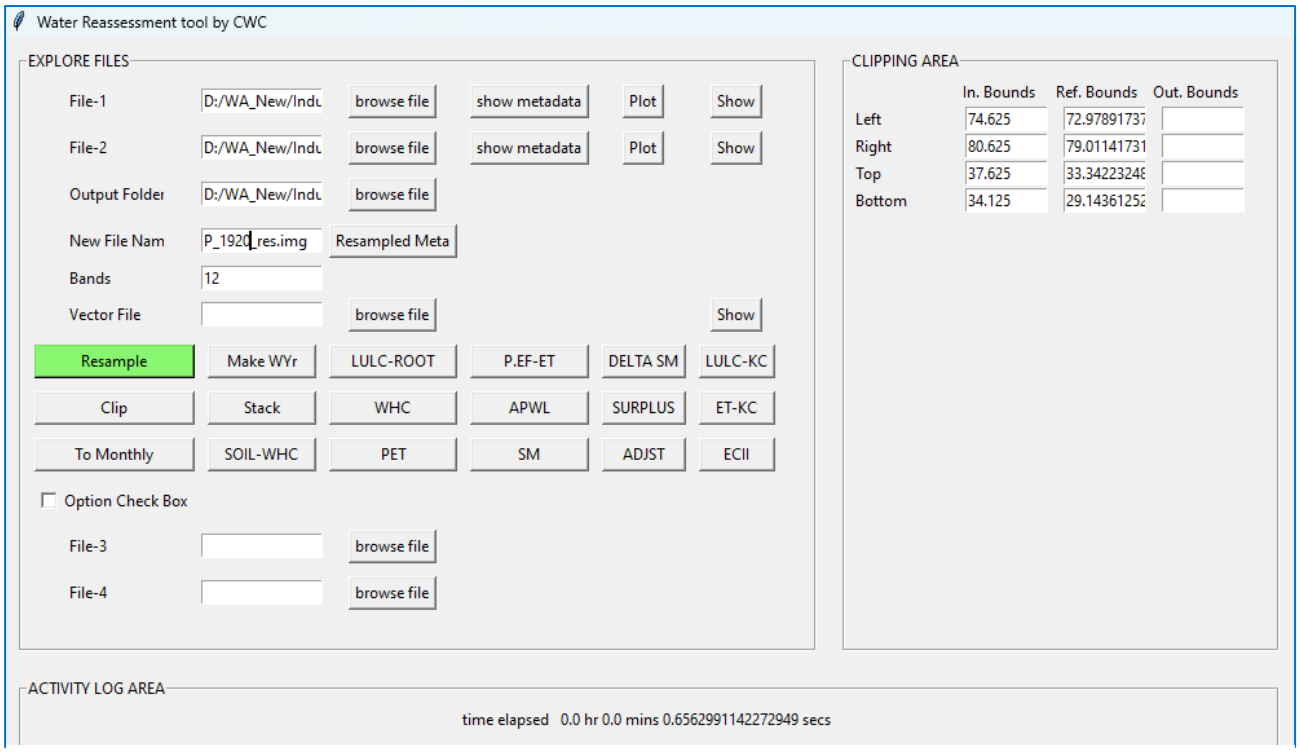


Figure 4.1: Water resources assessment tool interface

Sustainable Development Goal 6 aims to "Ensure availability and sustainable management of water and sanitation for all". The Goal 6 is further divided into 8 Targets. To measure the progress towards these Targets, each target has been further subdivided into Indicators. These Indicators are then reported country wise.

Chief Engineer, Basin Planning & Management Organisation (BPMO), CWC was designated as Nodal Point by DoWR, RD&GR for country reporting on SDG Indicator 6.4.2, 6.5.1 & 6.6.1 for the Data Drive 2023. In respect of SDG Indicator 6.5.1, the overall score of the country was 75 on a scale of 100, putting India in the category of High degree of IWRM Implementation. Similarly for SDG 6.4.1 & 6.4.2 the scoring points have improved since last reporting exercise in 2020.

4.3 Extended Hydrological Prediction (Multi Week Forecast)

Extended Hydrological Prediction (EHP) is the prediction of hydrological variables, most commonly the monthly/seasonal flow in a catchment at the time scale of weeks/months ahead. The skillful and reliable forecasts may prove valuable for planning and managing water use, mitigating drought, etc. and are expected to help water managers and users with long lead time, leading to judicious & informed operating decisions and better risk management.

The Extended Hydrologic Prediction (EHP) - Multi Week Forecast Project is a forecasting system being developed and deployed for three basins of India – Yamuna, Narmada, and Cauvery. The consultancy work has been awarded under National Hydrology Project (NHP) and project work started on 01.07.2020. The main objective of the consultancy is to develop tools for multi-week runoff forecast in the selected basins at four key locations in each basin upto four-week. The model (s) for low flow (lean) and high flow (monsoon) season have been developed and being tested at the selected forecast locations.

4.4 India-EU Water Partnership (IEWP)

A joint declaration for India-EU Water partnership (IEWP) was adopted in Brussels in

March 2016 during the visit of Hon'ble Prime Minister of India to Brussels. A formal MoU was signed to encourage and promote IEWP between India and European Union in New Delhi on 07.10.2016 by the Hon'ble Minister of Water Resources of India and Mr. Karmeny Vella, Member of EU for Environment, Maritime Affairs & Fisheries.

As a follow-up action on the MoU, vide its note of 21.02.2017 Erstwhile MoWR, RD&GR formalized working of IEWP and notified Chief Engineer (EMO), CWC as the Team Leader from Indian side. JS(IC&GW), DoWR,RD&GR is the focal point in the Ministry. Director (RS), CWC is Convenor of IEWP from Indian side.

The India-EU Water Partnership (IEWP) Phase-1 concluded on 30th October 2020 and Phase 2 has started from 1st November 2020 for the next three years.

In the IEWP Phase I, the flexible IEWP Action Plan was having Nine Priority Areas for technical implementation. RBM approaches and mechanisms of the European Union were blended with those in India in order to achieve sustainable practices that support the management of Indian River basins. In IEWP Phase I the following documents emerged:

1. Tapi River Basin Management Plan (Report on 5 Key Water Management Issues)
2. Guidance Document for Environmental Flows assessment and implementation In India
3. Assessment of Urban Pollution in the Hindon River Basin including first Recommendations for Measures.
4. Handbook for stable isotope data interpretation in India
5. Protocol for estimating Irrigation Performance in Small and Medium Irrigation Schemes in India, Using Remote Sensing Data
6. National Policy on the Safe Reuse of Treated Water (draft)

In the IEWP Phase II, the horizontal/vertical thematic pillars integrate the nine Priority Areas of the IEWP Phase 1 and aims to further consolidate RBM approaches in practice.

The horizontal/vertical thematic pillars hold four work areas for implementation:

- River Basin Management integrates most of the nine Priority Areas of the IEWP Phase I into one cluster that fosters the holistic management of river basins in India based on EU good practices that are merged with Indian approaches. During Phase II, the Tapi River Basin Management Plan developed during phase I has been further detailed by incorporating the available data and modeling results from SWAT, RIBASIM, etc. The detailed draft Tapi RBM plan was submitted on 02.11.2023. Irrigation and Efficient Water Use (Development of protocol for assessment of Project Irrigation Efficiency in 3 pilot projects namely: Lower Panjara (Maharashtra), Mahuar (Madhya Pradesh), and Golavagy (Telangana).
- Environmental Flows Assessment in Ramganga sub-basin and Mahanadi Delta area.
- Safe Reuse of Treated Water.

The vertical pillars hold cross-cutting issues with all work areas of the horizontal thematic pillars including a facilitated implementation of measures (in the Tapi River Basin). A major thrust will be on providing hands-on training on approaches and methods that will be undertaken in combination with the implementation of individualactivities in all thematic areas. EU Member States and the Indian partners will be further involved towards an improved EU-India Water Policy dialogue.

The 3rd JWG Meeting under the India-EU MoU was held on 12.07.2023 in Hybrid mode to take stock of progress in the implementation of the India-EU Water Partnership (IEWP) and discuss strategic priorities of EU-India water-related cooperation. Further, a final event for culmination of Phase II of support to Ganga Rejuvenation and IEWP Action was held on 20.11.2023 in New Delhi.

The Phase-3 of the IEWP is scheduled for a

duration of three years, spanning from 2023 to 2026. In this phase inclusion of two new topics, namely Urban Hydrology and the study of

Horizontal / Thematic Pillar	Vertical / Cross-cutting Pillar				
RIVER BASIN MANAGEMENT Integrating the Thematic Areas	Facilitated implementation of measure	Facilitation towards piloting of EU Technologies	Opportunities for Indian Water Sector and Research / EU Horizon 2020	Trainings and knowledge dissemination	Involve EU and Indian partners to improve EU-India Policy dialogue
Continued Implementation of the RBM Cycle					
Develop/Disseminate RBM toolbox					
Detailing of Tapi RBM Plan and gradual implementation					
Surface water / Groundwater					
Water Quality/Water Quantity/ Monitoring					
Pressure and impact on Basin aims					
IRRIGATION AND EFFICIENT WATER USE					
Development of Project Irrigation Efficiency Protocol					
ENVIRONMENTAL FLOWS ASSESSMENT					
In a selected Ganga Sub-basin involving all relevant stakeholders					
SAFE RE-USE OF TREATED WATER					
Finalization and implementation Support of the National Policy on the safe re-use of treated water					

Figure 4.2: Organisation of the IEWP Phase 2 work areas as basis of a flexible Action Plan

Climate change's impact on the Water sector will be taken up, in addition to the continuing activities from Phase-II.

4.5 National Water Policy

The National Water Policy was first adopted in the year 1987. It states that the policy may be reviewed and revised periodically as and when need arises. The National Water Policy was subsequently revised in 2002 and 2012. The "National Water Policy – 2012" was adopted by the National Water Resources Council in its 6th meeting held in December 2012.

Later a Committee was constituted by the Erstwhile MoWR for suggesting roadmap for implementation of National Water Policy - 2012 under the Chairmanship of Dr. S.R. Hashim, Former Chairman, UPSC & Former Member, Planning Commission. The Committee has submitted its report in September, 2013.

Further, in view of the latest issues in water sector, revision of the NWP (2012) has been envisaged by Ministry of Jal Shakti and a committee has been constituted, on 05.11.2019 under the chairmanship of Dr.Mihir Shah, to draft the National Water Policy. The Committee undertook a process of wide-ranging consultations to ensure that the process of drafting the policy is as inclusive as possible and the best possible policy emerges from this process of co-creation.

Ten meetings and Five consultation meetings of the Drafting Committee for revision of National Water Policy were conducted (November, 2019 - October, 2020), in which the consultations were held with the State Governments/ UTs, Central Ministries, Non- Governmental Organisations, Academia and Water Experts from all over the country.

Based on the consultations and deliberations, the Drafting Committee submitted three drafts of

National Water Policy on 17.08.2020, 17.10.2020 and 01.11.2020 respectively. The final draft of National Water Policy dated 07.11.2020 has been submitted by the Drafting Committee to the Ministry of Jal Shakti.

4.6 National Water Framework Bill 2016

The National Water Policy (2012) emphasizes the need to evolve a National Water Framework Law as an umbrella statement of general principles governing the exercise of legislative/executive powers by the Centre, the States and the local governing bodies. Subsequently on 03.07.2012, the Ministry had constituted a Committee under the Chairmanship of Dr. Y. K. Alagh to draft National Water Framework Law. The Committee submitted its Report in May, 2013. The report submitted by Dr. Y. K. Alagh Committee was circulated to the States/ UTs for comments and were also placed before the Forum of Water Resources / Irrigation Ministers of States for wider consultations in its meeting held on 29.05.2013.

Later on 28.12.2015, Erstwhile MoWR,RD&GR constituted a Committee under the Chairmanship of Dr. Mihir Shah to examine the provisions of the draft National Water Framework Bill and suggest changes/ modifications The Committee submitted its Final Report to the Ministry on 18.07.2016 whichwas circulated to all States/UTs and concerned Central Ministries for their comments on the proposed National Water Framework Bill.

Subsequently on 20.01.2017, the Secretary of the Erstwhile Ministry of Water Resources, River Development & Ganga Rejuvenation and on 14.03.2017, the Hon'ble Minister of Water Resources River Development & Ganga Rejuvenation has requested all States/UTs to pass suitable resolutions in their State Assemblies in support of the draft National Water Framework Bill, 2016.

The Bill was circulated to States/UTs and the concerned Central Ministries for obtaining their comments. Comments on the draft bill have been received from 11 States viz., Rajasthan, Tamil Nadu, Madhya Pradesh, Kerala, Karnataka, Odisha, Gujarat, Uttar Pradesh, Maharashtra, Bihar and Jharkhand whereas, interim response have been received from 5 States/UTs viz., Uttarakhand, Punjab, Arunachal Pradesh, NCT of Delhi and Lakshadweep. Response from other States / UTs is awaited.

4.7 River Basin Management Bill

DoWR,RD&GR had constituted a Committee on 06.03.2012 under the Chairmanship of Justice (Retd.) T.S. Doabia to study the activities that are required for optimum development of river basin and changes required in the existing River Board Act, 1956 for achievement of the same. The Committee submitted its Report in November, 2012 to the Ministry which includes a draft River Basin Management Bill, 2012. The same was circulated among all States, Union Territories and related Union Ministries by the Ministry.

Subsequently, a Committee under the Chairmanship of Dr. Mihir Shah was constituted on 28.12.2015 by the Ministry to examine the provisions of the draft River Basin Management Bill, 2012 and suggest changes/ modifications therein taking into account inter-alia the emerging challenges in the water sector, reuse of waste water after treatment, the likely impact of climate change on water resources, importance of river restoration/rejuvenation, water contamination issues etc.

DoWR,RD&GR has constituted an Expert Group in the Ministry to further review and finalize the bill. Director (NWP), CWC is representing CWC in the group. A one-day brainstorming session was held to deliberate upon various issues related to River Basin Management Bill, 2018 on 03.06.2019 at VigyanBhawan, New Delhi. Representatives from States/Union Territories, concerned Central Ministries, experts and other officials from Ministry of Jal Shakti, officers from CWC, CGWB, NIH and other officers participated in the deliberations.

The response of Central Water Commission on the comments of States during brain storming session was sent to the Department of Water Resources River Development & Ganga Rejuvenation on 25.10.2019. Central Water Commission also provided its response on the comments of public/ stake holders which were sent to the Department of Water Resources, River Development & Ganga Rejuvenation on 22.04.2020.

4.8 State Specific Action Plan (SSAP)

Under National Water Mission (NWM), State Specific Action Plans (SSAP) on Water Sector to be prepared for 36 numbers of States/UTS. The SSAPs has three stages of reports such as Stage I – Draft Status Report (DSR), Stage II – Interim Report and Stage III – Final SSAP. A Steering and Technical Committees for State Specific Action Plan (SSAP) on Water was constituted in September 2020 having Chief Engineer, Basin Planning & Management Organisation (BPMO) and Director, Basin Planning - III Directorate as members, respectively. The main responsibility of these committees is to examine and approve the SSAPs for States/UTs. The suggestions on DSR of 22 States/UTs have been offered by Basin Planning - III Directorate to NWM. The No. of meetings on DSR of Technical and Steering Committee held for 15 and 11 States/UTs, respectively.

4.9 Joint Operation Committee of Rihand Reservoir

Erstwhile Ministry of Water Resources set up a Joint Operation Committee (JOC) for Rihand Reservoir vide their O.M. No 54/7/92-BM/1172 dated 30.10.1992. The committee consists of members from Uttar Pradesh Jal Vidyut Nigam Limited (UPJVNL), Uttar Pradesh Power Corporation (UPPCL), Water Resources Department, Bihar and Central Electricity Authority. Member (WP&P), CWC is the chairman of the committee.

The 33rd & 34th meetings of Joint Operation Committee (JOC) for the Rihand Reservoir were held on 21.10.2022 & 25.11.2022 respectively under the chairmanship of Member (WP&P), CWC. In the meeting, operation plan for Rihand reservoir for 2022-23 was devised after assessing the water availability in the reservoir, irrigation requirements in Bihar and power to be generated, with a view to meet the requirement of both the states.

4.10 Rules Levels of Reservoirs

During the year 2022-23, the operation rules for Tehri, Kalagarh, Bisalpur, Gandhi Sagar, Rana Pratap Sagar, Madikheda, Rajghat, Matatila, Bansagar, Rihand, Kangsabati, Massanjore Reservoirs of the Ganga Basin were developed by CWC. Based on the mathematical simulation studies, performance indices were also derived for these reservoirs.

5 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 Pre-feasibility and Detailed Project Reports of water resources development projects (Irrigation/ Hydro-electric/ Multi-purpose) prepared by different agencies is also carried out in this Wing. Apart from Irrigation/ Water Resources Department of States and UTs, the Ministries/agencies utilising the above services of CWC include Ministry of External Affairs(MEA), Central Electricity Authority (CEA), WAPCOS, Uttarakhand Jal Vidyut Nigam Ltd. (UJVNL), Tehri Hydro Development Corporation (THDC), National Thermal Power Corporation (NTPC), National Water Development Agency (NWDA), Sardar Sarovar Narmada Nigam Ltd.(SSNNL), Narmada Valley Development Authority (NVDA), Farakka Barrage Project etc. CWC is using and promoting State-of-Art technology for planning and design of water resource projects at par with International Standards. The Design Wing has contributed significantly towards the development of water sector in the country.

Major activities of D&R Wing comprise of:

1. Planning and design of water resources and hydropower projects.
2. Designs of Dams/Weirs, Barrages & Canals, Gates, Power House, etc.
3. Examination and vetting of manufacturers designs/drawings.
4. Technical Appraisal of Pre-feasibility/Detailed Project Reports of Water Resources Projects viz Irrigation, Hydropower and Multipurpose River Valley Projects.
5. Hydrological studies - Water Availability assessment, Design Flood, Rule Curves, etc
6. Glacial Lake Outburst Flood (GLOF) Studies
7. Dam Break Analysis
8. Sedimentation Analysis
9. Instrumentation of Structures
10. Approval of Site Specific Seismic Design Parameters for dams
11. Standardisation- Revision/ Amendments in BIS codes
12. Implementation of Externally Funded Dam Rehabilitation and Improvement Project in 19 States
13. Providing training and capacity building through National Water Academy
14. Providing technical assistance to special problems during and post construction of projects
15. Assisting DoWR, RD&GR, MoJS in various design issues involved in international and trans-boundary projects, especially in implementation of treaties and water sharing agreements with neighbouring countries like Nepal, Bangladesh and Pakistan.

5.2 Planning and Design of Water Resources Projects

5.2.1 Details of Design Organisations of CWC

CWC has three design organisations which are responsible for planning and design consultancy of various components of construction stage Projects, DPR stage projects, rehabilitation measures of water resources projects viz Irrigation, Hydropower and Multipurpose River Valley Projects located in different regions of the country. The various stages of project implementation are (i) DPR preparation for project; (ii) construction of project; (iii) addressing specific problem during construction and operation of project; and (iv) undertaking rehabilitation measures of existing projects under

distress. The technical appraisal of PFR/DPR of the projects from design aspects is also carried out by these units. The Organization also keep a watch on latest development/identification of stress areas particularly in Dam Design/ Design of Hydro-Power Projects and identify areas of Research in the sphere of activities and carry out research in house/ by other agencies. Another significant aspect is dealing with Indus Water Treaty (IWT) related issues in Indus basin river system. It also provides services to projects located in other neighbouring countries namely Bhutan, Nepal, Afghanistan, Myanmar, African Countries and Srilanka. Apart from above, they are actively engaged in preparation of IS Codes.

5.2.2 Design Consultancy

During the year 2023-24, CWC had provided design consultancy services to 92 projects at investigation & Planning stage, construction stage and having special problems. Out of these, 87 number of Projects are located in various States in India and 5 number of Projects from Foreign Countries i.e., Bhutan (3), Indo-Nepal (1) and Nepal (1).

The list of projects is given in **Annexure 5.1**.

Salient features / details of services provided to some of the important projects designed/ handled during the year are as follows:

5.2.2.1 Projects at construction stage

1) Phina Sigh Medium Irrigation Project, Himachal Pradesh

The Project is being constructed at tehsil Nurpur in Kangra district of Himachal Pradesh on Chaki Khad stream with an irrigation potential of 9946.00 Acres. Forty (40) nos. of construction drawings related to Dams and Appurtenant Hydraulic Structures were vetted; and recommendations/approval were issued. Static and non-linear dynamic analysis of intermediate overflow (Sluice) Block was carried out and based on the results of analysis, Structural design for Dam Intermediate Piers, Sluice Glacis has been done and recommendations issued. Finite Element Model Stimulation of Phina Singh Dam Overflow Section is shown at Figure 5.1.

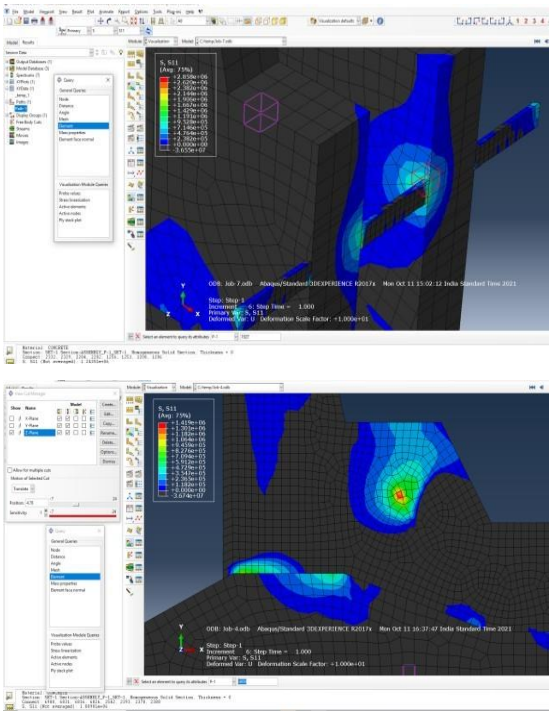


Fig 5.1: Finite Element Model Stimulation of Phina Singh Dam Overflow Section

2) Adi Badri Dam (Revival of Saraswati River), Haryana

The main purpose of the project is revival of Saraswati River, by transferring the water of Somb River to Saraswati River, as a heritage project along with the incidental benefits of Ground water recharge, Flood Control, Fish farming, Recreation/Tourism and Notional irrigation. The Project comprises the construction of the Adi Badri dam and Somb Saraswati Barrage on Somb nadi and a reservoir surrounded by embankments. The water is proposed to be transferred from the barrage to Saraswati Reservoir by the pipeline, which is later sent to the Saraswati River to maintain a sustained flow of the river during the lean season. The Governments of Himachal Pradesh and Haryana have signed a Memorandum of Understanding (MoU) for the construction of concrete gravity

dam in near Yamunanagar for the revival of the Saraswati River. Clearance from CWC on interstate aspects and clearance from Upper Yamuna River Board (UYRB) has been provided. For Planning, Supervising, and monitoring the dam works, Construction Monitoring Committee had also been constituted. CWC has issued Tender (Specification) drawings for the Concrete Gravity Dam and its Appurtenant Hydraulic Structures. Further, Specification drawings for Embankments envisaged on the periphery of the Saraswati Reservoir and Works related to conveyance pipeline from Somb barrage to Saraswati reservoir are under preparation in CWC.

3) Lakhwar M.P.P., Uttarakhand

The Lakhwar multi-purpose project has a command area of 33780 Ha and provides irrigation and water components to UP, Haryana, Rajasthan, Delhi, and Himachal Pradesh. Memorandum of Understanding (MoU) was signed between CWC and UJVNL in September 2013. Lakhwar Dam is a multipurpose project with 300 MW installed capacity. The main project components are a 204 m high concrete gravity dam, 3 steel-lined penstocks, and an underground powerhouse housing 3 vertical Francis turbines of 100 MW each. The Full Reservoir Level (FRL) and minimum drawdown level (MDDL) of the reservoir are El 796 m and El 752 m, respectively, with gross storage of 587.84 MCM at FRL for diurnal peaking capabilities. The total area of submergence is 9.57 sq. km. CWC has taken up the design engineering consultancy of the Lakhwar MPP which is being handled in the Designs (N&W) unit. The works related to the Concrete dam, Energy dissipation arrangement (EDA), diversion structures, power house and other appurtenant structures are being handled in CMDD (N&W), HCD (N&W) and Gates Design (N&W) Directorates. The project site has a challenging geology. As such, a Group of Geological Experts (GGE) has been constituted for this project to provide geological inputs for design. The GGE, after examining the site and geological data, has also stressed finding a technical solution for the shear zone. The GGE has suggested additional investigations and laboratory tests. CSMRS is currently carrying out the in-situ dilatometer/pressure meter tests to measure the geotechnical properties of the gauge, sheared rocks, and weak slate material in the drill holes.

In the Minutes of Meeting of Group of Geological Expert (GGE), member of TAC & UJVNL on the observations on Dam layout of Lakhwar MPP held on 31.10.2023, it is suggested that the intake needs relocation as dam axis has been shifted towards the upstream with caution in view of geological issues of right bank nallah. In pursuant of this, alternate locations of power intake structure were studied in CWC and a revised layout of water conductor system (up to powerhouse) is developed by shifting the power intake structure upstream of the right bank nallah and same was discussed in the meeting dated 22.11.2023. As decided in the meeting, two number of study drawings of the revised layout of water conductor system titled “layout plan of power intake and water conductor system” and “L-section through Pressure Shaft-3” were issued for views of UJVNL/Geological Group and L&T. One study drawing titled “drawing showing rock pillar between power house and dam block “showing critical section of dam and powerhouse with low rock pillar width (about 50m) was also issued with request to assess/study the concern related to seepage in power house and drainage requirement by expert geologist of GGE, GSI and UJVNL and to review the construction aspects and challenges involved in low-width rock pillar between dam and power house.

Further, a site visit to Lakhwar MPP to finalize the dam axis and revised intake location was carried out from 6.12.2023 to 08.12.2023 by officers CWC under the Chairmanship of Member, D&R along with officers of CSMRS, UJVNL, L&T, Consultants and geologists. On physical inspection, geologists noted that the slope uphill to the revised location of power intake (near to the state highway) has possibilities of sliding zones. In view of this, during meeting in UJVNL office on 08.12.2023, it is decided that locations of power intake closer to the dam may also be looked into. In this regard, some drill locations on intake area were suggested vide letter

dated 22.12.2023 so that layout of intake and water conductor system may be finalized.

A detailed 3D numerical model study of powerhouse complex is awarded to NIRM byUJVNL. The said studies are believed to contribute in understanding technical aspects i) assess rock support system required for future excavation of partially excavated powerhouse cavern ii) to assess strengthening measures required in the region of low rock cover between powerhouse and concrete dam block. Observations on reports/note of '3D Numerical Modelling Studies of Powerhouse Complex for Lakhwar Multipurpose Project' have been issued to Project Director, UJVNL vide CWC letter dated 02.01.2024. Reply of NIRM is received on 04.03.2024 which is being examined.

Further, Issues regarding the finalization the layout of power house complex and tail race system, fixation of TWLs, revision in PPS and requisite details of instrumentation with their location in power house were communicated to UJVNL vide CWC letter dated 20.12.2023 and 18.12.2023 respectively.

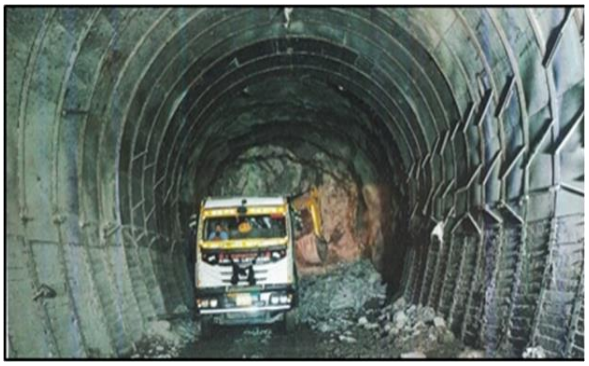
Observations on IIT Roorkee report on Tail Water Rating Curve of December,2023 has been issued to UJVNL vide letter dated 21.12.2023.

A detailed Note titled "Requirement of Estimation of Tail Water Levels of Lakhwar MPPwith assessment of impact of downstream Vyasi Reservoir" is prepared and sent to UJVNL vide CWC letter dated 18.03.2024

Site Visit to Lakhwar Project Site

Meeting at UJVNL's Dehradun Office

Ongoing Excavation works of Diversion Site



Tunnel (DT-3) at Lakhwar Project Site

4) Renukaji Dam Project, Himachal Pradesh

Renukaji Dam Project envisages the construction of a 148m high (from riverbed) rock fill dam with top of dam at El. 778m & Full Reservoir Level (F.R.L.) at 766m across the Giri River near Dadhau town, Sirmour District, Himachal Pradesh. The main purpose of the project is to store the monsoon water of River Giri and then releasing the same to meet the drinking water supply of National Capital Delhi during lean flow period of River Yamuna. Apart from that, project

will utilize the available head to generate incidental hydropower by installing two units of 20 MW (2x20=40MW) in the powerhouse at the toe of the dam.

An alternate layout of water conductor system (WCS) in the left side of the dam is explored for the project. The layout is envisaged to have a power block on the right side and adjacent to the spillway and a short water conductor system with surface powerhouse. A note on the layout along with related drawings mentioning the benefits of newly envisaged WCS layout compare to DPR stage layout were shared to Project authorities for views of Project authorities/Geological Group on the said layout.

In view of the challenging foundation conditions and presence of karst rocks at the dam site, as per the advice from CWC, Panel of Geological Experts (PoGE) has been constituted by HPPCL for proper geological assessment of the dam foundation and reservoir rim. Based on the suggestions from the PoGE, field investigations are going on at the Renukaji dam site. Subsequently, based on the results of these investigations, the decision has been made to opt for Earth Cum Rockfill Dam. A study purpose drawing of Diversion Tunnel has been issued. HPPCL informed that in the monsoon of 2023, landslides have occurred at the inlet and outlet portals of Diversion Tunnel.

A team comprising officers from CWC, GSI, CSMRS, HPPCL, Panel of Geological Experts and Member of Standing Expert (HPPCL) visited Renukaji Dam Project site from 21.02.2024 to 22.02.2024 for assessing the results of explorations and studies done recently. During the visit, team visited Inlet and Outlet portal of Diversion Tunnel, Upstream Coffer Dam Axis, Main Dam Axis, Drifts excavated in left and right abutments, Downstream coffer Dam, took a bird eye view of Spillway region proposed on left abutment, water conductor system, intake area adjacent to spillway, surface power house location and inspected borehole logs of recently drilled bore holes. Further, a meeting was held on 22.02.2024 after visiting the project components to discuss the geological exploration already done and suggestions/recommendation on further investigation requirements.

5) Sarasvati Reservoir Project (Under River Sarasvati Revival Scheme), Haryana

To revive the Sarasvati River by transferring the water of Somb River to Sarasvati River, Haryana Sarasvati Heritage Development Board (HSHDB) has decided to construct a project to link Somb River to Sarasvati River. The main purpose of the project is revival of Sarsvati River as a heritage project along with the incidental benefits of groundwater recharge, flood control, fish farming, recreation/tourism, notional irrigation etc. For the revival of Sarasvati River, project report on construction of Adi Badri dam, Somb Sarasvati Barrage on Somb River and Embankment for Sarasvati Reservoir was prepared by Haryana State Government.

Works related to conveyance pipeline from Somb barrage to Saraswati reservoir is being carried out

in HCD(N&W) directorate. Project authorities, initially, envisaged four alternative alignments of conveyance pipeline. During the meeting held with officers of Haryana Irrigation Department in CWC on 10.03.2023, each of the proposed alternatives was discussed in detail and it was conveyed to project authorities that arriving at the optimum alignment is not possible at this stage due lack of geological/geotechnical information at the outfall locations and requiring physical site assessment on the aspects. Accordingly, project authorities were advised to narrow down the alternatives from four to two and detailed out them.

Further, a meeting of CWC officers and project authorities was held on 06.11.2023 wherein relevant issues of layout and design of the conveyance pipeline were discussed. During meeting, it is decided that finalised layout showing locations/details of civil structures may be shared to CWC for examination and on finalised layout investigations along the conveyance pipeline may be carried out based on site (geological) conditions and requirements of civil structures (thrust blocks, piers, drainage/road crossings etc) and for geological investigations at the inlet structure, required SBC/plate load tests may be carried out at a level closer to the bed level of the Sarasvati reservoir.

Specification drawings pertaining to Embankment of Sarasvati reservoir had been issued on 07.03.2024. Construction stage drawing will be issued as per the requirement/ demand of the project authority.

6) KCC (Khetri) Tailings dam at KCC (Khetri Copper Complex) (Hindustan Copper Limited), Khetri (Rajasthan)

Memorandum of Understanding (MoU) has been signed between Hindustan Copper Limited, represented by General Manager, Khetri Copper Complex and Central Water Commission, represented by Director, Embankment (N&W) Dte. on 11.10.2021 for providing design consultancy for carrying out design and preparation of construction stage drawings for raising the height of Tailing Dam at Khetri Copper Complex (Dist.- Jhunjhunu), Rajasthan from EL 406 m to 413 m.

For further raising the height of Tailings Dam from EL 406m, list of requisite data was shared with Project Authorities in December 2021. Requisite data has been received from project authorities on 16.09.2023. Analysis and design of dam is being carried out.

To assess the feasibility of raising the height of the tailing dam from its current elevation of EL. 406 meters to EL. 413 meters, a team of officers from EMB(N&W), CWC conducted a site visit on 03.05.2024. The purpose of this visit was to gather essential information and to evaluate the existing conditions of the dam for the proposed height increase. Construction stage drawings for raising of tailing dam from EL. 406m to EL. 410m is under preparation and will be issued soon.

CWC team at Khetri Copper Complex's Tailing Dam Site, Khetri, Distt. Jhunjhunu, Rajasthan

7) Bhadbhut Barrage Project , Gujarat

Bhadbhut Barrage is a terminal barrage on Narmada River. Bhadbhut Barrage is located across river Narmada near village Bhadbhut with the purpose to avoid salinity ingress into river

from the sea and to conserve sweet water. It is 1.65 km long. It is a terminal structure on Narmada which can serve the needs of Industrial water supply in the coastal region and divert the water of Narmada to the proposed Kalpsar reservoir. The barrage is provided with 89 Nos. Fixed Wheel vertical lift spillway gate of size 15.5m (W) x10.5m (H) and one Navigation Bay of gate size 18m (W) x 10.5m (H) to pass the flood. CWC is entrusted with the vetting of designs and drawings of hydro-mechanical structure through WAPCOS Ltd. The Design and drawings of Spillway Service Gate, Upstream & Downstream Stoplogs of spillway service gate, 255T Rope Drum Hoist for the operation of spillway service gate and Upstream & Downstream Stoplogs of Navigation service gate were approved. The Design and drawings of Navigation Service Gate, 310T Rope Drum Hoist for the operation of Navigation Service Gate, Dogging beam of Spillway Service Gate & Navigation Service Gate, 75T &65T gantry crane for the operation of stoplog and its lifting beam is under scrutiny.

8) Kanhar Irrigation Project, Uttar Pradesh

CWC is providing design consultancy services for vetting of design/drawings of hydro-mechanical components. Design of Spillway Radial Gate, Spillway stoplogs, trunnion level walkway bridge, River Sluice Service Gate, River Sluice Emergency Gate, hydraulic hoist 125T for the operation of Spillway Radial Gate, Hoist Supporting structure and 50T Gantry Crane for the operation of spillway stoplog have been approved.

9) Punatsangchhu-I H.E. Project, Bhutan

- Punatsangchhu-I H.E. Project which intercepts a total catchment area of 6390 sq. km. envisages construction of a concrete gravity type dam, 130m high above the deepest foundation level and 256.53 m long at the top.
- The overall length of the spillway section of the dam is 89.125 m comprising of five nos. of sluice spillway bays, each of 9.6 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 the dam would be about 167.405 m. The dam would provide a gross pondage of 24.92 cu. mts. and live pondage of 5.00 cu. m. between MDDL 1195m and FRL 1202m to enable the power station envisaged under the project, to cater to diurnal variations in power requirements.

Status of the consultancy:

- CWC has been providing design consultancy and releases drawings as per the need of the Project Authorities.
- Design and Drawings of most of the HCD components are already issued. In year 2022 - 23, design and drawings for Pothead Yard cable trenches, Oil Water Sump, Downstream Surge Gallery Deck Slab and Bus Duct RCC lining issued. As of now works of issuance of construction drawings stands completed from HCD (E&NE).
- Due to pending decisions on construction of Dam/Barrage, the work is on hold at the present Dam site. The DPR for Barrage prepared by DGPC was shared by RGoB with GoI through diplomatic channels on 26.04.2022. GoI has appointed an Independent Committee to review the findings of CWC on the Barrage proposal of M/s Stucky. The Independent Committee visited the project sites on 12.08.2022. The Independent Committee has submitted its report to GoI and the same has been shared by GoI with RGoB on 28.10.2022. Hon'ble Secretary (Power), GoI along with HE Ambassador of India to Bhutan, JS(North), JS(Hydro), US(Bhutan), GoI & other delegation members visited Project Site on 30.10.2022. The 23rd PHPA-I Authority Meeting was held on 24.11.2022 at Thimphu during which it was informed that a Bilateral Committee (Inter-Governmental Group, IGG) was being constituted. An Inter-Governmental Group (IGG) was formed with members from both RGoB and GoI side to review both barrage and dam option of Punatsangchhu-I HEP and suggest a way forward. Total 5 meetings of IGG were held and IGG submitted its final report in October 2023.

- In 31st TCC, it was decided to drill boreholes on the dam site to finalize the geology. Drilling works were completed in March 2024.
- A meeting jointly chaired by Secretary DoWR, RD & GR, Ministry of Jal Shakti and Secretary, Ministry of Power was held in March 2024 and it was decided to onboard GSI for review of all the core logs of boreholes drilled.
- Design and Drawings of most of the HCD components are issued. As of now works of issuance of construction drawings stands completed from HCD (E&NE).

Joint Visit of CWC and GSI

10) Punatsangchhu-II H.E. Project, Bhutan

- The Punatsangchhu-II H.E. Project envisages construction of 86m high concrete gravity dam with an installed capacity of 1020 MW.
- The dam is located 29km downstream of the Wangdue Bridge and 3 km downstream of TRT outfall of PHEP-I on WangdueTshirang National Highway.
- The dam comprises of seven sluice blocks and five non-overflow blocks. The length of the dam is 213.00m.
- The top of dam is at El.846.00m with FRL at El. 843.00m and MDDL at El.825.00m. Seven sluices of gate size 8m (w) x 13.2m (H) have been provided at EL.797.00m for discharging simultaneously PMF 11723 cumec and GLOF of 4300 cumec.
- The project has a catchment area of 6835 sq. km. The gross storage capacity of the reservoir formed by dam construction is 7.0 MCM and the live storage capacity is 4.64 MCM.

Status:

- CWC provides design consultancy and releases drawings as per the requirement of Project Authority.
- Visit to the project was undertaken by Officers from Design (E&NE), CWC in November, 2023 and February, 2024
- Gates Design (E&NE) Dte of CWC provides design consultancy of HM works which inter alia includes vetting of design & drawings submitted by HM suppliers.All of the HM works components have been vetted and approved, except for few components of rope drum hoist of Draft Tube Gates.
- HCD (E&NE) Directorate, CWC is involved in analysis, design and issue of construction drawing for the Hydel Civil components of the projects. In 2023-24, a total of 77 construction drawings (17 fresh and 60 revised) have been issued for HCD components.
- CMDD (E&NE) Directorate, CWC is involved in analysis, design and issue of construction drawing for the Dam and its appurtenant structures.
- All drawings related to Dam construction has been issued from CMDD (E&NE). Dam work is almost complete.
- Construction activities of Punatsangchhu- II HE project are in full swing. Design and drawings for various componentsare being issued as per construction schedule

Punatsangchhu-I &II H.E. Project site visit images

11. Jamrani Multipurpose Project (Uttarakhand)

- The project envisages construction of a 150.6 m high concrete gravity dam over Gola River in Nainital district of Uttarakhand.
- The project is a multipurpose project with provisions of providing additional irrigation in 57065 ha area of four districts falling in Uttarakhand and Uttar Pradesh, providing 42.70 MCM drinking water annually assessed for projected population of 10.65 lacs of Haldwani town projected for the year 2051 and generation of 63.4 MU of hydroelectricity annually by installation of a 14 MW hydropower plant at dam toe.
- The top of dam is at El.765.60m .Five sluices of gate size 8m (w) x 10m (H) have been provided for discharging PMF 8427 cumec.

Status:

- Jamrani Dam MoU is to be signed between the CWC (represented by Director CMDD (E&NE)) and UPDCC (represented by General Manager, Project Implementation Unit (PIU), Jamrani)
- CWC shall provide review design consultancy as per the requirement of Project Authority.

12) Polavaram Irrigation Project, Andhra Pradesh:

Polavaram Irrigation Project is a multipurpose project on Godavari River near Ramayyapeta, Polavaram in West Godavari District, Andhra Pradesh. The project is located 42 Km upstream of Sir Arthur Cotton Barrage on Godavari River. Water from the project is proposed to meet the demands of irrigation, drinking water and power generation. The project envisages irrigation benefits to 4.0 lakh acres in East Godavari, Visakhapatnam districts under Left Main Canal and to 3.2 lakh acres in West Godavari, Krishna districts under Right Main Canal.

In addition to irrigation benefits, generation of Hydropower with installed capacity of 960 MW, water supply for industries in Visakhapatnam and drinking water supply to villages & towns are also envisaged under the project. Further, it is also proposed to release 15 TMC of stored water to downstream existing Sir Arthur Cotton Barrage in lean period and 80 TMC of stored water to be diverted to Krishna River through Right Main Canal.

Polavaram Irrigation Project, Andhra

The project components include:

i) Earth cum rock fill dam in Gap I on left bank of river
ii) Earth cum rock fill dam in Gap II located in main flow channel of Godavari River
iii) Concrete dam in Gap III
iv) Spillway located on RB along with connecting approach channel and spill channel

An Ogee Type Concrete Spillway has been constructed on the right bank for passing of PMF of 50 lakh cusecs with FRL of the reservoir at EL. 45.72 m. The concrete dam comprises of 49 nos. of overflow blocks (including 10 nos. of river sluice blocks), 2 nos. of non-overflow blocks and 2 nos. of key blocks. Spillway with crest level at EL.

25.72m has 48 Nos. of Radial Gates of sizes 16m(W) x 20m(H) with hydraulic hoist arrangement for lifting. There is provision of 10 nos. of river sluices of sizes 2.1m(W) X 3m(H) in the over flow blocks for releasing 15 TMC of water to the downstream.

CWC has been entrusted with the work of vetting the designs & drawings of the Polavaram Irrigation Project submitted by the Project Authority. A Dam Design Review Panel (DDRP) has also been constituted for providing suggestions on the technical issues relating to the planning and design of the project.

CWC has already issued drawings related to Spillway, Stilling basin, Spill Channel, Approach channel, Divide Walls, Training Walls, Gap-III, Bridge, Prestressed trunnion girder, Radial Gates, Sluice Gates & their hoisting arrangements, cofferdams, foundation improvement of ECRF dam, Block out and EM parts, Service Gates & Emergency Gates, Fish ladder Service gates, etc..

In the review meeting taken by Secretary, MoJS on 29.08.2023, it was decided that PPA will hire a reputed agency to advice on the associated complex technical issues of the project. Till hiring of reputed agency, PPA may identify individual experts for scrutiny of design submitted by project authority. A committee was constituted by DoWR, RD & GR under the chairmanship of Member (D&R), CWC and Chief Engineer; Designs (NW&S) as one of its members to evaluate and recommend international technical experts to be hired by PPA Two meetings of committee were held on 26.02.2024 & 27.03.2024 to discuss the CVs of International Experts received from World Bank.

Further, meetings were also held on 15.02.2024 & 21.03.2024 under the chairmanship of Member D&R with PPA, CSMRS, WRD AP & its design consultant to discuss the way forward & resolve all pending technical issues in order to complete project in a time bound manner.

Total 45 drawings pertaining to Block out and EM (Embedded) parts, Service Gates & Emergency Gates at 25 m elevation,75 Tons capacity Gantry crane for operation of spillway stoplog gate, 20 Tons RDH (Rope drum host)for Fish ladder Service gates and at 39.15 m elevation and 10 tonsRDH for Fish ladder Emergency gates at 39.15 m and observations on 02 drawing and 7 designs pertaining to Service and Emergency gates at 25 m elevation, 20 Tons RDH for Fish ladder Service gates at 39.15 m elevation and 10 tons RDH for Fish ladder Emergency gates at 39.15 m and 75 Tons capacity Gantry crane have been issued so far.

Polavaram Irrigation Project, Andhra Pradesh

13) Parwan Dam Project, Rajasthan

Parwan Dam Project envisages construction of a 38m high concrete dam on river Parwan in Rajasthan.Parwan is a tributary of river Kalisindh, which is a main tributary of river Chambal. The project has a catchment Area of 8242 Km²& live storage of 462 MCM and caters to a total of 2.01 lakh ha CCA with 60.65% intensity of irrigation targeting annual irrigation of 1,22,166 ha in three districts, viz. Baran (318 villages), Jhalawar (113 villages) and Kota (206 villages). It also includes provision for drinking water supply of 50 MCM for 1821 villages of Baran, Jhalawar & Kota districts, provision of 16 MCM for Shergarh Wildlife Sanctuary and 79 MCM for Chabbra Thermal Power Station and Kawai Thermal Power Station.

The dam is a 396.20 m long gravity dam having of length 299.0 and NOF 97.20m. An Ogee Type Concrete Spillway has been proposed to cater the PMF of 28,948 cumec at FRL of the reservoir at EL. 308.8 m. The MWL of project is 309.30 m. The

concrete dam comprises of 15 nos. of overflow blocks (including 2 nos. of river sluice blocks), 4 nos. of non-overflow blocks, 2 composite blocks and 2 nos. of key blocks. Spillway with crest level at EL. 294.6 m has 15 Nos. of Radial Gates of sizes 16m (W) x 14.2m (H) with hydraulic hoist arrangement for lifting. There is provision of 2 nos. of river sluices of sizes 2.0m(W) X 2.0m(H) in the over flow blocks which will additionally work as diverting the water during construction stage.

CWC has approved the construction drawings related to spillway, stilling basin, under sluice block, gallery, sump well, trunnion, , spillway bridge & training wall. Construction.

Further, CWC has also vetted the Design & Drawings of Intake structure with provision of trash rack for tunnel work of Right Main Canal., .

In Gates Design (NW&S) directorate, total 04 drawing pertaining to Gantry crane for operation of spillway stoplogs, Dogging arrangement of radial gate and sluice gate have been examined and vetted.

Parwan Dam, Rajasthan

(Parwan Dam, Rajasthan)

14) Krishna Raja Sagara Dam, Karnataka

KRS gravity dam is one of the iconic dams in India, more than 100-year-old, built across the Cauvery River, constructed in stone masonry with lime surki mortar as a binding material. The length of the dam is 2621 m and height is 42.67 m. The construction of dam was completed in 1932 and has been operating since then. The FRL for project had been fixed as EL124.0' with top deck level at EL130.0'. There are altogether 173 sluices of different sizes at various levels to serve the intended objective of project.

An MOU for providing consultancy services for vetting of detailed design & drawings related to replacement of 136 gates and 2 no. of cranes by 136 new gates and provision of 136 skid mounted compact hoists at different locations of Krishna Raja Sagara dam was signed between CWC & WRD Karnataka on 28.02.2020. All components of 136 nos of Sluice Gates and their hoisting arrangement have been successfully completed.

CWC examined and vetted 28 drawings pertaining to hydro-mechanical components of the project including combined hoist platform &trestles, 136 Sluice Gates and their hoisting arrangementetc.

Krishna Raja Sagara Dam- Upstream view- Gates at two level

15) Isarda Dam Project, Rajasthan

Isarda Dam Project is located near village Banetha of Tonk district of Rajasthan across Banas river, a tributary of river Chambal. Drinking water requirement of five towns and 1198 villages of Dausa and Sawaimadhopur are proposed to be

met from the project. As the project is envisaged for drinking water, the DPR has been approved by the State Government. CWC is providing consultancy for vetting of designs & drawings for construction of the project.

The composite dam consists of left flank earthen dam section having length 3198.5m & Right flank earthen dam having length 803.0m and concrete gravity dam having length of 587.50m. Two saddle dams are also proposed on right side of Right flank earth dam having length 354.0m and 324.0m respectively.

CWC has approved constructiondrawings related to spillway, Energy Dissipation Arrangement bucket, gallery, fish lock, sump well, pier, , spillway bridge, two intake wells on either side of the dam,The construction drawings related to left side NOF block and wing wall, the right side NOF block and U/s wing wall examined and vetted.

Total 37 drawing pertaining to hydro-mechanical components including u/s and d/s fish lock gate, gantry crane, Intake well, dogging arrangement of radial gate etc were examined and vetted.

(Isarda Project, Rajasthan)

16) Indroka&Bastawa Mata dam, Rajasthan

The project involvesconstruction of earthen dam at Indroka village and concrete dam at Bastawa Mata in Jodhpur District, Rajasthan, which is a part of the scheme, namely Ground Water Augmentation through Artificial Recharge in select Water Stressed Areas of Rajasthan beingundertaken up by CGWB. The projects wereexecuted by WAPCOS on behalf of CGWB. CWC is responsible for vetting of the design & drawings submitted by CGWB.

Indroka is a small village in village of Mandor Tehsil in Jodhpur district, Rajasthan. Western Rajasthan does not have sufficient rainfalland the entire irrigation is mostly dependent on monsoon and tube wells. For overcoming the water scarcity in this area, an earthen dam was planned for recharging the ground water in Indroka village of Mandor Tehsil in Jodhpur district, Rajasthan.

This 715 m long and 9.3 m high Zoned Earth Filled Dam and shall recharge the Ground water and meet the shortage of this area.

A Project Implementation Committee (PIC) for overseeing the design and construction of these two dams has been constituted under the chairmanship of Chief Engineer, Designs (NW&S), CWC. Project Implementation Committee held 22 meetings to discuss the design related issues of the project. Regular visit of Indroka and Bastawa Mata Dam Project were undertaken by officials of Designs (NW&S) unit of CWC to review the progress of the project.

The Indroka dam project was completed &inaugurated in March 2024.

Indroka Dam

Bastawa Mata Dam project is located on the river Gotavar of Luni Basin in village Bastawa Mata of Balesar Tehsil in Jodhpur district, Rajasthan to address water scarcity in the area. It comprises a concrete gravity dam with ungated broad crested spillway and stilling basin as energy dissipation arrangement. to the concreting of the Non-overflow and overflow blocks (Phase -1) has beencompleted. Howeverconsolidation grouting, concreting of cistern is continuing and phase-1 works are likely to be completed shortly.
Phase-2 will be taken up for construction after administrative approval.

(Photograph of Bastawa Mata Dam)

17) Chelligada Irrigation Project (Odisha)

The Chheligada Dam Project is contemplated across river "Badajore" which is a tributary of river Vansadhara. The river originates from "Ramagiri" hill ranges of Gajapati District in Odisha. For utilization of Odisha share of water potential in Vansadhara basin there is limited scope in this basin.
It is proposed to divert the water potential of Vansadhara basin to the neighboring Rushikulya basin and to utilize it in the chronically drought affected area of Ganjam district. The present schemes contemplate a storage reservoir across river Badajore near village "Chheligada" in R-Udaygiri Block of Gajapati District from which 6.9 cumec water is proposed to be diverted to neighboring Rushikulya basin through a tunnel connected with approach and exit channels.
CWC is providing consultancy in design and preparation of specification and construction drawings for tunnel portion and related components like entry and exit portals of Chheligada Irrigation Project.

5.2.2.2 Projects at DPR Stage

1) Damanganga (Val/Vagh)-Vaitarana (Pinjal/Upper Vaitarna) - Godavari (Kadvadam on Kadva river upto Dev stream) link Project

The Intra-state link of the proposed Damanganga (Val/Vagh) - Vaitarna (Upper Vaitarna)-Godavari (Kadva/Dev Nadi) in Maharashtra, from 4 identified storage reservoirs viz., Nilmati on Val river, Met on Vagh river in Damanganga basin, Koshimshet on Pinjal river and Udhale on Gargai River in Vaitarna basin. Total water transfer involved is 202 MCM (for industrial water requirement of Delhi-Mumbai new industrial Corridor, other Industrial area, irrigation and drinking water of Sinnar Taluka).
CWC is providing design consultancy to NWDA for preparation of DPR for this project.
The designs, drawings and the DPR chapter from Hydel Civil Design aspects for each of the sublinks have been issued to NWDA.
Preparation of design Chapter and its relevant drawings of Met, Udhale, Koshimset&Nilmati R.C.C dams are completed & issued to NWDA.
26 nos of drawings related to Hydro-Mechanical componentsforUdhale Dam, Met Dam,Nilmati Dam and Koshimshet Dam have been prepared.

2) Barinium Hydro Electric Project, (Jammu)

Barinium H.E. Project is proposed in Chenab River in Paddar Valley of District Kishtwar, J&K. The PFR of the project was made by M/S

WAPCOS Ltd. for JKSPDC. Consultancy for preparation of DPR of the Project is entrusted to CWC, Jammu by JKSPDC. Preliminary drawings for alternate layout have been prepared and shared with CWC Office, Jammu. Further, a site visit to proposed alternate dam axis of Barinium H.E. Project, was conducted by the design experts from CWC (Hq.) and GSI along with officers and staff of CWC, Jammu from 10 and 11 May, 2022. Joint visit report was prepared and issued on 31 May, 2022.

IBO, CWC conveyed that different alternative layouts of the project with dam are found not feasible due to geological and topographical aspects including deep overburden. In light of this and also in pursuant to request of CWC, Jammu, two alternative layouts considering barrage option at upper reaches of the project are studied. Two layouts with barrage on left and right sides are developed. Further, one more alternate layout based on tandem operation with Dugar HEP is also developed considering its benefits of avoiding such large size of desilting basin and river diversion structures to make it a viable alternative in this instant.

In this regard, note on alternative layout studies covering the background of previously developed alternative layouts (alternative studies before Aug 2023) and recently developed alternative layouts was sent to IBO, CWC for their comments and study. During the meeting held on 22.11.2023 between CWC, Jammu and GSI, Jammu, it was concluded that these three alternatives prima-facie appears to be geologically feasible subject to detailed Survey & Investigation on each alternative and alternative based on tandem operation with Dugar HEP seems geologically much feasible as there will be no desilting chamber and diversion structure.

Further, CWC, Jammu discussed these alternatives with JKSPDC in the meeting held on 02.12.2023 and concluded that JKSPDC may decide the viable option and accordingly may convey to CWC and JKSDPC may request CEA to hold a consultation meeting with JKSPDC, CWC, GSI, NHPC and Power Department of H.P. to sort out the interstate issue as the headworks of these alternatives falls in territory of Himanchal Pradesh and all other components in territory of J&K

3) Haora Dam Project, Tripura

- Preparation of DPR for Haora Dam Project at Champaknagar in Tripura is being undertaken by NEIC, CWC, Shillong.
- The project envisages construction of a 27.5 m high dam on the river Haora with a canal from the right bank.
- The project on completion would extend irrigation facility to a Gross Command Area (GCA) of 310 Ha.
- The Culturable command area (CCA) being 250 Ha. The net area being irrigated annually from the project would be 210 Ha.
-

Status of the consultancy:

- Design team from CWC (HQ) visited the project site on 15.10.2019. List of data required at preliminary stage were communicated to NEIC, CWC, Shillong.
- Topographical survey data has been submitted by NEID, CWC.
- Joint site visit of CWC Designers and GSI Team was held in December 2020 to finalize the tentative dam axis.
- Geotechnical Investigations werecarried out at site.
- DPR Chapter and Drawings CWC were issued.

4) Katakhal Irrigation Project, Assam:

- Katakhal Irrigation Project is being investigated by NEIC; Shillong in which a Barrage as head works is being planned.
- A team of officers from BCD (E&NE) Directorate, CWC along with officers from NEIC, CWC and GSI team undertook a joint visit to proposed Katakhal Irrigation Project site Hailakandi, Assam for finalizing the Barrage Axis, on 23-03-2021.

Status of the consultancy:

- Project is under DPR preparation state.
- Design chapter, design and drawing for head works and canal are yet to be prepared.

- Inputs pending from Project authority regarding additional foundation survey.
- Barrage and canal Design Chapter of DPR is under preparation.

5) Subarnarekha– Mahanadi Interlinking Project, West Bengal & Odisha

- The Subarnarekha - Mahanadi link project envisages diversion of 17,900 Mm3 of water from the proposed Subarnarekha barrage located at Chorchita village, Gopiballbpur block, Medinapur district, West Bengal state across river Subarnarekha.
- This is an extension of Ganga – Damodar - Subarnarekha link which will receive 28,913 Mm3 of water from Manas-Sankosh-Tista- Ganga link in the upstream of Farakka. Out of this, a quantum of 11013 Mm3 will be utilized in the enroute of Ganga – Damodar - Subarnarekha link canal and the remaining 17900 Mm3 of water will be transferred to Subarnarekha Mahanadi for enroute utilization and further transfer to South.

Status:

- Work of preparation of design and drawings for various chapter of DPR is underway in Design E&NE Unit.

Data is awaited from CWC, Faridabad

Subarnarekha – Mahanadi link Project site visit images

6) Buroi Irrigation Project, Assam

- Buroi River originates from the state of Arunachal Pradesh and flows through the state Assam from North to South. Buroi is a Right bank tributary of Brahmaputra River, which meets the Brahmaputra at Gohpur Sub- Division of Biswanath Chariali District, Assam. The Brahmaputra River after flowing through Indian States enters into Bangladesh which ultimately joins Bay of Bengal.
- Brahmaputra Basin Organization (BBO), CWC, Guwahati is entrusted with the work of preparation of Pre-Feasibility Report (PFR) & Detailed Project Report (DPR) of Buroi Irrigation Project, Assam. The project envisages construction of a barrage across Buroi River, in Gohpur Block of Biswanath Chariali District, Assam to irrigate a Culturable Command Area (CCA) of approximately 8830 Ha. Annual average rainfall in the command area is 1844.43 mm and 75% dependable water yield at proposed site is 601.74 MCM. Apart from irrigation, the project will also fulfil the drinking water supply need of approx. 74970 households.

Status:

- In response to the request made by North Eastern Investigation Division-III (NEID-III), Itanagar, Arunachal Pradesh, vide letter no.W-11014/1/2021-NEID-III, ITANAGAR, dated 11.08.2022, a joint field visit to the Buroi Irrigation Project, Assam was made by officers of NEID-III, Officers from Design E&NE Unit,

CWC, Officers from State Departments along with GSI during 10th September 2022 to 13th September 2022. The tour report was issued by BCD E&NE Directorate on 23rd September 2022, giving request of data which is awaited.

- PFR chapter and Bill of materials was issued by Gates (E&NE) in Aug-2023
- BCD chapter of PFR issued on July 27 2023.

Buroi Irrigation Project site visit images

7) MEBO IRRIGATION PROJECT, ARUNACHAL PRADESH

- Brahmaputra Basin Organization (BBO), CWC, Guwahati is entrusted with the work of preparation of Detailed Project Report (DPR) of this project. Design E&NE Unit is preparing Design Chapters and Drawings for the Project.
- A joint field visit to the Mebo Irrigation Project was made by officers of NEID-III, Officers from Design E&NE Unit, CWC, officers from State Departments along with GSI during 17th September 2022 to 20th September 2022.
- The tour report was issued by BCD E&NE Directorate on 14th November 2022, giving request of data which is awaited.

Status:

- PFR chapter and Bill of materials was issued by Gates (E&NE) in Dec-2023
- Topographical data of barrage area, Inputs from IP Dte, Topographical data of Canal area is awaited.

Photographs of visit to Mebo Irrigation Project

8) Madhura Irrigation Project, Assam

- An Irrigation Project is being proposed on Madhura River near Ratanpur in Cachar District of Assam State. Annual average rainfall is 2750mm and 75% dependable water yield is 118 MCM. Project is being proposed for the Cultural Command Area of 13000 Ha.

Present Status:

- A joint field visit to the Madhura Irrigation Project, Assam was made by officers of NEID-III, Officers from Design E&NE Unit, CWC, along with GSI during 24th August 2022.Tour Report indicating the requisite topographical survey issued on 09.09.2022.
- Field office informed on 18.05.23 that it might take 6-8 months for data compilation.
- To be taken-up after receipt of requisite inputs/data.

Madhura Irrigation Project site visit image

9) Tlawng HEP, Mizoram

- Tlawng hydroelectric Project is a storage type development proposed on river Tlawng, a principal tributary of Barak river which is one of the major rivers of southern Assam.
- The latitude and longitude of the proposed dam is 23°37′31″ N and 92°40′15″ E respectively. River Tlawng is located in close proximity to Tamdil Lake and is considered to be the longest river in Mizoram.
- The project envisages construction of a 120 m high Rockfill Dam across the river Tlawng, about 500 m upstream of old suspension bridge 8 km south west of N Lungleng village to intercept a live storage of 667 MCM (Gross storage – 982 MCM).
- The waters from the reservoir would be led by means of 2050 m HRT to a surface power house for power generation. The power house would have an installation of two units of 60 MW each (Total 120 MW) operating under a net head of 90.5 m. The annual energy generation from the project would be 201.49 MU in 90% dependable year.

Present Status:

- Embankment Directorate issued a letter requesting for futher data in Septemeber 2022. Information has been received partly.
- Proposal for Design of Structures and preparation of Design Chapters of Tlawng HEP (120 MW), Mizoram received vide letter dated 02.09.2022.
- HCD (E&NE) Dte. issued a letter dated 14.12.2022 requesting inputs.
- A joint site visit of CWC Designers, Geologist from GSI is requested from NEID-II and the visit was undertaken from 3rd to 8th January 2023.
- Observations & Recommendations have been issued to the NEID-II, CWC, Aizawl

10) Mat-Sekawi Project, Mizoram

- It was originally Kolodyne HEP (Stage-I) in Mizoram.
- DPR of Kolodyne HEP (Stage-I) was submitted in February 2000.
- DPR of Kolodyne HEP (Stage-I) was submitted in October 2008.
- DPR for KHEP-II was prepared for FRL as 230 m which becomes operating level of tail race of power house of Kolodyne H.E. Project Stage-I (KHEP-I). Thus, new proposal for relocating the power house was proposed in the name of Mat-Sekawi HE project by Government of Mizoram in 2010. However, same was stopped in 2014. In order to restart the work, NEID-II (CWC, Aizawl) requested for the visit of Designs (E&NE) Team on 30.08.2022

Status:

- A joint visit of Officers from CMDD (E&NE) CWC, New Delhi and GSI Shillong along with the officers of NEID-II, CWC, Aizawl to the Project Site of Mat-Sekawi Project, Mizoram was undertaken from 21st September 2022 to 25th September 2022. In this regard, Site visit report was issued to NEID-II on 09.12.2022.

11) Tuichang HE Project, Mizoram

- A joint site visit of CWC Designers, Geologist from GSI was requested from NEID-II and the visit was undertaken from 3rd to 8th January 2023.

Observations & Recommendations have been issued to the NEID-II, CWC, Aizawl.

TuichangHEproject site visit image

12) Kaya Valley Irrigation Project,Arunachal Pradesh

- Kaya Valley Irrigation Schemes is a Minor Irrigation scheme located in East Kameng District of Arunachal Pradesh State under Thrizino Civil Sub-Division. The tentative Gross command area will facilitate under this scheme is 480.70 ha. East Kameng District is sharing international border with Tibet in North.
- The whole command area has been divided in two stretches and two separate barrages are proposed as per the desktop study.
- The total catchment area which contributes to the stream flow (Local River) at the Barrage 1 is 101.638 Km2 and at Barrage 2 is 215.363 Km2. The scheme shall cater to irrigation and domestic water requirement of the command area.

Status

- A joint field visit to the Kaya Valley Irrigation Project, Arunachal Pradesh was made by officers of BCD (E&NE) Directorate, CWC, Hydrology (NE) Directorate, CWC along with the officers of BBO, CWC, Guwahati, GSI, Shillong and Irrigation Department, Govt. of Assam during 23rd March to 27th March 2023.
- The objective of joint visit was to assess the field conditions so as to finalize tentative and suitable Barrage Axes and Command area on various design aspects.
- Tour report was issued on 18th April 2023 giving data requirement. Topographical data of barrage area,Cross sectional data and input from Hydrology, IP Dte awaited.

Kaya Valley Irrigation Project, site visit photos

13) Damring Irrigation Project, Meghalaya

Joint Site visit was undertaken on 22.06.2023. Tour Report of Joint Visit to the project site by CWC Designers and officials of NEID-I, CWC, Silchar, Assam Sent to SE, NEIC Shillong on 24.07.2023.

To be taken-up after receipt of requisite inputs/data.

14) Burusuti Irrigation Project, Arunachal Pradesh

- Burisuti Irrigation Project is a Medium Irrigation Scheme located in Chirang and Barpeta District of Assam on the River Burisuti, which is the tributary of the river Manas as proposed by Irrigation Department, Govt. of Assam.
- The project area is bounded between 90°46.41' to 90°53.20'. The people of Bijni Sub Division (BTC Area), district Chirang/Barpeta, Assam will be benefited. No area will be submerged and therefore no population will be affected.

- Proposed Burisuti Medium irrigation scheme is located in the district of Chirang/Barpeta in the left bank of Manas River of Assam state covering an area of GCA 13084.4 ha & CCA 6390 ha tentatively. Catchment area of the project partly lies in India and Bhutan.
- The Burisuti river is a left bank tributary of Manas River. The river originates from Bhutan. The Burisuti river system lies between the latitude 26°45′N & 27°15′N and longitude 93°15′E and 93°35′ E from its origin to the outfall to the river Manas. The river originates from Bhutan. The length of the river is approximate 21 km in the command area.
- North latitude 26°29.58′ to 26°38.02' & East longitude

Status

- Cross sectional data and input from Hydrology awaited.
- Letter regarding minimum data required for preparation of Design and drawings for PFR issued by 08.03.2024.

Damring Irrigation Project (Meghalaya) and BurisutiIriigation Project (Assam), Site

15) Bhuswa Reservoir Scheme, Jharkhand

The proposed Bhuswa Reservoir scheme is located on Siwane River, a tributary of Damodar River, in District Hazaribagh. The project envisages construction of an 11m high earthen dam with concrete spillway across river Siwane with benefits of irrigation, industrial & municipal water supply.

05 Nos. of drawings related to Earthen dam for preparation of the Detailed Project Report (DPR) Bhuswa Reservoir Scheme have been prepared and issued to project authority. Design chapter along with layout plan has been prepared and will be issued after receiving spillway drawings.

16) Bhelwa Reservoir scheme, Jharkhand

The proposed Bhelwa Reservoir scheme is located on Bhelwa River, a tributary of North Koel River, in Palamu District. The project envisages construction of a 10.5m high earthen dam with concrete spillway across river Bhelwa with benefits of irrigation, industrial & municipal water supply.

05 Nos. of drawings related to Earthen dam for preparation of the Detailed Project Report (DPR) Bhelwa Reservoir Scheme have been prepared and issued to project authority. Design chapter along with layout plan has been prepared and will be issued after receiving spillway drawings.

17) Sonadubi Reservoir scheme, Jharkhand

The proposed Sonadubi Reservoir scheme is located on Sonadubi River; a tributary of Subernarekha River, in District Ranchi. The project envisages construction of a 11.5m Earthen Dam with Concrete Spillway across river Sonadubi with benefits of irrigation, industrial & municipal water supply.

05 Nos. of drawings related to Earthen dam for preparation of the Detailed Project Report (DPR) Sonadubi Reservoir Scheme have been prepared and issued to project authority. Design chapter along with layout plan has been prepared and will be issued after receiving spillway drawings.

18) Kuntishot Reservoir Scheme, Jharkhand

The proposed Kuntishot Reservoir scheme is located on Khuntishot River; under North Koel River basin, in District Palamu. Two main canals are proposed to off-take from Kuntishot Reservoir from Left and right bank head/sluice regulator. The Culturable Command Area (CCA) for the project has been considered as 1150 ha keeping in

view the water availability, designed live storage and development in the command. The envisaged Gross Command Area (GCA) is about 2000 ha as per the Google Earth and contour map generated by SRTM Data.

Design chapter along with a total of 12 Nos. of drawings related to Canal Design for preparation of the Detailed Project Report (DPR) of Kuntishot Reservoir Scheme have been prepared and issued to project authority.

19) Sapta-Kosi Multipurpose Project (Indo - Nepal)

The Sapta Koshi High Dam Multipurpose Project (SKHDMP) is a proposed hydroelectric and irrigation project on the Sapta Koshi River in Nepal. Earlier, the project involves the construction of a 269-meter-high concrete dam. Nepal has proposed, on the upstream of Sapta-Kosi Dam, the Lower Arun Hydroelectric project on the Arun River. There is concern that this project may reduce the amount of water available to the SKHDMP, which may affect the project's benefits.

To address this issue, CWC has studied the potential impacts of proposed upstream projects in Nepal on SKHDMP. Based on these studies, the parameters of SKMP have been revised in 17th JTE meeting held on 9-11 October 2023 at Biratnagar, Nepal. After detailed deliberations on the proposed revised parameters, JTE decided that governing water level of SKHDMP reservoir may be taken as 304.80 m for further studies including assessment of EIA & RR studies and FRL as 299.00 m for power potential studies. However, the governing level and FRL of SKHDMP may be reaffirmed once the parameters and other features of upstream projects including Dudh Kosi Storage Lower Arun and Sun Kosi-l are finalised.

In view of substantial reduction in the Dam height and in consideration of the proposal from the local inhabitants, the JTE agreed to rename the Sapta Kosi High Dam Multipurpose Project as Sapta Kosi Multipurpose Project ISKMP) and Sun Kosi Storage Cum Diversion Scheme (SSDSJ as Sun Kosi Kamala Diversion Multipurpose Project ISKDMP) to reflect the nature of the project.

Further, a meeting of officers of CWC, GSI and JPO-SKSKI was held under chairmanship of Chief Engineer, Designs (N&W) on 08.11.2023 in his chamber to review requirement of balance Drilling and Drifting works at Sapta Kosi Multipurpose Project (SKMP) and Sun Kosi Kamala Diversion Multipurpose Project (SKDMP), Nepal. In the meeting, it was decided that the Geological investigations of SKMP may be taken up in two phases, wherein the

a. First phase will focus on executing drilling works which will help in finalization of dam type.

b. After finalisation of dam type, in second phase, focus on executing drilling works of diversion arrangement and water conductor system (tunnels, powerhouse, transformer cavern etc.) shall be given.

For taking up design and drawing work, pertaining to Sapta Kosi Dam for preparation of DPR of the (Indo-project, the requisite design data/inputs are awaited from Project authorities and work will be taken up immediately after receiving the requisite design data/inputs from Project authorities.

20) Kishau Multipurpose Project, Uttarakhand

The Kishau (660 MW) multipurpose project is located on the Tons River, a major tributary of the Yamuna River, at the border of Dehradun district (Uttarakhand) and Sirmour district (Himachal Pradesh). The command area of the Kishau project is 97,076 hectares. The project involves the submergence of 2,950 hectares of land in the territories of Himachal Pradesh and Uttarakhand.

The investigation reports for the Kishau project were submitted to the CWC for examination in October 2020. In June 2022, an "Inception Report" for the preparation of the DPR of the Kishau Multipurpose Project (MPP) was received by the CWC from Uttarakhand for comments and observations. CWC's detailed views and comments

on the Inception Report have been conveyed to the project authority during September'2022.

21) Panchnad Barrage, Uttar Pradesh

A barrage has been proposed across Yamuna River in Auraiya district just downstream of the confluence of five rivers viz Yamuna, Chambal, Sindh, Pahuj, and Kwari for Irrigation and drinking water purposes. CWC has taken up the consultancy work for the designing and preparation of DPR for this project. Accordingly, a MoU has been signed between CWC and I&WRD, Govt. of Uttar Pradesh on 29.08.2022.A joint field visit was carried out at the proposed location of Barrage during November'2022. The observations based on the field visit have been shared with the project authority. Further works related to this project are under progress. Study drawings based on data received from project authority so far has been issued vide letter dated 26.09.2023. Study drawings for Fish Pass & Navigation Lock drawing also issued vide letter dated 01.01.2024.

The drawings for DPR in respect of hydro-mechanical equipment of spillway service gate is prepared and issued.

22) Construction of two barrages in the downstream of existing Bariyarpur Pickup Weir under Ken-Betwa Link Project, Banda, Uttar Pradesh

To resolve the issues of water sharing in non-monsoon season, NWDA suggested utilizing unfilled capacity of existing tanks in Mahoba district during monsoon season from Daudhan dam as well as creating new storages in the territory of Uttar Pradesh and utilizing this water during non-monsoon period. Accordingly, Uttar Pradesh identified two new barrages in the downstream of Bariyarpur pick-up weir.

- A meeting was held to discuss the design parameters (Pond Level) for the barrages at CWC(HQ), New Delhi on 30.10.2023.
- Vide email dated 28.12.2023, it was informed by NWDA that as per decision taken in the meeting taken by Engineer-in-Chief (Project), I&WRD, Govt. of UP, Lucknow on 27.12.2023 at Sinchai Bhawan, Lucknow, it has been requested that the chapter on Design and drawing of Pailani Barrage with pond level of 96 m on river Ken may be prepared, so that DPR can be submitted to I&WRD.
- Data with respect to the Pailani Barrage has been provided to CWC vide email dated 08.01.2024.

  The study drawings based on the data received so far and observations regarding pending data for finalization of drawings have been issued by this office to the project authorities on 15.03.2024

23) Kosi Mechi Intra State Link, Bihar

The Kosi-Mechi intra-state link canal envisages diversion of part of surplus water of Kosi River for extending irrigation in un-irrigated areas of Mahananda basin lying in Bihar state by way of extending the existing Eastern Kosi Main Canal (EKMC) beyond its tail end at RD km 41.30 upto river Mechi so that rivers Kosi and Mechi which flow through Bihar could be linked together within Bihar.

- Letter has been received from NWDA requesting for preparation of working DPR stage design and drawings vide letter date 25.01.2024.
- A meeting was held to discuss the various issues of the project with NWDA and Govt. of Bihar on 13.03.2024 under the chairmanship of CE Design (N&W), CWC.

A joint site visit has been proposed from 04.04.2024 to 06.04.2024.

5.2.2.3 Special Problems Projects

1. Farakka Barrage Project (FBP), West Bengal

1) Farakka Barrage Project with headquarters at Farakka in Murshidabad district of West Bengal is a subordinate office under Department of Water Resources, River Development & Ganga Rejuvenation, Ministry of Jal Shakti.

2) The Farakka Barrage Project Authority was set up in 1961 with the mandate to execute and thereafter operate and maintain the Farakka

Barrage Project Complex comprising of Farakka Barrage, Jangipur Barrage, Feeder Canal, Navigation Lock and associated structures.

3) The Barrage comprises of 112 nos. of Gates (108 Nos. main Gates and 4 Nos. Fish Lock Gates)at main barrage and 11 Nos. Head Regulator Gates for diversion of approximately 40,000 cusec (1035 cumec) of discharge into the Feeder Canal.

4) The project construction commenced in 1961 and the project was commissioned and dedicated to the Nation in May 1975.

5) 119thTAC meeting held on 30.01.2024at CWC(HQ),Sewa Bhawan, New Delhi.

6) Recently, this office has designed & issued drawings on 27.02.2024 for anti erosion/ bank protection works for the concerned RDs in upstream left bank area of Farakka Barrage in compliance of issue raised in 119th meeting of TAC. A total of three drawings have been prepared out of which two no. of drawings are meant for strengthening of anti-erosion work and one drawing is prepared for new critical reaches as informed by FBP vide email to reclaim more land and to stem further erosion.

7) Foreclosure of fish lock replacement contract has been initiated.

8) Rectification of jammed wheel bogie assembly has been taken-up on a pilot basis.

Photos of 119th TAC –FBP meting

2. Anandapur Barrage Project,Orissa

- The Anandapur Barrage is located at village Anandapur, in District - Keonjhar, (Odisha) at Longitude 86°8′ E and Latitude 21°13′ N.
- The scheme envisages construction of a Barrage, having 491.60m total waterway with 25nos. spillway bays and 8nos. under sluice bays, across river Baitarani at Anandapur including Left & Right Head Regulators to divert 165.00cumecs water in Baitarani Left Bank Canal (BLBC) to irrigate 1200Ha in Anandapur&Hatadihi Blocks of Keonjhar District and 10.00cumecs water in Baitarani Right Bank Canal (BRBC) to irrigate 5000Ha CCA in Ghasipura Block of Keonjhar District.
- The Left Bank Canal (Link Canal) carrying 165.00cumecs water, outfalls in Salandi River at upstream of existing Bidyadharpur Barrage to provide water to the extended Salandi left ayacut of 53,800ha in Balasore District.

Status:

- The Project has been completed except for some design issue related to D/S Guide Bund of the Barrage which is under examination.
- Prima facie, the alignment of downstream right guide bund appears to obstruct the flow through the barrage. Such condition may cause undesirable flow conditions on upstream and downstream of barrage during high discharge and may lead to potentially hazardous circumstance for barrage structure as well as to the life and property of nearby areas.
- It was suggested to the Project Authorities to carry out the model studies of the project as per actual site condition so as to ensure the proper hydraulic functioning of the Barrage.
- Joint Field visit to IRI Roorkee regarding model studies held on 07.02.2024 and Tour Note of joint fieldvisit to IRI Roorkee issued on 19.02.2024.

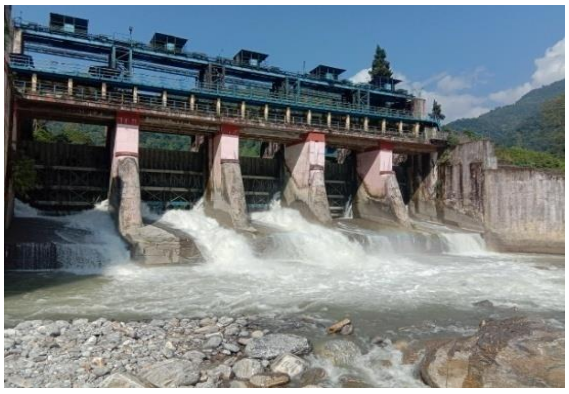
Site visit images to IRI,Roorkee (Anandapur Barrage Model)

3. Bindu Barrage, Jaldhaka, H E Project, West Bengal

A visit to Bindu Barrage was undertaken by officers from BCD (E & NE) Dte, CWC jointly with officers of West Bengal State Electricity Distribution Company Ltd WBSEDCL) on 29th – 30th October 2021. The purpose of the visit was to preliminarily assess the Health of Civil Structure of Bindu Barrage in response to recommendations of DSRP team who visited the site on 23/03/2021.

Status :

- A team of officers from Central Water Commission (CWC) and West Bengal State Electricity Distribution Company Limited (WBSEDCL) jointly visited the Bindu Barrage, Jaldhaka H.E. Project site on 8th – 11th March 2022 and report of the field visit was shared with the Project Authorities on 29.03.2022.
- Awaiting instructions from DSO/WAPCOS/State Gov.



Bindu barrage Site

4. Imphal Barrage,Manipur

- The Imphal barrage is located at OinamSawombung of Imphal West district in the southern part of Manipur and is at a distance of 17 km from Imphal city.
- The barrage supplies Irrigation water to a Gross Command Area of 6000 ha; Culturable Command Area is 4000 ha. In addition, there is a link channel (TurelAhanbi) about 6 Km long leading water to a cross regulator which provides irrigation to a command area of 800 ha.
- The construction of Imphal Barrage & Cross Regulator across Imphal River was completed in the year 1984 and has been operating since then.
- The Pond Level for project had been fixed as 778.0 m. There are 5 no's of 9m×6m Spillway Gates and 3 no's of Cross Regulator Gates (2 no's with 2.4 m Width & 1 no. with 2.3 m) to serve the intended objective of project.

Status:

- The consultancy for replacement of hydro-mechanical equipment under DRIP-II is being provided by Gates (E&NE).
  - Vetting/approval of vendor's drawings and designs for hydro-mechanical equipment is under progress.Fabrication drawings and design for spillway stoplog and service gates have already been approved. Remaining items pertaining to hoisting etc. shall be dealt as and when submitted by Project Authority.

5. Flat Bay Lake Project, Andaman.

- The proposed Flat Bay Fresh Water Scheme is intended to be commissioned to cater the water supply needs of Port Blair Municipal Council area. The scheme would broadly deal with the following:
- Isolation of the bay from the marine environment
- Pumping out/draining out the saline water of the bay
- Storing of rain water from surface runoff
- Intake arrangement and water supply scheme

Present Status:

- WAPCOS submitted a basic engineering report. Final Report is awaited

- CWC officers visited Pune in April 2022 and issued minutes for further necessary action by WAPCOS.
- Further in March 2023, WAPCOS Submitted draft DPR.
- A site visit was carried out in April 2023. Further observations were issued and WAPCOS submitted the compliance. However, Andaman Public Works Dept. (APWD) views are pending for finalization of project.

Flat Bay Lake Project site visit photo

6. Drinking Water Project, Aizawl, Mizoram

- Public Health Engineering Department (PHED), Aizawl, Mizoram had requestedCWC to provide guidance on the issue of very low discharge in Tlawng River during leanperiod and consequent shortage of drinking water for Aizawl City.
- A joint site visit by officers from CWC and PHED, Mizoram was undertaken on 9thOctober, 2023 followed by detailed discussions with senior officers of PHED, Aizawl,Mizoram. Based upon the data provided, observations made during site visit and discussionsheld, the issue was analyzed and a report was prepared which analyses the reasons of theshortage and also suggests short / long term remedial measures to take care of drinking watershortage in Aizawl water supply scheme.
- The report and short / long term measures contained therein were discussed with CE& SE, PHED, Mizoram during their visit dated 19th February 2024 to CWC and were foundsatisfactory by them. The report was issued on 07.03.2024.

7) Siltation problem in DVC reservoirs and their operation

As per the decisions taken in the meeting held on 11th May 2023 under the Chairmanship of Union Home Secretary at New Delhi, the proposed Balpahari Dam project may be reviewed by Central Water Commission in consultation with the DVC authorities and the States of West Bengal and Jharkhand. Following options were suggested to fulfil the objectives of managing floods and siltation as well as ensuring that Jharkhand gets its share of water for irrigation, keeping in mind the constraint of land acquisition and rehabilitation of project affected families:

i. Jharkhand suggested that a Barrage could be built at the site so that Jharkhand gets its share of irrigation water.

ii. The second option was that the Balpahari Dam could be scaled down to reduce submergence and the number of affected families, while managing the irrigation needs of Jharkhand as well as the flood cushion required by West Bengal.

CWC has been directed to study both the options and find out whether both the options are technically and economically feasible. In this regard, Embankment (N&W), CWC has requested Superintending Engineer, HOC, CWC for necessary design Data/input. Preparation of drawings and design chapter for scaled down Balpahari Dam Project will be take up after receipt of requisite input data.

8) Nanak Sagar Dam, Uttarakhand

Nanak Sagar Dam situated in Udham Singh Nagar District of Uttarakhand, operated and maintained by Uttar Pradesh Irrigation Department, is constructed across the Deoha/Kamini River and completed in the year 1962. It is 19.20 km long earthen dam with a maximum height of 16.50 m. The dam is constructed in two portions namely East Flank (10.60 km long) and West Flank (8.60 km long) separated by a

concrete / masonry spillway capable of discharging a flood of 1600 cumecs. The top of the dam is at EL. 217 m providing 1.81m of free board over Full Reservoir Level (FRL) at EL. 215.19 m. Dead Storage Level of the project is at EL. 207.264 m. The main purpose of the dam is Irrigation and Flood Control.

The Superintending Engineer, Irrigation Division, Bareilly vide letter dated 23rd September, 2022 requested CWC to inspect Nanak Sagar Dam and give suggestions on the present issues of seepage and boiling in the Nanak Sagar reservoir.

Accordingly, a team of CWC officers was constituted to visit the dam. The team of officers inspected the Nanak Sagar Dam, on 13-14th July, 2023. During the inspection, a team of officers from Irrigation and Water Resources Department, Uttar Pradesh participated in the visit. Various issues pertaining to dam i.e. observed boiling in toe drain and seepage in various locations in West and East flanks of Dam etc. were discussed with the project authorities. Inspection Report on Site Visit of Nanak Sagar Dam, issued August 2023.

9) Kanhar Irrigation Project, Uttar Pradesh

A Dam is proposed on river Kanhar in village of Tehsil Dudhi in District Sonebhadra (Uttar Pradesh) to facilitate irrigation in 35467 hectare drought prone area of District Sonebhadra. Apart from the irrigation, 1.42 MCM water from the reservoir of the dam is also proposed for drinking purpose. Total length of Dam is 3.24 km and Maximum height of dam is 39.90 m.

Chief Engineer, Kanhar Irrigation Project, U.P, vide letter dated 20.01.2023, addressed to Member (D&R), CWC with copy endorsed to Chairman, CWC, had sought technical advice on development of cracks on top of existing earthen section of Kanhar Dam.

A team of officers comprising from CWC, CSMRS, Kanhar irrigation project and State Dam Safety Organization (SDSO, U.P.) jointly inspected the Dam to understand various issues pertaining to dam i.e. observed cracks, freeboard provided and in-situ parameters of the Embankment material on 28th July 2023. Report of this Joint Visit was issued in August, 2023.

10) Standing Technical Committee to study the issues in the event of any geological surprise faced in the Hydroelectric Projects and to vet/ examine and recommend the additional time/ cost involved

A "Standing Technical Committee to study the issues in the event of any geological surprise faced in the Hydroelectric Projects and to vet/ examine and recommend the additional time/ cost involved" has been constituted by CEA vide letter no. CEA-HY-11-22/1/2021-HPM Division dated: 20.09.2023.

Shri Somesh Kumar, Director, Embankment (N&W) Dte has been nominated as the representative from Central Water Commission in the Standing technical committee. 1st meeting of the Standing Committee was held for the natural disaster incident at Teesta-III Hydroelectric Project located in the state of Sikkim on 22.22.2023. 2nd meeting was held on 05.02.2024.

11) Joint Committee of Temple Precinct DPR & Works for Development of Badrinath Dham

Chief Engineer, Design (N&W) has been nominated as the member of Joint Committee to address the issues pertaining to the Temple Precinct DPR and works for the development of Badrinath Dham. Director, Emb (N&W) attended joint committee meeting on the behalf of Chief Engineer, Design (N&W) that was held on 30th June 2023 under the Chairmanship of Director General, National Mission for Clean Ganga at Uttarakhand Tourism Development Board to address the issues pertaining to the of Temple Precinct DPR & Works for Development of Badrinath Dham.

12) Durgawati Reservoir Project

The objective of the project is to provide assured irrigation facilities to the fertile land lying between Kaimur hill range and Sone high level canal. Director, Monitoring, CWC, informed that the project authorities intend to reconstruct the damaged parapet wall at the d/s edge of Durgawati Earthen dam. CWC was requested to provide suggestions for the same. The project was earlier visited by CWC teams in January 2016 and July 2018 on the requests of the concerned officials from the Water Resources Department of Bihar Government to inspect the issues of

settlement, gully formations, deep cuts, seepage through d/s face, etc. Some remedial measures were suggested by the visiting teams to address the prevailing issues.

Subsequent to the above, the State Government informed about the damage of d/s parapet wall in 180m length between Ch 18 to Ch 26.

A virtual meeting was held with the State Government officials, Director, DSM, CWC and CSMRS scientists on 12.03.2021 for better appreciation of the site conditions.

In view of the repeated distress in the dam body particularly in the closure section, CWC in consultation with CSMRS has advised the project authorities to carry out some essential field and laboratory tests so that the problem can be analysed. The Data/inputs from Project authorities are awaited.

13) The matter of maintaining full reservoir level (FRL) in Bhakra dam and Pong dam:

Bhakra Dam and Pong Dam are concrete gravity and earth-fill embankment dams on the Sutlej and Beas rivers, respectively, in the state of Himachal Pradesh. The dams are used for water storage for irrigation and hydroelectric power generation. Satluj-Beas river system downstream of the Bhakra Dam and Pong Dam is shown in Figure 5.2.

In Northern Zonal Council meeting held on July 9, 2022, in Jaipur under the chairmanship of the Honourable Union Home Minister, the matter of maintaining the Full Reservoir Level (FRL) in Bhakra Dam and Pong Dam was discussed. The council chairman directed that a study be conducted on the impact of water levels in the two dams. The study should cover the extent to which the water level can be safely taken, the flow through downward channels, and the impact of encroachment. The chairman also directed that an action plan with specific suggestions be developed and discussed with the states. Subsequently, the Joint Commissioner, Indus Wing, DoWR,RD&GR, CWC was requested to carry out the requisite studies as directed by the council chairman.

In this regard, based on the data provided by Bhakra Beas Management Board (BBMB) and revised hydrology, CWC carried out flood routing studies for the Bhakra and Pong dams to evaluate how various operating conditions of the reservoir and spillway gates affect outflow discharge and maximum reservoir levels, considering both designed and current operational scenarios.

CWC has compiled a draft report on restoring the water levels in Bhakra and Pong Dams, titled "Report on Restoration of Bhakra Dam Reservoir Level" and "Report on Restoration of Pong Dam Reservoir Level," the document summarizes key findings from the study and CWC's recommendations. The report has been sent to BBMB for their comments.

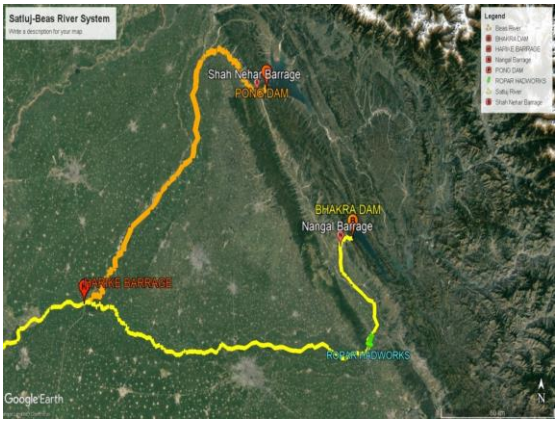


Fig 5.2: Showing the Satluj-Beas river system downstream of the Bhakra Dam and Pong Dam

14) Remedial measures to check recurring damages on D/S side of Hathnikund Barrage

Hathnikund Barrage was constructed to replace the Tajewala weir (an old pre-independence structure) located around 2 km upstream.

Post-construction of Hathnikund Barrage, Tajewala weir got heavily damaged and large parts of the weir started getting washed away from the year 2010 onwards. The aggradation which had taken place upstream of Tajewala weir also started eroding and consequently the river portion between Hathnikund and Tajewala started getting lower due to erosion caused by annual floods.

Construction drawing with remedial measures has been issued on 09.01.2024 to the project authority.
Meeting to discuss the same was held on 17.01.2024 under chairmanship of CE, Designs (N&W), CWC and minutes issued on 18.01.2024. Letter received from project authority regarding model studies and good-for-construction drawing vide letter date 02.02.2024 and the reply has been issued to the project authority vide letter dated 14.02.2024.

15) Committee for assessing the various issues of Indira Gandhi Feeder/Rajasthan Feeder Canal

1st Meeting of the committee was held on 27.10.2022 under the chairmanship of Member, D&R, CWC.
Data has been requested from CE, IBO for evaluating the discharging capacity of the canal. Indus Wing, MoJS has been requested for time extension of the committee and further data with respect to the issue has been sought vide T.O. letters dated 17.11.2022 and 29.11.2022 respectively.
Requested data has been provided vide email dated 14.11.2022, 11.01.2023 and 12.01.2023.

The numerical modelling was carried out by BCD (N&W) dte based on the data received and final report of the committee was issued vide letter dated 27.02.2024.

16) Request for in-principal approval for construction of new Barrage near to Existing Barrage across Yamuna at Wazirabad

A reference has been received from Director, NDSA Secretariat & DSD-Il forwarding therein a letter by CE (W), PRII, DJB (2) and a CD containing reports and studies of Wazirabad Barrage undertaken by Delhi Jal Board.

Letter requesting to reconsider the request for in-principal approval has been received vide email dated 19.12.2022. The reply to the same has been issued vide T.O. letter dated 12.01.2023.
A proposal regarding rubber dam in upstream of Wazirabad has been received from D&R (C) vide letter dated 24.01.2023. The reply to the same has been issued vide TO letter dated 27.01.2023/03.02.2023.

A visit to the Wazirabad Barrage was undertaken on 02.03.2023 and the report of visit has been shared with the project authority vide letter dated 10.04.2023.

17) Joint Flood Management Study of River Yamuna for its reach between Hathnikund and Okhla barrage

DoWR, RD&GR, Ministry of Jal Shakti, vide Z-15011 /1/2020-FM Section-MOWR dated 06thAugust 2023, constituted a Committee for conducting a joint flood management' study of river Yamuna for its reach between Hathnikund and Okhla barrage.
The 1st meeting of the Committee was held on 04.09.2023. 2nd Meeting was held on 13.11.2023. In the second meeting of the Committee under Chairmanship of Chairman, CWC constituted by DoWR, RD&GR for joint flood management study of river Yamuna, it was decided that officers from Design Unit of CWC will visit the barrages on Yamuna River from Hathnikund to Okhla.

Accordingly, a team of officers from BCD (N&W) Dte. and Gates Design (N&W) Directorate visited Hathnikund Barrage and Okhla Barrage on 18.11.2023 & 09.01.2024 respectively, to understand the operating procedure of the barrage.
Visits to Wazirabad and ITO Barrage were undertaken with the Parliamentary Standing Committee on 23.08.2023.
A study of the discharging capacity of the Hathnikund and Okhla Barrage was undertaken in this office and subsequently comments were issued to the Member secretary of the above said committee accordingly.

18) Bisht Doab Canal and Sidhwan Canal

Request has been received from Mon (E&W) directorate CWC and comments have been issued vide TO letter dated 18.09.2023 and 21.09.2023.

Compliance by GoP to observations issued vide TO letters above was received from Mon (East & West), CWC vide their email dated 27.10.2023. The comments of this office were issued vide TO letter dated 09.11.2023. A meeting was held under the chairmanship of Secretary (DoWR, RD & GR) and pilot project was proposed and comments of

this office has been issued vide letter dated 22.12.2023 and 04.01.2024.
Letter received regarding inspection of Bisht Doab Canal and Sidhwan Canal vide letter dated 25.01.2024. Reply of BCD (N&W) directorate issued vide letter dated 28.02.2024.

5.2.3 Technical Examination of PFR/DPR'S of H.E./Irrigation/M.P./FMP Projects:

5.2.3.1 Hydroelectric Projects

1. **Anjaw Hydroelectric Project (270 MW), Arunachal Pradesh (Pre-DPR)**

- Anjaw HEP is proposed in the Anjaw District of Arunachal Pradesh having Latitude 28°02'34.35"N Longitude 96°34'49.43"E.
- The project envisages utilization of discharge of River Lohit, a major tributary of the mighty Brahmaputra.
- The river bed level at the Barrage site is about at EL.550.00 m. Surface powerhouse is proposed on the right bank of Lohit River just downstream of the barrage axis.
- The first consultation meeting was held on 31-03-2021 and during that meeting it was informed that alternates sites were also explored by the Project Authorities

Status:

- Reply to latest comments issued by HCD (E&NE) Dte. vide letter dated 31.01.2023 is awaited. Further, reply to comments on sedimentation issued on 17.07.2023 is also awaited.
- Pre-DPR chapters received on 16.05.2023. Comments were issued by BCD (E&NE) Dte. On 27.02.2024, Reply awaited from project authorities.
- Comments in r/o HM equipment have been issued by Gates (E&NE).

2. **Demwe H E Project-I,Arunachal Pradesh (PFR)**

- Demwe Upper Stage-I HEP is proposed in the Anjaw District of Arunachal Pradesh having Latitude 28°01'59"N Longitude 96°26'47"E.
- The project envisages utilization of discharge of River Lohit, a major tributary of the mighty Brahmaputra.
- The river bed level at the Barrage site is about at EL.442.00 m. Surface powerhouse is proposed on the right bank of Lohit River just downstream of the barrage axis.
- The first consultation meeting was held on 28-07-2021.

Status:

- Final comments issued on 30-11-2022 by BCD(E&NE)
- Proposal for 1st consultation meeting of CEA in respect of Demwe Upper Stage-I H.E. Project (Arunachal Pradesh) has been examined. Compliance to HCD (E&NE) letter dated 31.01.2023 is awaited.

3. **Niare H.E. Project,Arunachal Pradesh**

- Niare Hydro Electric Project is planned as run-of-river scheme across Subansiri River, a major right bank tributary of Brahmaputra River. The project envisages the construction of about 100 m high concrete gravity dam across Subansiri River near Niare village 50 km upstream of Nacho town in Upper Subansiri District of Arunachal Pradesh
- The catchment area up to the dam site is 11,181 sq. km and the catchment lies in two countries viz. China (Tibet) and India (Arunachal Pradesh).

Project proposal

- The Niare HEP will utilize a gross head of 204 m and design discharge of 443.43cumecs for generation of 770 MW (4 units of 192.5 MW) and also utilize a gross head of 91.33 and design discharge of 114.01 Cumecs for the generation of 90 MW (2 units of 70 MW & 20 MW) in Upper Subansiri district of Arunachal

Pradesh. Salient features of the project given below.

- A 115.58 m high Concrete Gravity Dam which will provide a gross storage of 14.92 MCM at FRL (EL 1259 m) and storage of 8.86 MCM at MDDL (EL 1242 m). The dam top has been kept at EL. 1261 m.
- River diversion is planned on the right bank with the help of 2 nos. of 11.0 m diameter horse shoe shaped Diversion Tunnels.
- Spillway comprising of (a)low level Orifice/Sluice spillway - 6 nos. of opening size 8.5 m X 11.0 m (wxh) with crest elevation at EL 1203.00 m and (b)upper level Sluice spillway of dimension 10.0 m X 12.0 m with crest elevation at EL 1259 m.

Status:

- Compliance submitted by project authorities to CMDD (E&NE) was examined and clearance to proceed for survey & investigations works has been issued vide letter dated 07.03.2023.
- Go-ahead for investigations from HCD point of view was given vide 12.06.2023. Proposal for shifting of Upstream Surge Chamber received vide letter dated 26.02.2024.

4. Teesta Intermediate H.E Project,West Bengal

Present Status:

- Preliminary Comments on General Layout Chapter issued on 14.12.2022 from BCD E&NE Directorate, CWC.
- Go-ahead for investigations from HCD point of view was given vide 12.05.2024.

5. Rangit-IV H.E. Project, Sikkim (MoC)

- Rangit-IV HEP is a run of the river development across river Rangit and proposes to utilize a natural drop of about 103.67 m (net) available between the stretch near village Reshi and confluence point of River Rangit and its tributary RothakKhola to generate 120 MW of power.
- It envisages construction of a 44 m high concrete gravity dam across Rangit River near Reshi (about 1.0km upstream of village Rishi in West Sikkim) to divert 128 cumec river discharge through a water conductor system comprising of power intake, desilting chamber, 6.488 km long head race tunnel, surge shaft, pressure shaft/ penstocks, surface power house (at Rothak on the right bank of river Rangit) with installation of three nos. Francis Turbine generating units of 40 MW capacity each and small length of tail race channel utilizing a gross head of 123.50 m, available between dam and tail race exit point.
- Considering environmental flow as 15% of average inflow of lean season, the design energy of the project is 507.88 MU.

Present Status:

- Memorandum of Changes (MoC) in respect of Rangit-IV HEP (120 MW), Sikkim received vide letter dated 21.10.2022 was examined and the observations from CMDD (E&NE) Directorate were issued on 17.11.2022.
- Cleared by Gates (E&NE) on 30.01.2023
- Cleared by HCD (E&NE) Directorate vide letter dated 09.02.2023.

6. Teesta-VI H.E. Project (MoC)

- Teesta Stage-VI Hydroelectric Project located in Southern Sikkim is a run off the river scheme across river Teesta. It envisages construction of a 26.5m high diversion Barrage located about 100m downstream of L.D. Kazi Bridge at Sirwani to divert 531 cumec river discharge through a water conductor system comprising of 2nos. surface Desilting basins, Silt flushing tunnel, 2nos. Intake, 2nos. Head race tunnels of about 13.76 km length each, 2nos. Surge

shaft along with surge galleries, 4nos. pressure shafts, MIV cavern, Power house cavern with Installation of 4 Nos. Francis turbine generating units of 125 MW capacity each, Transformer cavern, 4nos. Tail race tunnel utilizing a gross head of 116m, available between barrage and tail race exit point at SubinKhor, to generate 500MW of power.

Status:

- MoC proposal submitted on 09.03.2023. HCD observations issued vide letter dated 29.05.2023.
- New MoC proposal received on 12.03.2024 has been examined and comments issued.
- Cleared by Gates (E&NE) in March-2023.

7. Simsang H.E. Project, Meghalaya

- Project is located in Meghalaya and it is proposed to construct a concrete gravity dam of height 61m from the river bed level.
- Brahmaputra Board prepared a PFR for the project in 2004 but due to some issues, proposal was revised and WAPCOS has submitted its report on Alternative Layout Study vide letter dated 06.06.2022.

Status:

- Compliance received from project authority vide letter dated 12.10.2023. Further observations issued on 31.10.2023.
- HCD (E&NE) Dte. has requested Project authorities to submit the project through proper channel in view of PA (N) letter vide email dated 09.01.2024.
- Cleared by Gates (E&NE) on 24.03.2023

5.2.3.2 Irrigation/FMP/MP Projects

1. Upper Siang Multipurpose Storage Project,Arunachal Pradesh

Present Status

- It was decided by MoJS that NHPC may prepare PFR and DPR and budget allocation by CWC under IWRD Component. Accordingly, MoU signed between CWC and NHPC. CWC Faridabad is nodal in case of fund related matters.
- As part of PFR and DPR preparations, two committees namely, Technical committee and Monitoring committee have been formed.In the Technical Committee meeting it was decided that working group may be formed with CE, Designs (E&NE) will be steering/ Coordinating.
- Till now 5 Monitoring Committee Meetings, 3 Technical Committee Meetings and 2 Working group meetings were held.
- A Joint site visit was also undertaken by CWC, GSI, CSMRS and NHPC in January 2023.
- NHPC had submitted PFR with Date 30th December 2022 and CE, Designs (E&NE) issued comments on 14.02.2023.
- Observations on Geophysical investigations report submitted by NHPC were issued on 24.05.2023.
- MoU has been signed between NHPC Ltd and CWC regarding carrying out drilling works by NHPC as suggested by GSI vide their letter 28.11.2022.
- Cost approved for these investigations is Rs. 4.01 Cr. 1st installment amounting to Rs. 1.6 crore has been released to NHPC Ltd on 12.10.2023.
- Proposal for construction of 3 model villages submitted by Govt of Arunachal Pradesh amounting to Rs 160.5 crore, has been approved by D/o WR, RD & GR and a Tripartite MoU has been signed between D/o WR, RD & GR; Govt of Arunachal Pradesh; and NHPC Ltd on 30.08.2023.
- 1st installment of Rs 16.05 crore has also been made by D/o WR, RD & GR to Govt of Arunachal Pradesh on 06.11.2023, which is further to be transferred to NHPC Ltd for taking up various activities.
- NHPC Proposal of social development works in East Siang, Siang and Upper Siang District,

amounting to Rs. 325 Cr. submitted by Ministry of Power to Ministry of Jal Shakti. As per the 6th Monitoring Committee meeting minutes, the comments from Govt. of Arunachal Pradesh are awaited.

- Present Status: No further progress during the last 6-7 months in the work of geophysical investigations. Further, work order for drilling has been awarded on 4th / 5th May 2023. However, no progress has so far been made in this regard on account of pending security clearance from the State Govt.

5.2.4 OTHER WORKS

1. Works related to Points of Difference between Pakistan and India on KHEP and RHEP

Neutral Expert (NE) has been appointed by World Bank for the resolution points of differences that have arose between Pakistan and India with regard to Kishenganga and Ratle HEPs. In this regard, Technical Sub-Committee under Chairman, CWC has been constituted for preparation of technical submissions to NE and for related technical matters. HCD(N&W) is the secretariat to this committee. In this regard, Draft Memorial Chapters have been prepared and duly approved Draft Memorial Chapters were forwarded to Indus Wing for compilation.

2. Technical examination of projects from IWT angle

Directorate helps Commissioner; Indus on Indus Water Treaty related issues of Hydro Power Projects, being referred regularly. Projects which have been examined from IWT angle includes Uri-I Stage-II HEP, J&K.

3. Memorandum of Changes (MoC) examined and observation issued

a. Ratle HEP (850 MW), J&K
b. Kiru HEP (669 MW), J&K

4. Kosi Barrage Gate Regulation Committee: The 23rd Meeting of Kosi Barrage Gate Regulation Committee was held on 03-04 May 2023.

5.2.5 Technical Examination of Projects

The technical appraisal of DPR/PFR of irrigation and multipurpose projects in respect of hydropower component, gravity dam component, embankments, hydro-mechanical structures such as gates, hoists etc., barrages and different components of canal are carried out in the design organization of D&R Wing. The comments/clearances in respect of the projects are communicated to concerned appraisal unit of CWC. Further, the civil components in DPR of Hydro-Electric Projects are also technically examined in D&R Wing and comments/clearances in respect of the projects are communicated to CEA.

Table 5.1: Status of Technical Examination of Projects

	In India	In Foreign Country	Total
Hydro-Electric Projects			
Total Nos. of projects	90	03	93
Nos. of projects cleared	10	01	11
Nos. of projects in which comment issued	66	02	68
Projects under examination	14	0	14
Irrigation Projects			
Total Nos. of projects	26	0	26
Nos. of projects cleared	06	--	06
Nos. of projects in which comment issued	15	0	15
Projects under examination	05	--	05
Multi-Purpose Projects			
Total Nos. of	09	0	09

projects			
Nos. of projects cleared	01	--	01
Nos. of projects in which comment issued	06	0	06
Projects under examination	02	0	02

The list of above projects is at **Annexure- 5.2, Annexure-5.3 & Annexure-5.4**

5.3 Hydrological Studies

The Hydrological Studies Organization (HSO), a specialized unit under Design and Research (D&R) Wing of CWC, carries out hydrological studies in respect of the Water Resources projects in the country. The success of a project is largely governed by the hydrological inputs. The inputs in Detailed Project Report (DPR) or Pre-Feasibility (PFR) stage are made available in the form of:

- Water availability/Yield Studies.
- Design flood estimation.
- Sedimentation studies.
- Diversion flood studies.

The country has been divided into 7 zones and further into 26 hydro- meteorologically homogeneous sub- zones and flood estimation models are developed for each subzone to compute the design flood in un- gauged catchments. So far, flood estimation reports covering 24 sub-zones have been published. During the year 2023-24, technical examinations of hydrological aspects of DPRs in respect of 128 projects have been carried out in CWC. Out of this, 79 projects have been cleared and comments were issued for 21 projects. List of projects along with their status is placed at **Annexure-5.5** In addition, CWC has also carried out Design Flood Review Studies of the 7 projects under Drip-II & III in the following states.

Table 5.2: Design Flood Review Studies under DRIP Phase-II & III

S.No.	Name of the State	No of Projects
1	Andhra Pradesh	01
2	Tamil Nadu	04
3	Uttar Pradesh	02

5.3.1 Consultancy works / special studies related to hydrological aspects

Hydrological studies were carried out on consultancy basis for the following projects:

- Assessment of Water Availability in Godavari and its sub-basins as per GWDT Award.
- Design Flood Review Study of SardarSarovar Project, Gujarat on consultancy basis.
- Consultancy work for the preparation of hydrological studies chapter of Detailed Project Report of Panchnad Barrage on Yamuna River in District Auraiya, Uttar Pradesh.
- Design Flood Review Study of Kinnersani Project, Telangana on consultancy basis.
- Conducted workshop on Familiarization with DPR Preparation of SMI, FMP, AIBP, RRR Projects for officials of Govt. of Ladakh.
- Hydrological studies for Detailed Project Report of Burisuti Irrigation Project, Chirang and Berpeta District, Assam.
- Hydrological studies for Detailed Project Report of BuroiIrrigatio Project, Biswanath, Assam.
- Hydrological studies for Mebo Irrigation Project, East Siang Distt, Arunachal Pradesh.
- Hydrological studies for Detailed Project Report of Kaya Valley Irrigation Project, East Kameng District Arunachal Pradesh
- Hydrological studies for Detailed Project Report of The Mat Sekawi HEP, Lunglei District, Mizoram.
- Hydrological studies of 18 projects under modified PKC link
- Special Study report submitted on Glacial Lake Outburst Flood (GLOF) of Teesta -III HEP, Sikkim.
- Re-assessment of design flood of Lakya Dam tailing reservoir (Karnataka)
- Design flood study of Erach dam, Uttar Pradesh.

- Hydrological studies for DPR for Construction of Medium Irrigation project by providing Rain Water Harvesting Structure in SatyarKhad (near Parchhoo) in tehsil Dharampur/ Sarkaghatdistt. Mandi. H.P on consultancy basis.
- Hydrological studies for Revise Pre-Feasibility Report for Rehabilitation/Relining of Nohar feeder, BaruwaliDisty&Fatehabad Branch in Haryana state.
- Hydrological studies for Kishau Multi-Purpose Project, Uttarakhand.
- Hydrological studies for Arakot-Tiuni HEP, Uttarakhand.
- Hydrological studies for Bokang Bailing HEP, Uttarakhand.
- Water Availability Study of Yamuna River at Hathnikund Barrage, Okhla and Mawi Site.
- Development of 2D- Urban Flood Model of Delhi.

HSO has provided secretariat assistance to various Technical /Expert Committees for undertaking special studies on various aspects related to water resources development and management. It has also participated and provided key role in Committees held by other organisations. Some of the important contributions during the year 2023-24 are as under:

Mulla Periyar Dam

5.3.2 Trainings/Workshop/ Seminar

Officers of HSO delivered online lectures on Project Hydrology & Design Flood Studies for Training Programs conducted by NWA, Pune, WRD, Tamil Nadu, Chennai..

5.4 Dam Safety Aspects

Dam Safety Organization (DSO) of CWC looks after the issues related to Dam Safety aspects which can be broadly categorized as under:

- Mulla Periyar Dam Issue
- National Register of Large Dams
- DAM SAFETY ACT, 2021
- Dam Health and Rehabilitation Monitoring Application (DHARMA)
- Dam Rehabilitation & Improvement Project (DRIP) Phase II
- National Committee on Seismic Design Parameters
- Technical Examination of Projects for Seismic and Foundation Aspects
- Special Studies for water resources projects
- Consultancy Services on Instrumentation in Hydraulic Structures

5.4.1 Mulla Periyar Dam Issue

The Mulla Periyar Dam (MPD) is a masonry gravity dam constructed across the Periyar river in 1895, situated in Thekkady District in Kerala. The Dam is operated and maintained by Govt. of Tamil Nadu under 999 years lease agreement signed on 29.11.1886 between the Maharaja of Travancore and the Secretary of State for India in Council.

In 1979, the then Chairman, CWC inspected the dam and held a meeting with the officers of Kerala and Tamil Nadu. In the meeting three level measures, (i) emergency, (ii) medium term and (iii) long-term were suggested for strengthening the dam. It was recommended that, in the mean time, the water level in the reservoir be kept at 136 ft. A second meeting under the Chairmanship of Chairman, CWC was held on 29th April 1980 at New Delhi with officers of Kerala and Tamil Nadu and it was opined that after the completion of emergency and medium term measures, the water level in the reservoir can be restored upto 145 ft. However, no

consensus could be reached between the two State Governments to raise the water level beyond 136 ft.

Subsequently, on the directions of Hon'ble Minister (WR) an Expert Committee under Member (D&R), CWC with representatives from both the States was constituted in 2000 to study the safety of the dam. The Expert Committee in its final report of March, 2001 opined that water level in the Mulla Periyar reservoir could be raised to 142 ft. Further raising the water level to 152 ft. will be considered after balance strengthening measures are completed. Hon'ble Supreme Court delivered its orders on 27.02.2006, permitting the water level in the Mulla Periyar dam to be raised up to 142 ft. Further, Hon'ble Supreme Court vide its order dated 18th February, 2010 constituted an Empowered Committee (EC) on Mulla Periyar Dam under the Chairmanship of Justice Dr. A.S. Anand, former Chief Justice of India to look into all the issues in relation to Mulla Periyar Dam. The EC in its report dated April 2012 concluded that as the existing Dam is found Hydrologically, Structurally and Seismically safe, the FRL may be raised from EL 136 ft to 142 ft and a new Independent Expert Committee may look into the need of raising the FRL beyond 142 ft.

The Hon'ble Supreme Court in its Judgment of 07.05.2014, held that the dam is safe and hence permitted to raise the reservoir water level upto 142 ft. Furthermore, on completion of balance strengthening works and on examination of the same by the independent experts, the water level is permitted to be raised upto 152 ft.The Hon'ble Supreme Court also directed to constitute a Supervisory Committee to allay the apprehensions of Kerala- though none exists - about the safety of the Mulla Periyar dam. Accordingly, the committee was constituted with Chief Engineer, Dam Safety Organisation, CWC as Chairman and Principal Secretary, PWD, Tamil Nadu and Additional Chief Secretary, WRD, Kerala as members. Subsequently as per court orders dt 08.04.2022, Ministry of Jal Shakti re-constituted the Supervisory Committee on Mulla Periyar Dam, by including one technical expert each from both the states, vide OM dated 09.05.2022. The Hon'ble Court in the same order also directed that until the regular National Dam Safety Authority becomes functional, till such time, the reconstituted Supervisory Committee would discharge all the functions and also exercise all the powers of the NDSA for ensuring safety of the Mulla Periyar Dam, as also, prevention of dam failure related disasters.

The Supervisory Committee has met and inspected the dam 16 times since the Supreme Court judgment of 2014. 16th Meeting of Supervisory committee on Mulla Periyar dam was held on 27.03.2023. In the last inspection of Mulla Periyar dam by Supervisory Committee on 27.03.2023, the overall condition of dam and its appurtenant structures, as revealed by visual inspection was found to be satisfactory.

5.4.2 National Register of Large Dams (NRLD)

The National Register of Specified (Large) Dams 2023 was prepared by NDSA along with CWC and the same was released by Hon'ble Vice President of India in International Conference on Dam Safety held during 14th -15th September 2023 at Jaipur. As per NRLD-2023, there are 6138 constructed and 143 under construction dams in the country. The copy of NRLD-2023 can be viewed at http://cwc.gov.in/publication/nrld

5.4.3 Dam Rehabilitation & Improvement Project (DRIP) Phase-II and III

The Phase II & III of the Scheme envisages rehabilitation of 736 dams at the budget outlay of Rs 10211 Cr during 10 years duration. 19 States (Andhra Pradesh, Chhattisgarh, Goa, Gujarat, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Odisha, Punjab, Rajasthan, Tamil Nadu, Telangana, Uttar Pradesh, Uttarakhand, West Bengal) and three Central Agencies (Central Water Commission, Bhakra Beas Management Board, and Damodar Valley Corporation) are part of this Scheme. The Project duration is of 10 years (October/November 2021- March 2031).

i) Objective of the Project

The project development objectives of DRIP Phase-II & Phase-III are:

a) To improve the safety and performance of selected existing dams and associated appurtenances in a sustainable manner,
b) To strengthen the dam safety institutional setup in participating States as well as at Central level, and
c) To explore the alternative incidental means at few of selected dams to generate the incidental revenue for sustainable operation and maintenance of dams

ii) Project Components

a) Rehabilitation of dams and associated appurtenances to improve the safety and operational performance of selected existing dams and associated appurtenances in a sustainable manner, and
b) Dam safety Institutional Strengthening to strengthen the dam safety institutional setup in participating States as well as on a Central level,
c) Incidental Revenue Generation for sustainable operation and maintenance of dams, and
d) Project Management.

iii) Cost and Funding

The total cost of the Project including both the Phases is Rs. 10,211 Cr (Phase II: Rs. 5107 Cr, Phase III: Rs. 5104 Cr). Out of the total proposed cost, Rs 7000 Cr is an external loan, Rs 3211 Cr would be borne by the respective participating States and the three Central agencies. DRIP Phase II entails financial assistance from the World Bank (WB) and the Asian Infrastructure Investment Bank (AIIB) to the tune of 500 Million US$.

iv) Funding Pattern

It is a State Sector Scheme with Central component. The Scheme has 100% back to back loan arrangement for States. Funding pattern for [loan: counterpart budget] Phase-II and Phase-III of DRIP is varying from 50% to 80% depending

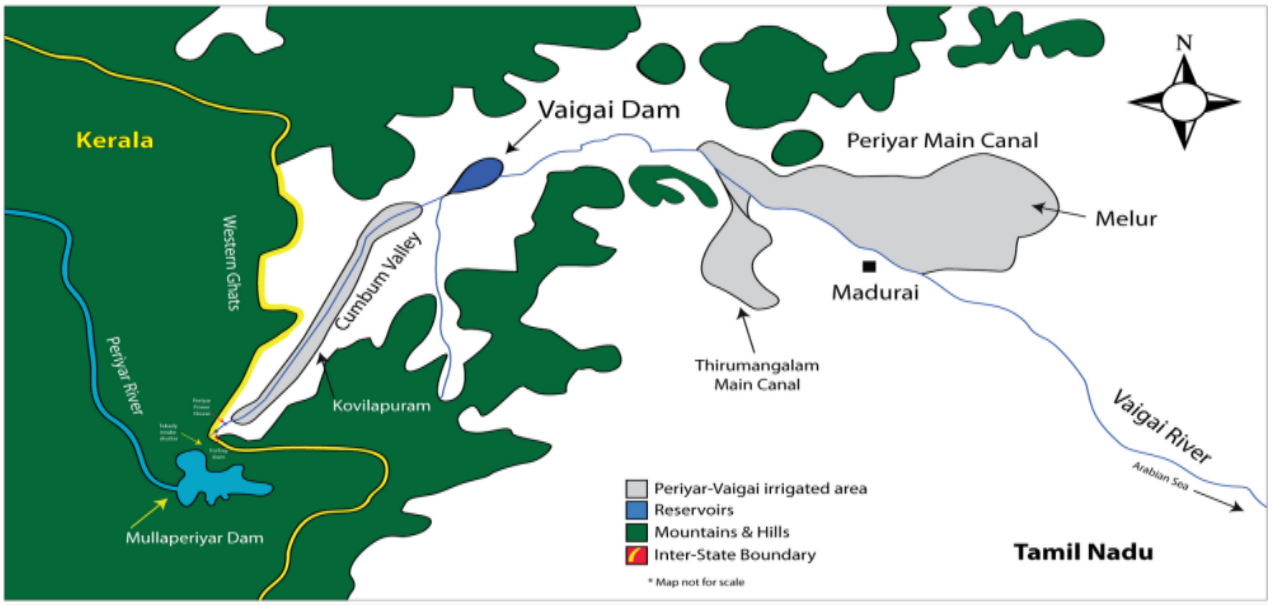


Fig. 5.15: Location of Mullaperiyar Dam

upon the category of the agency, as funding pattern proposed is 50:50 for the Central agencies, 80:20 for the Special Category of States and 70:30 for other States.The Scheme also has provision of Central Grant of 90% of loan amount for special category States (Manipur, Meghalaya and Uttarakhand).

v) Project Implementation Status

DRIP Phase II is being co-financed by the World Bank and Asian Infrastructure Investment Bank (AIIB) with US$ 250 million each. Loan Negotiation with World Bank (USD 250 Million) was held in November 2020. The loan agreement with World Bank (US$ 250 million) has been signed between DEA, MOF and World Bank on 4th August 2021. The Loan Agreement and the Project Agreements with World Bank are effective since October 12, 2021. Loan signing for another US$ 250 million with AIIB has been done in May 2022. The World Bank declared the loan effective since October 2021 and AIIB since December 2022 respectively.

The contract(s) for about Rs 2264 Cr have been awarded by various Implementing Agencies under DRIP Phase-II. The cumulative expenditure of Rs. 1253 crore has been incurred in the scheme and loan disbursed by the bank is US$ 87 million as on 31.03.2024. During the year 2023-24, contracts worth Rs 458crore have been awarded and expenditure of Rs. 561 crore has been incurred.

vi) Capacity BuildingActivities

a) Trainingson various Dam Safety Aspects are being organised by CPMU in association with NWA Pune. First such training was held for Gujarat WRD officers (25 officers) during 17-26 May 2023; Second training was organisedduring 18-23 September 2023 and third training was organised on Dam Safety and Instrumentation during 06-10 Nov, 2023.

b) 3 trainings on EAP, flood routing and freeboard calculation has been organised. Two training (17-19 May; 26-28 June 2023) were for UP WRD officers (80 officers in two trainings), and one training (11-15 Dec) was held in New Delhi for 34 officers belonging to 8 States and academic institutes.

c) A one-day National workshop on 'Integrated Management of Sediments in River Basins and Reservoirs for Sustainable Development" was organized on 19.6.2023

d) Environment and Social (E&S) Workshop in association with World Bank was organized by CPMU on 27.10.2023

e) Number of trainings on application of web-based asset management tool DHARMA were organized by CPMU for various State Governments in online and physically mode.

f) A five-day training program (11th-15th December 2023) on 'Dam Break Analysis, preparation of inundation maps, Emergency Action Plan (EAP), Reservoir Routing and Free Board Calculations' was organised at CWC, Delhi.

g) A virtual Orientation Workshop to guide the Implementing Agencies to fill up the information in the requisite Templates in respect of Environmental & Social was organized on 29.12.2023

h) A two-day webinar series on "Dam Safety Aspects" organized at NWA, CWC, Pune

i) World Bank organized a training program on the In-situ application of the Rapid Risk Assessment tool from March 4- 15, 2024, during which teams of Risk Assessment experts from the World Bank visited the three dam sites (Ukai Dam, Ichhari Dam and Bhakhra Dam) for demonstration of this tool at the dam sites.

j) Three international training programs on dam safety have been organized, one in USA, second in Canada, and third in Australia

wherein about 40 officers fromState/Central Government participated.

vii) Construction Supervison& Quality AssuranceActivities

a) CPMU officersvisited the three dams (i.e.Umium Stage I dam, Umium Stage III dam and Umium Stage IV Dam) of MePGCL, Meghalaya where rehabilitation works under the DRIP Phase II are in progress. The visit was undertaken during 27th-30th September2023.In addition, to above Director DSR delivered the lecture on dam safety aspects and addressed various issues being faced in DRIP Program by MePGCL. The Dy Director DSR, gave presentation on procurement and financial management aspects related to the Scheme.

b) Project Director, DRIP along with CPMU officers visited the two projects of UJVNL namely Joshiyara barrage & Maneri dam to oversee the status of ongoing rehabilitation works under the scheme and the Model developed at IRI, Bhadrabad to witness the studies.

c) CPMU officers and the experts from EMCvisited three dams (namely Krishnaraja Sagar, Almatty Dam and Tungabhadra Dam) of Karnatakaduring 11th to 14th December, 2023 to inspect the rehabilitation works of dams under the ongoing Dam Rehabilitation and Improvement Project, Phase-II & III.

CPMU officers, experts from EMC & Project officials at KRS dam

d) Experts from CPMU Consultant visited RSP dam of Chhattisgarh during 22-23 Feb 2024

e) Experts from CPMU Consultant visited Kadamparai Dam, Kundahpalam Dam, and PillurDam, TANGEDCO during 26-28 feb 2024

Pillur dam, Tamil Nadu

viii) Institutional Strengthening Activities

a) International Centre of Excellence

The second International Centre of Excellence has been established at IISc, Bengaluru under DRIP Phase II & III. MoA with IISc Bangalore for ICED signed on 4.03.2024 at total grant of Rs 118.05 Cr

The ICED shall focus on two main areas- Comprehensive (multi-hazard) risk assessment of dams and advanced construction and rehabilitation & for Material testing.

ix) Other Important activities

a) SMEC International Pty Ltd in JV with STUCKY Ltd and SMEC (India) Pvt. Ltd appointed as the Engineering and Management Consultants, for the DRIP Phase II & III. CWC sign the contract with SMEC on 14.08.2023

Signing of Contract with SMEC

b) The 2nd meeting of Technical Committee of DRIP-II was held on 26th October 2023 in Delhi under the Chairmanship of Member (D&R), CWC in which nodal officers and Project Directors of DRIP IAs, World Bank & AIIB officers, MoJS & CPMU/CWC officers participated. Deliberations in respect of technical matters pertaining to implementation of the scheme were held during the meeting.

c) Mid Term Review (MTR) for DRIP-II and Preparatory Mission of DRIP-III was held during 18th to 20th Jan 2024 at Bhubaneswar, Odisha and 29th to 31st Jan 2024 at Surat, Gujarat. Also, a one-day parallel session on the matter of Environmental & Social was also held during the above missions. This was followed by the wrap-up meetingfor the mision held on 1st March 2024 at Delhi.

5.4.4 DAM SAFETY ACT, 2021

Dam Safety Act (DSA), 2021 was enacted by the Parliament and notified in the Gazette of India by Ministry of Law and Justice (Legislative Department) as the Dam Safety Act, 2021 No.41 of 2021 on 14th Dec 2021. Further, vide MoJS, DoWR, RD&GR Gazette Notification-S.O. 5422(E) dated 28th Dec 2021, the Central Government appointed 30th Dec 2021 as the date on which the provisions of the said Act shall come into force. DSA, 2021 provides for surveillance, inspection, operation and maintenance of the specified dam for prevention of dam failure related disasters and to provide for institutional mechanism to ensure their safe functioning and for matters connected therewith or incidental thereto. The Act applies to all specified dams in the country.

The Act has provision for four tier of institutional mechanism: constitution/ establishment of National Committee on Dam Safety (NCDS), National Dam Safety Authority (NDSA), State Committee on Dam Safety (SCDS), and State Dam Safety Organization (SDSO).

a) National Committee on Dam Safety

National Committee on Dam Safety (NCDS) shall evolve dam safety policies and recommend necessary regulations and maintain standards of dam safety. The functions of NCDS are defined in the first Schedule of the Act.

Ministry of Jal Shakti, vide Gazette notification S.O. 757(E) dated 17.02.2022 constituted National Committee on Dam Safety with Chairman, CWC as the Chairman of the Committee. Ministry of Jal Shakti vide Gazette notification G.S.R. 134(E)

dated 17.02.2022 also published the rules of NCDS i.e. 'National Committee on Dam Safety (Procedures, Allowance and other Expenditure) Rules, 2022. The first meeting of NCDS was held under the chairmanship of chairman, CWC at New Delhi on 02.08.2022.

Fig. 5.19: Hon'ble Minister of Jal Shakti during the discussion on Dam Safety Bill in Parliament

b) National Dam Safety Authority

National Dam Safety Authority (NDSA) shall discharge such functions as related to implementation of the policies made by the NCDS including making regulations on the recommendations of the NCDS for the purpose of maintaining standards of dam safety and prevention of dam failure related disasters. NDSA shall resolve any issue between the SDSOs of States or between a SDSO and any owner of a specified dam in that State. NDSA shall undertake the duties and functions of SDSO where a specified dam is owned by a Central Public Sector Undertaking or where a specified dam is extended over two or more States, or where the specified dam in one State is owned by another State. The functions of NDSA are defined in the second Schedule of the Act.

Ministry of Jal Shakti, vide Gazette notification S.O. 758(E) dated 17.02.2022 established the NDSA and appoints the 18th February, 2022 as the date on which the said Authority shall come into force. Further, Ministry of Jal Shakti, vide Gazette notification G.S.R. 135(E) dated 17.02.2022 also published the rules of NDSA i.e. 'National Dam Safety Authority (Functions and Powers) Rules, 2022'.

Ministry of Jal Shakti vide OM No. N-52011/2/2021-BM/PR dated 25.04.2022 established the NDSA on the additional charge basis under the chairmanship of Member (Design & Research), CWC assisted by the 5 Members. Post of Members of NDSA is also being held by the officers of CWC and DoWR, RD&GR on additional charge basis. To support the NDSA, 4 regional offices (North, East & North East, West and South) headed by Director level officers of CWC on additional charge basis have been also established.

c) State Committee on Dam Safety

State Committee on Dam Safety (SCDS) shall supervise state dam rehabilitation programs, review the work of the SDSO, and review the progress on measures recommended in relation to dam safety. The functions of SCDS are defined in the third Schedule of the Act. All 28 States have constituted State Committee on Dam Safety. In addition to this, the 3 UTs having specified dams have also constituted UT committee on Dam safety.

d) State Dam Safety Organisation

State Dam Safety Organisation (SDSO) shall keep perpetual surveillance, carry out inspections, and monitor the operation and maintenance of all specified dams falling under their jurisdiction to ensure continued safety of such specified dams and take such measures as may be necessary to address safety concerns. All 28 States have established State Dam Safety Organisations. In addition to this, the 3 UTs having specified dams have also established UT Dam Safety Organisation.

5.4.5 Dam Health and Rehabilitation Monitoring Application (DHARMA)

DHARMA is a web-based asset management software to support the effective collection and management of asset and health data of all specified/large dams in India. As per National Register of Large Dams (NRLD)-2023, there are 6138 operational & 143 under construction large dams in the country. In DHARMA, dam owners can directly fill/upload the static details, inspection report, Operation and Maintenance (O&M) manual, Emergency Action Plan (EAP) and other reports etc. DHARMA is being upgraded and re-developed in accordance with provisions of Dam Safety Act, 2021 and the data into the DHARMA portal is being updated as per the NRLD – 2023.

CWC is constantly pursuing with States Govts. and dam owning agencies to enter data and upload the inspection reports, O&M manuals, Emergency Action Plans and other reports in the various modules of the DHARMA portal. The different modules under DHARMA are shown in Figure 5.3.

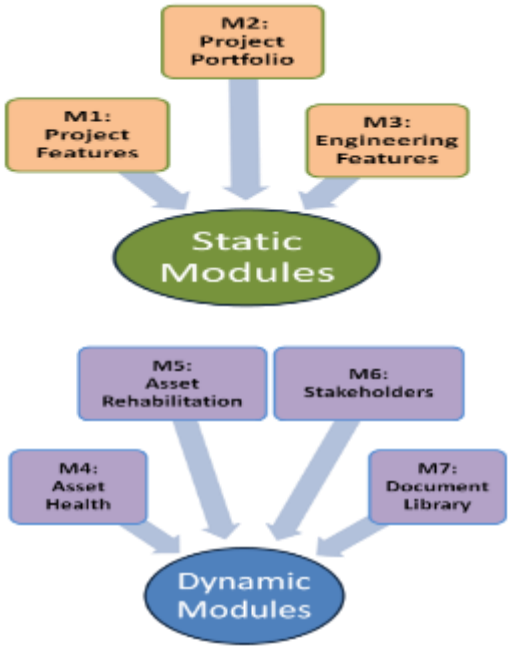


Fig. 5.3: Modules under DHARMA

Online trainings on DHARMA portal are being conducted for officials of State Govt. from time to time and other dam owning agencies. Moreover, trainings at NWA Pune have been conducted inphysical mode for various State officials to make them familiar with features of DHARMA.

5.4.6 National Committee on Seismic Design Parameters

The National Committee on Seismic Design Parameters (NCSDP) was constituted by erstwhile MoWR order dated 21st October, 1991 with the objective to recommend the Seismic Design Parameters for the proposals received from the dam owners. Member (D&R), CWC is the Chairman of the Committee with 11 other experts from various engineering disciplines from different technical institutions and Government organizations as its Members. Director FE&SA, CWC is the member secretary of NCSDP.

The 38th meeting of National Committee on Seismic Design Parameters (NCSDP) is scheduled to be held in May 2024. During 2023-24, Technical evaluation of 25 nos. Site Specific Seismic reports have been carried out by CWC. Details of Projects are given in **Annexure- 5.6**

5.4.7 Technical Examination of Projects for Seismic and Foundation Aspects

During 2023-24, Detailed Project Reports/ Prefeasibility Reports of 25 nos. of river valley projects of various states were examined. Details of Project given in **Annexure-5.7**

5.4.8 Special Studies

CWC/DSO also undertakes special studies e.g. Dam Break Analysis, Backwater Study, GLOF studies, Reservoir routing 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. Glacial Lake Outburst Flow (GLOF) studies are carried out to

account for the flood, resulting from the breach of moraine dams, in the design of the projects.
During 2023-2024, GLOF and special studies for following 14 nos. of projects have been carried out/appraised by CWC:

1) Dam Break Analysis report and Emergency Action Plan of Bisalpur Dam, Rajasthan
2) GLOF study of South Lhonak Glacial Lake up to Teesta-III project site, Sikkim to simulate the GLOF events of intervening night 3rd & 4th October 2023 and estimate the consequent flood which might have hit the Teesta-III project
3) The extension of GLOF study of South Lhonak Lake, Sikkim including impact beyond TLDP-IV incorporating breaching of Teesta-III also.
4) Glacial Lake Outburst Flood (GLOF) study report of Kamala HEP, Arunachal Pradesh, Kishanganga Power Station, Jammu & Kashmir, Pakal Dul HEP, Jammu & Kashmir, 8 HEPs (Dugar, Kirthai-II, Kiru, Kwar, Dulhasti, Ratle, Sawalkot& Salal PS) located in Chenab Basin,Tiuni-Plasu HEP, Uttarakhand, Arun-IV, Nepal, Anjaw HEP, Arunachal Pradesh, Naba HEP, Arunachal Pradesh, Niare HEP, Arunachal Pradesh, Subansiri Upper and Subansiri Lower HEP, Arunachal Pradesh, ArakotTiuni HEP, Uttarakhand

5.4.9 Consultancy Services on Instrumentation in Hydraulic Structures

Technical Examination of Instrumentation aspects of the projects:
Detailed Project Report (DPR) / construction drawings of 55 river valley projects/PSPs in various States/ countries namely Andhra Pradesh, Arunachal Pradesh, Gujarat, Himachal Pradesh, Jharkhand, Karnataka, Madhya Pradesh, Maharashtra, Meghalaya, Odisha, Rajasthan, Tamil Nadu, Uttarakhand, Uttar Pradesh, West Bengal, Jammu & Kashmir and Nepal were examined, out of which 6 projects were cleared with respect to instrumentation aspects ; 43 projects are at various stages of examination and remaining 6 projects are under consultancy . (List of projects attached as Annexure-5.8)

5.4.10 Formulation of Indian Standards

Central Water Commission, being an apex technical body in the water resources sector, has been playing an important role in formulation of standards in field of water resources development and management and allied areas through its participation in activities of Water Resources Division (WRD) and Civil Engineering Division (CED) of BIS. Chairman, Central Water Commission is presently the Chairman of Water Resources Division Council (WRDC). Central Water Commission has been represented by its officers of the rank of Chief Engineer as Chairperson of 8 Sectional Committees and Directors/Deputy Directors as Member in the 18 Sectional Committees of WRDC and Directors as Member of 08 Sectional Committees of CEDC constituted from time to time.
During 2023-24, 14 Nos. of draft standards/amendments to IS Codes have been approved by Chairman, CWC for adoption and printing. List is given in Annexure 5.9

5.5 International Cooperation

Expertise in Design helps CWC in providing technical advice to Government on issues related to international cooperation and international disputes. The activities in this area include:

- Special Technical studies for unresolved issues of projects under Indus Water Treaty.
- Preparation of technically sound arguments in support of India's position during meetings of Permanent Indus Commission, Secretary Level Talks, proceedings of Neutral Experts & Court of Arbitrations. A major part of Counter Memorial and Counter Rejoinder are prepared by CWC as and when issues arise.

- Technical assistance to government for Cooperation with China, Bangladesh, Nepal, Bhutan and Afghanistan and technical evaluation of impacts of the projects on neighboring countries.

5.6 Assistance in Inter-State Dispute Resolution

D&R wing of CWC provides technical advice and assistance to Committees setup by Court/ Tribunal for resolution of disputes related to Water sharing. It provides services for impartial/unbiased assessment of Water availability studies and Backwater assessment to give a fair picture for concerns on submergence. Site inspections and preparation of reports for Government on critical issues related to Inter-State Projects are undertaken by CWC.

5.7 Development, Dissemination and Standardisation of State of Art Technology and Capacity Building

Following activities for works related to BIS are noteworthy:

i. Director, Gates Design (N&W), CWC has been nominated as Member in Working Group (WRD 06/WG1): Canal Automation
ii. Director, BCD (N&W), CWC has been nominated as Member in Working Group (WRD 06/WG5): Piped Irrigation Network
iii. SE, HOC, Vaishali, CWC has been nominated for working group in the revision of IS 3911: 1994 Surface floats - Functional requirements
iv. Director, IPO Dte has been nominated as Principal Member of Environment Protection Sectional Committee, CHD 32
v. Chief Engineer, EMO, CWC has been nominated as Principal Member of Service Sector Division Council (SSDC)

6 WATER MANAGEMENT

6.1 Monitoring of Reservoir Storage

Central Water Commission monitors the live storage of important reservoirs of the country. This information is also used by the Crop Weather Watch Group constituted by the Ministry of Agriculture and Farmers' Welfare (MoA&FW) for reviewing the crop planning strategy based on the availability of water in the reservoirs.

During Water Year 2023-2024 (1st June, 2023 – 31st May 2024), Central Water Commission (CWC) has added 4 more reservoirs under CWC monitoring. The total live storage capacity of 150 reservoirs is 178.784 BCM which is about 69.35% of the live storage capacity of 257.812 BCM which is estimated to have been created in the country. The status is given in Table 6.1.

Table 6.1: Storage Status for Water Year 2023-24

Number of Reservoirs monitored (Nos)			146
Total Designed live storage in BCM			178.185
ACTUAL STORAGE	On June, 1st (Start of Monsoon)	In BCM	52.150
		In % of Designed Live Storage	29
		In % of last 10 Years Avg. Live Storage	121
	Number of Reservoirs monitored (Nos)		150
	Total Designed live storage in BCM		178.784
	On September, 29th (End of Monsoon)	In BCM	129.669
		In % of Designed live Storage	73
		In % of last 10 Years Avg. live Storage	92

Weekly bulletins on storage status of important reservoirs of country were regularly issued during the Water Year 2023-24. 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.

Whenever the percentage of departure of current storage of all reservoirs under CWC monitoring in a state falls below 80% of Normal (Average Storage of last Ten years), advisory is issued by CWC to the State Government for judicious use of available water. Based on reservoir storage during Year 2023-24, CWC has issued advisory to 14 States namely Andhra Pradesh, Telangana, Karnataka, Punjab, Odisha, Bihar, Chattisgarh, West Bengal, Tamil Nadu, Kerala, Tripura, Jharkhand, Gujarat and Uttar Pradesh for judicious use of available water.

6.2 Interaction with Ministry of Agriculture

CWC is representing the Crop Weather Watch Group (CWWG) meetings of Ministry of Agriculture and Farmers' Welfare (MoA&FW) in which the water storage status of 146 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 use of water for irrigation and suggest measures for maximizing.

6.3 Reservoir Sedimentation-Capacity Survey of Reservoirs

6.3.1 Hydrographic Survey/ Capacity Survey

The sedimentation studies of reservoirs has been a continuing activity, known as hydrographic survey of major reservoirs in the country. Sedimentation is a natural phenomenon in the reservoirs. It has been observed that the rate of siltation is on higher side in the initial years of impoundment and thereafter reduces with the passage of time. In this context, WS&RS Dte. of CWC has planned to carry out the capacity survey of reservoirs in the country from reputed consultants. The scheme was initiated during the VIII Plan and continued in subsequent Plans. Up to the end of XI plan, the capacity survey work of 36 reservoirs had been completed in all respects.

During Year 2020-21, a new scheme for conducting reservoir sedimentation survey using hydrographic techniques of major reservoirs in India under National Hydrology Project (NHP) was introduced with a total budget sanction of Rs 30 cr. Under the scheme in Phase-I, 32 reservoirs were taken up, which have been completed in all respect well before the stipulated time. In phase–II, 87 reservoirs across the country are taken up, of which works of 35 reservoirs have been completed in all respect and of remaining 52 reservoirs are under progress.

Publication of Compendium on Silting of Reservoirs in India

A Compendium on sedimentation of Reservoirs in India has been published by CWC in 2020 with the data of 369 reservoirs. Draft Compendium on "Sedimentation of Reservoirs in India" based on studies of 548 reservoirs is under final stage of completion.

6.3.2 Live Storage Capacity Survey using Remote Sensing Technique

The study "Estimation of Sedimentation in Reservoirs using Remote Sensing Techniques" is being carried out by CWC under the plan scheme "Research & Development programme in Water Sector and Implementation of National Water Mission" during plan period of 2021-26. The details of the progress of studies are as under:

1. So far, Remote Sensing Dte. of CWC has completed 183 Sedimentation Assessment studies both in-house and by outsourcing.
2. As per approved EFC targets for 5-year period 2021-2026, 50 in-house and 80 (in 2 batches of 40) outsourced sedimentation assessment studies using SRS are to be done.
3. During the year 2023-24, the work of "Sedimentation Assessment Study of 40 reservoirs using Remote Sensing Techniques" was awarded to M/s Geo Marine Solutions Pvt. Ltd. Out of which, 31 reservoirs were found feasible and the study reports have been approved.
4. In-House Studies of reservoirs namely Parambikulam (Kerala), Indira Sagar (Madhya Pradesh) and Tattihalla (Karnataka) have been also been completed and approved.
5. In-House Studies of reservoirs namely Vaigai (Tamil Nadfu), Kol (Himachal Pradesh) and Tattihalla (Karnataka) have been also been completed and are at approval stage.

CWC also conducts in-house sedimentation studies using Remote Sensing techniques. During 2023-24, three in-house studies were taken up. The details of these are given in the table below:

Table 6.2: Reservoir Sedimentation Studies

In-house Reservoir Sedimentation Studies approved in year 2023-24	
Parambikulam(Kerala)	Indira Sagar(Madhya Pradesh)
Tattihalla (Karnataka)	
Out-sourced Reservoir Sedimentation Studies year 2023-24	
Almatti Reservoir(Karnataka)	Badua Reservoir (Bihar)
Banasura Reservoir (Kerala)	Chakra Reservoir(Karnataka)
Chandan Reservoir (Bihar)	Chankapur Reservoir (Maharashtra)
Chimony Reservoir (Kerala)	Dhandhraul Reservoir (Uttar Pradesh)
Hemavathy Reservoir (Karnataka)	HimayatSagar Reservoir (Telangana)
Jamini (Uttar Pradesh)	Jirgo Reservoir (Uttar Pradesh)
Kolar Reservoir (Madhya Pradesh)	Malaprabha Reservoir(Karnataka)
Nanak Sagar Reservoir (Uttarakhand)	Pawana Reservoir (Maharashtra)
Peechi Reservoir (Kerala)	Raiwada (Madhya Pradesh)
Rajghat (Uttar Pradesh)	Ram Sagar Reservoir (Rajasthan)
Rangawan (Uttar Pradesh)	RavishankarSagar Reservoir (Chattisgarh)
ShardaSagar Reservoir (Uttar Pradesh)	Sholayar Reservoir (Tamil Nadu)
Sikasar (Chhattisgarh)	Thanwar (Rajiv Sagar) Reservoir (Madhya Pradesh)
Thokarwadi Reservoir (Maharashtra)	Tungabhadra Reservoir (Karnataka)
VanivilasaSagar Reservoir (Karnataka)	Vir Reservoir (Maharashtra)
Warna Reservoir (Maharashtra)	

6.3.3 New initiatives

1. Sedimentation Analysis of reservoirs are being conducted using Microwave data (instead of optical data) since 2020. This has been tried for the first time in CWC. The main advantage of using microwave data is that images are not affected by cloud cover. Hence, images of monsoon season can also be obtained when the reservoir level is near FRL (Imageries are cloudy in case of optical imageries during monsoon season).
2. A comparative study of sedimentation assessment of Jhakam reservoir was conducted using both hydrographic survey and Remote Sensing technique. It was noted that hydrographic survey of Jakham reservoir conducted in the year 2021 reported live capacity as 162.68 MCM having a deviation of only 2% from the SRS study (159.312 MCM), thus establishing the accuracy of both the methodologies.
3. Next batch for out-sorcingwork "Sedimentation Assessment Study of 40 reservoirs using Remote Sensing Techniques" is planned to be taken up during 2024-2026.
4. Considering the importance of hydrographic survey of major reservoirs, it has been decided to take up the work of 191 major reservoirs of India under NHP by CWC. ToR and RFP for the same are being finalized. With this study, about 70-80% of the live storage of India will be covered for sedimentation assessment. The reservoirs are divided into 4 groups and each group is likely to take 3 years time to complete.

6.4 Project Performance Evaluation

Performance Overview and Management Improvement Organization (PO&MIO) of CWCis involved in undertaking Post Project Performance Evaluation and Water use Efficiency studies of completed major/medium irrigation (MMI) projects in the country. It is also involved in benchmarking of completed irrigation projects and promoting Water Audit and Water Conservation in all the three sectors viz. domestic, industrial, and irrigation in the states. During 2020-21, a new initiative "Support for Irrigation Modernization Program (SIMP)" has been taken up by CWC, DoWR,RD&GR with technical support from Asian Development Bank (ADB) to modernize MMI Projects in the Country. POMIO has been functioning as Central Irrigation Modernization Office (CIMO) for overall implementation and management of SIMP.

6.4.1 Post Project Performance Evaluation study of Completed Irrigation Projects

The Study includes five components consisting 1) Evaluation of system performance 2) Agro-economic, 3) Socio-economic and 4) Environmental impacts of project along with economic analysis with the central objective of identifying deficiencies and 5) recommending corrective measures for improving the performance of projects for achieving the envisaged objectives and targeted benefits.

There is a Technical Advisory Committee (TAC) under the Chairmanship of Member (WP&P), CWC for guiding, supervising and approving the study reports.

Central Water Commission has undertaken Performance Evaluation Study (PES) of 28 nos. completed MMI projects in the country upto 12th Five Year Plan (2012 to 2017). The State Governments are also encouraged for carrying out the Performance Evaluation Study and Benchmarking Study of the completed MMI Projects in their respective states.

Further, to conduct Performance Evaluation studies of 10 nos. MMI projects during 2021-2026 by engaging WALMIs or other such institutes, State Govts have been requested for providing the list of potential/ priority projects.

6.4.2 Water Use Efficiency (WUE) Studies

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 (WUE) in irrigation sector is relatively low. CWC has undertaken WUE studies of 35 nos. completed MMI projects in the country during 10th & 11th Five Year Plans. CWC has in place the "Guidelines for computing WUE of the irrigation projects", updated from time to time, last updated in Feb'2014. The guidelines recommend the definition of WUE which is based on the following broad components:

i. Reservoir Filling Efficiency
ii. Delivery System/Conveyance Efficiency
iii. On Farm Application efficiency
iv. Drainage Efficiency

Based on 35 nos. studies, overall average WUE of MMI projects in India is about 36% only. The study reports also included set of recommendations/ suggestions for improving the efficiency by focussing on certain critical aspects of the irrigation project. A Technical Advisory Committee under the Chairmanship of Member (WP&P), CWC has been constituted for guiding, supervising and approving the WUE study Reports.

Further, to conduct WUE studies of 10 nos. MMI projects during 2021-2026 by engaging WALMIs or other such institutes, State Govts have been requested for providing the list of potential/ priority projects. Accordingly, WUE studies of two projects namely the Upper Kolab Major Irrigation Project in Koraput District and the Satiguda Medium Irrigation Project in Malkangiri District, both in Odisha have been awarded to ICAR, IIWM, Bhubneshwar.

6.4.3 Baseline Studies of National Water Mission (NWM)

One of the five goals identified by NWM is to improve the water use efficiency in all sectors of water use. Since agriculture is the sector which consumes almost 80% of the total annual water consumption in India, the increase in water use efficiency in irrigation sector could potentially lead to significant water savings. As seen from the studies carried out by CWC, the average Water Use Efficiency of irrigation projects in India is only 36% thus, there is significant scope in systematically improving the efficiency in irrigation sector. Under this goal, Baseline Studies of 22 MMI projects from various parts of the Country have been taken up to evaluate their water use efficiency.

Chief Engineer (POMIO), CWC is one of the members of the Core Group formed for steering the studies, who is responsible for technical examination of the study reports in light of CWC's Guidelines to Compute Water Use Efficiency in Irrigation Projects.

Draft Final Reports (DFRs) in respect of 2 projects were received from National Water Mission during 2023-24 which have been scrutinized by POMIO, CWC and comments conveyed to NWM.

6.4.4 Efficiency Studies under International Cooperation

1) India- European Union Water Partnership (IEWP)

One of the priority area under IEWP is to formulate a protocol for assessment of irrigation efficiency of small and medium irrigation projects which would be practical and easy to implement. Phase-I of IEWP completed on 31.10.2020 and subsequently, the IEWP Phase-II commenced from 01.11.2020 for a period of three years.

The activity of developing the irrigation efficiency protocol has been included under the Thematic pillar "Irrigation & Efficient Water Use" of IEWP Ph-II. Under Phase-II for this particular Thematic pillar, Chief Engineer (POMIO), CWC has been nominated as the nodal officer from Indian Side. A Joint Technical Working Committee headed by CE (POMIO) has been constituted to oversee the development of protocol. The First Joint Working Group meeting took place on May 2nd, 3rd, and 4th, 2023 in which hands-on training was organised on draft irrigation efficiency protocol. The Phase-3 of the IEWP is scheduled for a duration of three years, spanning from 2023 to 2026. In this phase inclusion of two new topics, namely Urban Hydrology and the study of Climate change's impact on the Water sector will be taken up, in addition to the continuing activities from Phase-II.

2) India- Australia MoU on Water Cooperation

MoU between Governments of India and Australia for cooperation in the field of Water Resources Management has been renewed on 20.05.2020. One of the activities identified under the MoU on the basis of mutual interest is to carry out the "Irrigation Efficiency pilot project" for improving irrigation efficiency and crop production on a pilot project from India. A steering committee under the Chairmanship of Member (WP&P) has been constituted for this particular study. Subernarekha Irrigation Project (Odisha) has been identified for carrying out this pilot study by Australian side. About 560 ha. of command area under Kichakeswari Panipanchayat of Subernarekha project has been selected for carrying out the pilot study. POMIO is acting as the nodal office from Indian side for the study.

3) India- Japan Memorandum of Cooperation (MoC) on Water Resources

A Memorandum of Cooperation (MoC) was signed between DoWR,RD&GR, MOJS (GoI) and Ministry of Land, Infrastructure, Transport and Tourism (MLIT) of Japan on December 11, 2019 in the field of Water Resources. The specific areas of Cooperation as per the MoC are as under:

i) Integrated Water Resources Management including River Basin management;

ii) Collaboration in the field of use of modern technology and scientific knowledge for

efficient use of water and developing appropriate decision support system;
iii) Flood management and forecasting;
iv) Promoting water management, water quality issues and water cycle management through innovative concession arrangements;
v) Capacity building including science and technology development;
vi) Water use efficiency;
vii) Any other mutually agreed areas as decided by the Parties.

DoWR,RD&GR vide OM dated 26.10.2021 constituted a Joint Working Group (JWG) headed by Addl. Secretary (WR,RD&GR) and Chief Engineer (POMIO), CWC as Member Secretary from Indian side. Further, a Joint Implementation Group (JIG) has been constituted dated 06.09.2022 comprising of officers from both sides to take forward the deliberations. CE (POMIO), CWC acts as the Nodal officer from Indian side for the JIG. 1st Meeting of the JIG was convened on 14.12.2022. Japanese Delegation led by Japanese side Nodal officer of Sub Group on 11th Dec 2023 meet Indian side Nodal officer of Sub Group. Issue related to Ground water Management, Dam Safety, Water Use efficiency and 3L Water Level Gauge were discussed by both sides.

6.4.4 Support for Irrigation Modernization Programme (SIMP)

A new initiative "Support for Irrigation Modernization Program (SIMP)" has been taken up by CWC, DoWR,RD&GR during 2020-21 with technical support from Asian Development Bank (ADB) to modernize Major/ Medium Irrigation (MMI) projects in the country. Objective of the programme is to improve water use efficiency, increase crop water productivity and ultimately increase farmer's income in the command area of the project through application of national/ international best practices in the command area of the projects. For overall implementation and management of the programme, a Central Irrigation Modernization office (CIMO) has been setup under Chief Engineer (POMIO), CWC supported by National/ International consultants. SIMP is proposed to be taken up in 4 phases.

Phase-1 includes identification of first batch of projects i.e. 3 to 4 MMI projects. Phase-2 includes activities related to preparation of Irrigation Modernization Plans (IMPs) of batch-1 i.e. 3 to 4 MMI projects and capacity building. For IMP preparation, ADB will provide technical assistance in terms of International and National Consultants. Phase-3 includes activities related to preparation of Detailed Project Report (DPRs) of Batch-1 projects taking in consideration of IMP options for modernisation. Phase- 4 is Execution/Implementation of DPRs by concerned State Govts. Implementation of the project would lie with the concerned States who would have an option to either fund it from their own resources or they can avail loan facility from ADB or any other financial institutions.

Total 57 nos. proposals were received from 14 States/ 2 UTs for inclusion under SIMP. ADB is providing its Technical Assistance (TA) in terms of International and National Consultants for Phase-1(identification of first batch of projects) and for Phase-2 preparation of IMPs.

SIMP Ph-I has been successfully implemented in collaboration with ADB which concluded in December'2021. 04 nos. of projects namely IGNP St-II (Rajasthan), Palkhed (Maharashtra), Vanivilasa Sagara (Karnataka) and Loharu (Haryna) have been identified as Batch-1 Projects to be taken up for Modernization.

ADB had a Mission for SIMP from Feb-2022 to August-2022 wherein discussions were held with Water Resources/Finance Departments of four States namely Rajasthan, Maharashtra, Karnataka and Haryana.

SIMP Phase-2 Mid- Term workshop conducted on 09th June, 2023 by Central Water Commission and Asian Development Bank at New Delhi. 26 nos. of Projects officials from SIMP Batch 1 projects and officials from CWC participated in the workshop. In the workshop, draft IMP of Loharu project was also discussed among the participants.

Draft IMPs of Loharu, VVS (Vanivilassagara), Purna and Palkhed projects have been submitted by ADB consultants during year 2023 and circulated to respective project authorities and concerned organizations of CWC for comments/inputs.

Under SIMP capacity building the following activities were organized: -

From 6th to 10th November 2023, a five days training on modernization and design of Pipe Distribution Networks (PDN) was organised at Panchkula/ Chandigarh. 22 Engineers from Karnataka, Maharashtra, Haryana, Punjab and CWC participated in the training.

On 15th and 20th Dec 2023, a Webinar on Irrigation Modernization and Design of PDN Systems was organized.

A Training on Asset Management Planning for Irrigation Schemes was held from 8th to 12th January 2024 at WALMI, Aurangabad.

A training on new technologies in Agriculture and Water Practices was held from 22nd to 25th January 2024 at HIRMI, Kurukshetra, Haryana.

SIMP Phase-2 progress and PPR submission

The Preliminary Project Reports (PPR) of all the four projects have been submitted by ADB to the concerned project authorities. PPR of Loharu, Haryana is under process with Govt of Haryana, PPR of VVS, Karnataka is under process with state finance department.PPR of Palkhed- Purna, Maharashtra is under process in Planning Department of Govt of Maharashtra.

PPRs are to be finalised by the states and submitted to DEA. After necessary approval from DEA, action for phase-3 will be taken up for prepration of DPRs.

Fig. 6.3: SIMP Initiative with ADB Assistance

7 APPRAISAL OF PROJECTS

7.1 Project Appraisal

One of the important activities assigned to CWC 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) of CWC. After establishment of techno-economic viability of the project, the Advisory Committee of DoWR,RD&GR on Irrigation, Flood Control and Multipurpose Projects headed by Secretary, DoWR,RD&GR considers the projects for acceptance and thereafter recommends the same for investment clearance. Since 1976, about 1628 projects have been considered and accepted by the Advisory Committee of Erstwhile Ministry of Water Resources on Irrigation, Flood Control and Multipurpose projects till 31st March 2024 .

Besides these, the Hydro-power projects proposed by State Power Corporations/ Electricity Boards/ Private Sector Organisations for Techno-economic clearance by Central Electricity Authority (CEA) are also scrutinised in CWC from the view point of hydrology, civil design, inter-state issues and cost aspects of civil components. Technical aspects of water supply schemes and cost aspects of Flood Control Schemes (except projects for Ganga Basin and Brahmaputra Basin) are also appraised as and when referred to by State Governments.

7.2 Appraisal of Major Irrigation / Multipurpose Projects

During the year 2023-24, 37 major irrigation/ multipurpose projects have been appraised. Out of that, 07 major irrigation/ multipurpose projects have been accepted by the Advisory Committee of DoWR,RD&GR. A Pie chart showing state-wise distribution of major irrigation/ multipurpose projects under appraisal during 2023-24 is shown at Fig-7.1

7.3 Appraisal of Medium Irrigation Projects

During the year 2023-24, 14 medium irrigation projects have been appraised in field units of CWC. Out of that, 04 medium projects have been accepted by the Advisory Committee of DoWR, RD & GR during this period.Necessary assistance was provided by PAO, CWC to the concerned regional offices for processing the projects for

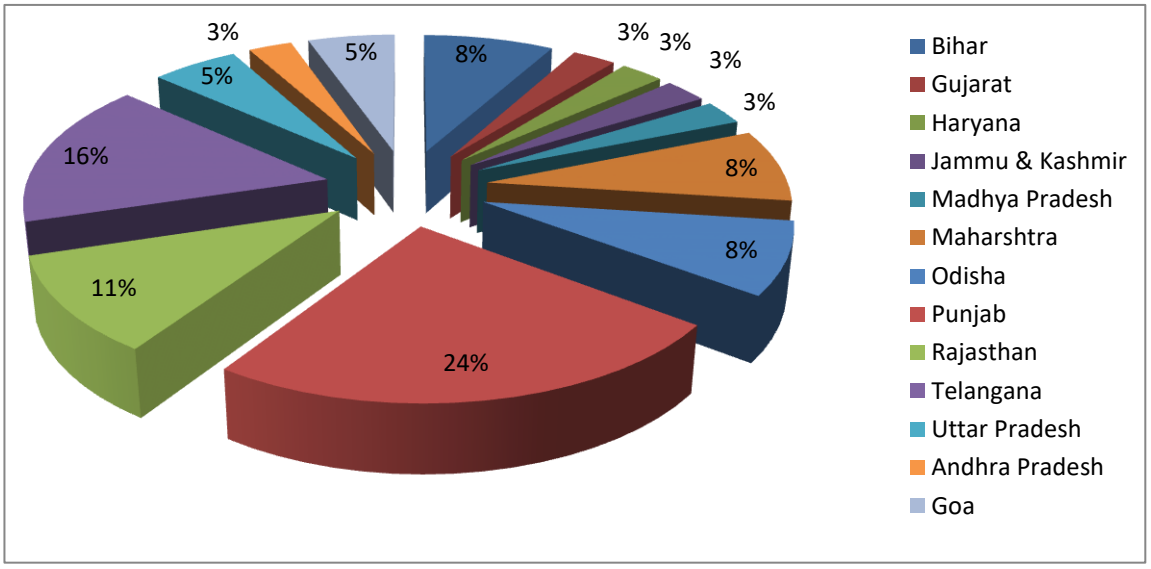


Fig. 7.1 State-wise distribution of major irrigation/ multipurpose projects under appraisal during 2022-23

acceptance by the Advisory Committee.

7.4 Meeting of the Advisory Committee

During the year 2023-24, the Advisory Committee of DoWR,RD&GR, under the Chairmanship of Secretary (DoWR,RD&GR) accepted 29 projects comprising 11 Major & Medium Irrigation/ Multipurpose projects and 18 Flood Control schemes in 4 meetings. The list of major & medium irrigation/ multipurpose projects and flood control schemes accepted by the Advisory Committee is enclosed as **Annexure- 7.1** and **Annexure- 7.2** respectively.

The irrigation projects accepted during 2023-24 envisages annual irrigation benefits to about 5.73 Lakh hectares in 10 States of the country. The Flood Control Schemes accepted during 2023-24 envisages protection to a population of about 1.03 crores & area of about approx. 11.37 Lakh hectares in the 5 States of the country. Pie Chart showing State-wise distribution of 11 Nos. major & medium irrigation/ multipurpose projects accepted by the Advisory Committee during the current year is enclosed as **Fig. 7.2.**

7.5 Appraisal of Hydro-Electric Projects

Apart from the appraisal of Irrigation and Flood Control projects, civil components of hydro-electric projects are also appraised by Central Water Commission. The said activity is coordinated by PAO, CWC. Cost finalisation of civil component of 01 DPR of Hydro-Electric Project has been done by CWC during the period of 2023-24. Techno-Economic Clearance (TEC) to the project is accorded by CEA. During 2023-24, CEA has accorded TEC to 01 No. Hydro-Electric Project having total installed capacity of 1350 MW.

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

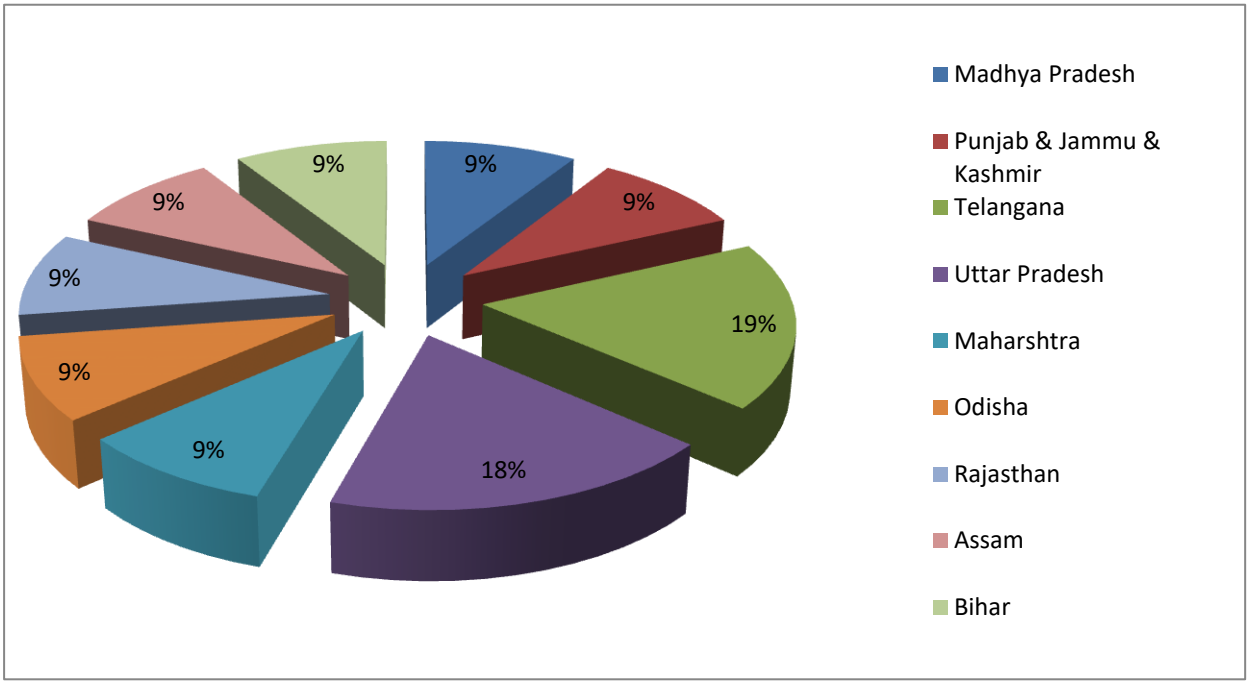


Fig. 7.2: State-wise Distribution of Major/ Medium/ Multipurpose Projects Accepted by the Advisory Committee of DoWR,RD&GR during the Year

7.6 National Projects

Government of India is implementing the scheme of National Projects since XI Plan with a view to expedite completion of identified National Projects for the benefit of the people. So far, Central Government has declared 16 water resources projects as National Project.
The provision of financial assistance for National Projects has been included in the recently launched PMKSY. The proportion of Central share has now been revised to 60% except in case of projects in eight North Eastern States and three Himalayan States which will continue to obtain central assistance at 90% of the cost of the project.

Out of 16 projects included in the scheme of National Projects, eight projects, namely, Gosikhurd Project of Maharashtra, Shahpur Kandi of Punjab, Teesta Barrage Project of West Bengal, Saryu Nahar Pariyojana of Uttar Pradesh, Indirasagar Polavaram Irrigation Project of Andhra Pradesh, Ken-betwa inter-linking project of MP & UP, Renukaji Dam Project of Himachal Pradesh and Lakhwar MPP of Uttarakhand are under implementation. Gosikhurd and Shahpur Kandi projects have been provided grant amounting to Rs. 3881.2825 Cr and Rs. 364.7698 Cr, respectively, up to March, 2024. Teesta Barrage Project started receiving funds under the scheme of National Project during 2010-11 and grant amounting to Rs. 178.20 Cr has been provided for the project till March 2012. Saryu Nahar Pariyojana started receiving funding under the scheme of National Project since 2012-13 and an amount of Rs. 2257.612 Cr has been released up to March 2024. The Indirasagar Polavaram Irrigation Project started receiving funding under the scheme of National Project since 2014-15 and an amount of Rs. 15146.27 Cr has been released upto March 2024. Saryu Nahar Pariyojana (Uttar Pradesh) and Gosikhurd Irrigation Project (Maharashtra) have been included under the 99 priority projects under PMKSY-AIBP. Saryu Nahar Pariyojana (Uttar Pradesh) was inaugurated by the Hon'ble Prime Minister Shri Narendra Modi on 11th December, 2021. CA for Ken-Betwa inter-linking project have been granted amounting of Rs. 6659.01 Cr up to March 2024. Renukaji Dam project and Lakhwar Project has received amounting Rs. 1909.9569 Cr and 201.14 Cr CA from Central Government.

Project-wise Status of 16 declared National Projects is presented at Annexure 7.4.

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 Secretary (WR) as Chairman and Chief Engineer (PPO), CWC as its Member-Secretary. The terms of reference of the Committee are as under:

a) To recommend implementation strategies for National Projects.
b) To monitor implementation of National Projects.
c) To examine the proposal for inclusion of new projects as National Projects and make appropriate recommendation to the Government.

Fourteen meetings of High Powered Steering Committee constituted for implementation of National Projects have been held so far.

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

The scheme on Repair, Renovation & Restoration (RRR) of Water Bodies was launched during January, 2005 to meet the needs of the communities which are dependent for water on tanks, ponds and lakes. The prime objective of the scheme was Comprehensive improvement and restoration of water bodies, including protection works to avoid encroachment thereby increasing tank storage capacity.
The scheme continued from 2005 onwards with slight changes from time to time. However, after launch of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) during 2015-2016, the scheme of RRR of Water Bodies became part of one of the

components of PMKSY, namely Har Khet Ko Pani (HKKP).

During 2021-26, the scheme targets to create an irrigation potential of 0.9 lakh hectare. In addition to water bodies directly linked to irrigation, other water bodies such as percolation tanks and the water bodies used for providing drinking water and for other community purposes which fulfil the eligibility criteria, are now proposed to be included under the scheme.

As per the Guidelines of the scheme, rural water bodies having minimum water spread area of 2 hectares (1 hectare for North Eastern, Sikkim and Hilly States including UTs. of J&K and Ladakh), and urban water bodies having minimum water spread area of 1 hectare (0.5 hectare for North Eastern, Sikkim and Hilly States including UTs of J&K and Ladakh) are eligible for inclusion.

Since XII Plan, restoration works in respect of 3309 water bodies was taken up out of which works in respect of 1940 water bodies have been reportedly completed. Irrigation potential of 159.9 Th ha has been restored with total release of Central Assistance of Rs.690. crore.

Status of Water Bodies & Funds released under Scheme of RRR of Water Bodies since XII Plan (as on 31.03.2024) is presented in **Table 7.1**

During FY 2023-24, no new projects were included under the scheme. Central Assistance of Rs.136.0 crore was released during the same period.

7.8 Surface Minor Irrigation (SMI) Scheme

The scheme on Repair, Renovation & Restoration (RRR) of Water Bodies was launched during January, 2005 to meet the needs of the communities which are dependent for water on tanks, ponds and lakes. The prime objective of the scheme was Comprehensive improvement and restoration of water bodies, including protection works to avoid encroachment thereby increasing tank storage capacity.

The scheme continued from 2005 onwards with slight changes from time to time. However, after launch of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) during 2015-2016, the scheme of RRR of Water Bodies became part of one of the components of PMKSY, namely Har Khet Ko Pani (HKKP).

During 2021-26, the scheme targets to create an irrigation potential of 0.9 lakh hectare. In addition to water bodies directly linked to irrigation, other water bodies such as percolation tanks and the water bodies used for providing drinking water and for other community purposes which fulfil the eligibility criteria, are now proposed to be included under the scheme.

As per the Guidelines of the scheme, rural water bodies having minimum water spread area of 2 hectares (1 hectare for North Eastern, Sikkim and Hilly States including UTs. of J&K and Ladakh), and urban water bodies having minimum water spread area of 1 hectare (0.5 hectare for North Eastern, Sikkim and Hilly States including UTs of J&K and Ladakh) are eligible for inclusion.

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During FY 2023-24, no new projects were included under the scheme. Central Assistance of Rs.136.0 crore was released during the same period.

Table 7.1
Status of Water Bodies & Funds released under Scheme of RRR of Water Bodies Since XII Plan (as on 31.03.2024)

Rs. in Crore

Sl. No.	Name of State	No. of Water Bodies	Estimated Cost (Rs. in Crore)	Committed Central Assistance (CA)	Irrigation Potential to be restored (Th. ha)	CA released in 2023-24	Total CA released since XII Plan	Cumulative Expenditure	No. of Water Bodies Completed	Irrigation Potential Restored (Th. ha)
1	**Andhra Pradesh**	235	137.5	82.5	13.0	0	2.7	0	0	0
2	**Bihar**	93	161.9	89.5	26.1	7.8	41.8	43.6	73	21.8
3	**Gujarat**	61	102.9	61.7	11.4	2.6	14.5	22.5	21	3.7
4	**Madhya Pradesh**	125	183.2	93.0	33.3	0	37.7	149.7	124	33.0
5	**Manipur**	3	65.4	58.9	1.2	3.7	38.3	38.3	0	0
6	**Meghalaya**	9	11.4	10.3	1.1	0	5.2	9.0	8	0.9
7	**Nagaland**	17	35.6	32.1	0	5.6	5.6	0	0	0
8	**Odisha**	1437	988.5	570.1	89.7	56.3	212.5	375.9	905	50.9
9	**Rajasthan**	189	452.8	160.0	24.8	10.5	81.9	154.6	68	15.0
10	**Tamil Nadu**	545	365.2	219.0	12.2	49.6	129.0	146.4	245	6.2
11	**Telangana**	575	459.2	272.0	29.0	0	104.6	268.7	488	26.0
12	**Uttar Pradesh**	20	49.5	32.6	3.4	0	16.4	44.4	8	2.4
	Total :	3309	3013.2	1681.7	245.3	136.0	690.2	1253.0	1940	159.9

The above data are as per information available with CWC. May further be updated as per record available in MI Div. of DoWR, RD & GR.

Table 7.2
Details of Projects under implementation since XII Plan under Surface Minor Irrigation Scheme (till 31.03.2024)

Rs. in Crore

Sl. No.	State	No. of SMI Schemes	Estimated Cost (Rs. In Crore)	Committed Central Assistance (CA)	Target Irrigation Potential Planned (Th. ha)	CA released in 2023-24	Cumulative CA released	Cumulative Expenditure	Schemes completed	Irrigation Potential Acchieved
1	**Arunachal Pradesh**	1282	1210.3	1089.3	57.6	138.7	654.0	412.2	437	22.1
2	**Assam**	1119	5777.8	5200.0	473.0	52.1	3876.1	3460.3	763	262.8
3	**Bihar**	176	351.6	274.1	77.5	0.0	178.8	256.3	173	76.2
4	**Chhattisgarh**	147	722.2	433.2	50.5	0.0	200.4	720.7	106	31.9
5	**Himachal Pradesh**	168	878.3	790.4	35.2	142.3	599.8	464.9	124	22.1
6	**J&K & Ladakh**	419	1277.6	1149.9	115.1	0.0	689.5	702.9	211	94.7
7	**Jharkhand**	82	75.3	56.5	9.0	0.0	19.4	66.8	82	8.7
8	**Karnataka**	603	1038.4	722.4	53.4	37.5	229.9	481.5	390	37.3
9	**Madhya Pradesh**	276	1817.4	1325.5	111.3	0.0	987.7	1657.6	258	64.7
10	**Manipur**	477	397.1	357.4	22.5	19.9	296.1	222.1	102	18.7
11	**Meghalaya**	335	1049.4	944.2	59.0	74.2	585.7	563.5	177	27.5
12	**Mizoram**	45	51.0	45.9	3.2	0.8	34.7	35.7	0	2.2
13	**Nagaland**	919	666.9	600.2	36.7	87.1	513.1	403.2	544	28.7
14	**Sikkim**	690	278.6	250.7	19.9	29.3	152.5	121.5	381	12.3
15	**Tripura**	58	145.8	131.2	11.9	0.0	89.7	98.0	29	1.3
16	**Uttarakhand**	1073	870.0	783.0	59.9	93.4	577.0	609.9	659	44.2
	Total :	7869	16607.5	14153.9	1195.9	675.2	9684.4	10277.1	4436.0	755.4

The above data are as per information available with CWC. May further be updated as per record available in MI Div. of DoWR, RD & GR.

8 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 timely achievement of physical and financial targets regarding creation of irrigation potential. Monitoring System is also expected to contribute in identification of the inputs required, analysis of the reasons for any shortfalls/bottlenecks and suggest remedial measures, etc., with a view to complete the projects in a time bound manner.

The entire monitoring exercise normally comprises of three stages:

(i) Desk-top monitoring,
(ii) Satellite based monitoring,
(iii) Physical monitoring

The "Desk-top monitoring" exercise is being carried out project-wise at the CWC regional offices through review of all project related information, progress review through MIS, compliance review of audits/ site-visit reports, and inviting concerned Project officers at the beginning of the financial year to have an overall assessment of construction planning of the project, to make effort for a realistic assessment of the progress of the works made during the previous financial year, to know shortfall in the utilization CA fund as well as state share fund, to identify the bottlenecks faced in the general progress of work, to identify critical issues needing special attention, to ensure updated entries of Physical and Financial Status of projects in the online Monitoring Information System(MIS)

The "Satellite Based Monitoring" is being Carried out at the CWC HQ, regional offices, concerned Project offices or any other institute/organization assigned with the task to digitize the completed components of the project canal network and Irrigation Infrastructures for visualization of the extent and size of the project, to compare scope of the project with the actual progress thus digitized and help in the decision making process, to know the actual size of balance works and actual pace of construction of the project, gaps, and major bottlenecks, so as to rationally understand the impediments, risks and issues likely during the implementation for completion of the Project, to identify the critical areas/places of bottlenecks thus to reduce the numbers of site visits limiting to focus areas identified in advance for finding answers of some of the queries/doubts and to generate minor-wise/ outlet-wise digitized data to assess the status of potential utilization.

The "Physical Monitoring" is being carried out by the regional offices of CWC by way of minimum of two field visits per project per year, and any additional visit as per the direction issued from time to time. The CWC (HQ) is monitoring inter-state projects. The physical monitoring of the project will involve Preliminary preparation, Field visit and discussion with WUAs, Collection of information/ data and review of the status of the project, having wrap up meeting with project authorities, preparation of status report, follow up of the action point etc.

Government of India launched the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) during 2015 with the motto of 'Har Khet Ko Pani' ensuring access to some means of protective irrigation to all agricultural farms in the country, to produce 'per drop more crop', thus bringing much desired rural prosperity. The ongoing programmes as being implemented by the Government of India, viz Accelerated Irrigation Benefits Programmes (AIBP), Repair, Renovation and Restoration (RRR) of Water bodies and Command Area Development and Water Management (CADWM) have been subsumed in Pradhan Mantri Krishi Sinchayee Yojana (PMKSY).

In order to overcome the bottlenecks faced in completion of project under AIBP, during 2016-

17, ninety-nine (99) on-going Major/Medium irrigation projects (and 7 phases), having ultimate irrigation potential of 76.03 lakh hectare, were prioritized in consultation with States, for funding under PMKSY-AIBP in a mission mode. Eight (08) new MMI/ERM projects have been included in the scheme during FY 2021-22 to 2023-24. During the year 2023-24, 87 monitoring visits to the projects were carried out by CWC in accordance with these targets. State-wise and project-wise list of these projects proposed for AIBP monitoring is given at **Annexure-8.1.**

Also during 2023-24, 10 monitoring visits wre carried out for Special Package Irrigation Projects of Maharashtra and 1visits was carried out for Special Package Projects of Punjab (i.e. Relining of Sirhind Feeder & Relining of Rajasthan Feeder). State-wise and project-wise list of these projects proposed for Special Package monitoring is given at **Annexure-8.2**

8.2 Accelerated Irrigation Benefits Programme

Central Government launched the Accelerated Irrigation Benefits Programme (AIBP) during 1996-97, to provide Central Loan Assistance (CLA) to major/medium irrigation projects in the country, with the objective to accelerate the implementation of those projects which are beyond resource capability of the States or are in advanced stage of construction. While selecting the projects, special emphasis was to be given to Pre-Fifth and Fifth Plan projects. Priorities were also given to those projects which were benefiting Tribal and Drought Prone Areas. Under the revised AIBP Guidelines from the year 1999-2000 onwards, Central Loan Assistance under AIBP was also 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. 01.04.2005 the programme was extended to non-special category states also and 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 could be included. Grant component was introduced under the programme during 2004-05 and Centre provided both loan portion and grant component of Central Assistance. However, as per the present policy, Centre is providing the grant component only from 2006-07 and States are authorised to raise loan component by market borrowing.

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

During the 12th Plan, AIBP guidelines has been further re-modified and implemented from October, 2013. As per the revised guidelines, the pari-passu implementation of Command Area Development (CAD) works were given more emphasis for the full utilization of the Irrigation Potential Created. The eligibility criteria for new projects was continued but the advanced stage of construction was 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 was slightly modified. CWC was assigned the responsibility to comprehensively monitor the projects receiving CLA/Grant.

So far, 297 projects from 25 States had been included for funding under AIBP. Out of 297 projects, upto 31.03.2016, 143 projects had been completed and 5 projects were deferred. **Annexure - 8.3** gives State-wise list of Major and Medium projects completed under AIBP.

Government of India launched the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) during 2015 with the motto of 'Har Khet Ko Pani' ensuring access to some means of protective irrigation to all agricultural farms in the country, to produce 'per drop more crop', thus bringing much desired rural prosperity. The ongoing

programmes as being implemented by the Government of India, viz Accelerated Irrigation Benefits Programmes (AIBP), Repair, Renovation and Restoration (RRR) of Water bodies and Command Area Development and Water Management (CADWM) have been subsumed in Pradhan Mantri Krishi Sinchayee Yojana (PMKSY).

In order to overcome the bottlenecks faced in completion of project under AIBP, Erstwhile MoWR, RD & GR identified 99 (106 including phases) priority projects from amongst the 149 on-going projects as on 01.04.2016 under AIBP for early completion. Under the dedicated funding mechanism i.e. Long Term Irrigation Fund (LTIF), a special window was created in NABARD which could be utilized by the Central and State Governments to bridge the requirement of funds for completion of the 99 priority projects including CAD works for central assistance as well as state share component. Out of these 99 (106 including phases) priority projects, 58 projects have been reported completed as on 31st March, 2024 and 23 projects have progress above 90%. The list of 58 projects reported as completed is given at **Annexure - 8.4.**

Since the inception of AIBP, the cumulative total Central Loan Assistance / Grant provided to States under AIBP/PMKSY-AIBP was Rs. **55231.04** Crores till **31.03.2016** to 297 projects. Since 01.04.2016 to 31.03.2024 an additional Central Assistance of Rs. 14743.56 crore under PMKSY-AIBP to prioritized projects including 8 newly included priority projects. As reported by the State Governments, **11.26** Mha of additional irrigation potential has been created under AIBP since the start of the scheme till March, 2024. Central Assistance totalling to **Rs. 504.34** Crores has been released to **14** Projects, out of 99 (and 7 phases) and 7 newly included priority projects, under PMKSY-AIBP during 2023-24.

The Cabinet Committee on Economic Affairs (CCEA) approved the continuation of Pradhan Mantri Krishi Sinchai Yojana (PMKSY) for 2021 to 2026 on 15th December, 2021 with an **outlay of Rs. 93,068.0 crore including Rs. 37,454 crore Central Assistance to States**. Under the continuing scheme it is planned to provide financial assistance for completion of 60 ongoing MMI projects under PMKSY-AIBP, 85 ongoing CADWM projects and financial assistance to new MMI projects. Irrigation potential creation target through MMI projects under AIBP has been kept as 13.88 lakh ha. and CCA coverage under CADWM component has been targeted at 30.23 Lakh ha. Under SMI and RRR of water bodies component, it is envisaged to create 4.50 Lakh ha. of irrigation potential. Under Watershed Development Component, it is planned to complete sanctioned projects covering 49.5 Lakh Ha rain fed/degraded lands to bring additional 2.5 lakh ha. under protective irrigation.

During February, 2022 the new guidelines for PMKSY-AIBP and National Projects were issued. The eligibility criteria for inclusion of new MMI projects, ERM projects and National Projects were defined in the new guidelines. As per the revised guidelines, Central assistance under AIBP, for new major and medium irrigation projects, and also the ERM projects included under AIBP after March, 2021, shall be as under:

(i) 90% Central Assistance (CA) of project cost (works Component) in case of Projects in 8 North-Eastern, 2 Himalayan States (Himachal Pradesh, Uttarakhand) and Union Territories of Jammu & Kashmir and Ladakh.

(ii) 60 % CA of project cost Projects benefitting special area in other general category States, i.e., command under Drought Prone Area Programme (DPAP) & Desert Development Programme (DDP), Tribal area, Flood prone area, Left Wing Extremist area, Bundelkhand, Vidarbha, Marathwada and KBK (Odisha) and

(iii) 25% CA of project cost in case of Projects in general category states benefitting areas other than at (ii) above.

For National Projects (NP) Category wise funding pattern for central assistance (CA) in the form of grant will be as given below.

(*i*) 90% Central Assistance (CA) of project cost (works Component) in case of Projects in 8

North-Eastern, 2 Himalayan States (Himachal Pradesh, Uttarakhand) and Union Territories of Jammu & Kashmir and Ladakh.

(ii) 60% CA of project cost Projects in other States

Fig. 8.2: Gosikhurd (National) Project, Maharashtra (under PMKSY-AIBP)

A Screening Committee of DoWR,RD&GR has been constituted under the Chairmanship of Secretary, DoWR for the inclusion of new MMI Projects and Modernisation (ERM) projects under said scheme as per the revised guidelines. In accordance the decisions taken in the 2nd meeting of screening committee held on 09.03.2022, five new projects were included under PMKSY-AIBP after the approval of Competent Authority on 31st March 2022. One more project was included under PMKSY-AIBP in accordance with the decision taken in the 3rd meeting of the Screening Committee on 12.09.2022. Two (02) projects were included during 2023-24. The Details of newly included project are given at **Annexure 8.5.** Central Assistance totalling to Rs. 187.60 Crores has also been released to 3 new Projects, out of these 8 newly included projects, under PMKSY-AIBP during 2023-24. Total Central Assistance released under PMKSY-AIBP since 2016-17 to March 2024 is Rs. 14743.56 Crore including newly included projects.

8.3 Special Package Projects

Government of India has sanctioned a special package for completion of Irrigation Projects to address agrarian distress in Vidarbha, Marathwada and other chronically drought prone areas of Maharashtra during July, 2018. The package consists of 8 MMI Projects approved by TAC of DoWR,RD&GR and 83 Surface Minor Irrigation (SMI) Projects. The balance estimated cost of projects of Maharashtra to be completed under this package is Rs 13651.61 Cr as on 01.04.2018, with Rs 3831.41 Cr being the Central Assistance (CA) component by Government of India. On completion of the balance works of these projects, additional Irrigation Potential of 3.77 Lakh Ha would be created. Central Assistance amounting to Rs. 699.99 Crores has been released to Maharashtra Projects under Special Package during 2023-24.

Government of India has also sanctioned for funding of Relining of Sirhind Feeder and Relining of Rajasthan Feeder Project of Punjab as Central Assistance (CA). The approved cost of relining of Sirhind Feeder Canal is Rs. 671.478 Cr and that of Relining of Rajasthan Feeder Canal is Rs. 1305.267 Cr. Of the total estimated cost, Rs. 826.168 Cr would be provided as Central Assistance (Rs. 205.758 Cr for Sirhind Feeder and Rs.620.4l Cr for Rajasthan Feeder) in addition to Rs 155.84 Cr of Central Assistance earlier released for these projects. Central Assistance totalling to Rs. 159.046 Crore has been released to Relining of Sirhind Feeder and Relining of Rajasthan Feeder Project of Punjab under Special Package during 2023-24. Total CA released is Rs. 763.175 (Rs. 203.651 Cr. For SF and Rs. 559.524 Cr. For RF).

Project-wise details of these 10 MMI projects indicating Central Assistance released and Irrigation Potential details is enclosed at **Annexure-8.6 & 8.7**

8.4 North Koel project

North Koel project is situated on North Koel River which is a tributary of Sone River. The project construction originally started in the year 1972 and continued till 1993 when the work was stopped by the Forest Department, Govt. of Bihar. The major components of project are: 67.86 m high (FRL : 367.28 m) and 343.33 m long concrete

dam called Mandal dam originally intended to store 1160 MCM of water; 819.6 m long barrage at Mohamadganj, 96 km downstream of the dam; and two canals originating from left and right banks of Mohammadganj Barrage with distributary system for irrigation.

PS to the PM took a meeting to revive the North Koel Project in June 2016 wherein it was decided to lower down the FRL of Mandal dam to 341 metre to save core area of Palamau tiger reserve. Mandal dam will now have a live storage of 190 MCM.

The irrigation achieved from the project in the year 2016 is reported as 71,720 hectares and completion of this project will provide additional irrigation benefit to the extent of 42,301 hectares. Thus, the project aims to provide irrigation to 1,14,021 hectares of land annually in the drought prone areas of Palamu & Garhwa districts of Jharkhand and Aurangabad & Gaya districts of Bihar.

The PIB deliberated and considered the proposal of 8th RCE of North Koel Reservoir Project on 31st March, 2023. The Cabinet Committee on Economic Affairs Chaired by Prime Minister Shri Narendra Modi, has given its approval in Oct, 2023 to a proposal of Department of Water Resources, River Development and Ganga Rejuvenation, Ministry of Jal Shakti to complete the balance works of North Koel Reservoir Project at a revised Cost of Rs. 2,430.76 crore (central share: Rs.1,836.41 crore) as against the balance cost of Rs.1,622.27 crore (central share: Rs.1,378.60 crore) approved earlier in August, 2017.

A Technical Evaluation Committee (TEC) has also been constituted under the Chairmanship of Member (WP&P), CWC for completing the balance works of North Koel Project, Jharkhand and Bihar in May, 2017. So far, 34 meetings of TEC have been held, to discuss and decide on the various technical issues of the project.

In the year 2023-24, four TEC meetings were conducted to review the progress of various components of the remaining works on the project by M/s WAPCOS, including Dam & Appurtenant Works, Barrage Works, LMC Works and its distribution, and RMC works and its distribution. During these meetings, TEC consistently followed up with the Water Resources Department (WRD), Government of Jharkhand (GoJ), regarding the provision of security at the Mandal Dam site, where work has stalled due to resettlement and rehabilitation (R&R) issues of Project Affected Families (PAFs). The completion of dam gate installation is contingent upon resolving these issues. Additionally, TEC reviewed the status of land acquisition by the state governments of Bihar and Jharkhand, urging them to expedite the process to prevent any delays related to land acquisition. In these meetings, TEC also regularly discussed the reports submitted by Sub-committees I and II and instructed M/s WAPCOS to address the observations made by these sub-committees.

Some of the key outcomes of the TEC for the year 2023-24 are as follows:

During the 32nd TEC meeting held on 01.12.2023, upon detailed deliberation TEC recommended the draft amendment no. 2 to original Contract Agreement of 2017, for approval from DoWR, RD&GR, MoJS, GoI. Subsequently the DoWR, RD&GR, MoJS vide letter dated 18.01.2024, accorded approval to the amendment no. 2 to original Contract Agreement of 2017 with some modifications.

In the 33rd TEC meeting held on 11.01.2024, upon detailed deliberation, TEC recommended to release the amount of Rs. 2.1591 Cr to WRD, GoJ for shifting electric poles from RMC in Jharkhand.

8.5 National Infrastructure Pipeline (NIP)

The National Infrastructure Pipeline (NIP) for FY 2019-25 aims to improve project preparation and attract investments into infrastructure. To draw up the NIP, a High-Level Task Force was constituted under the Chairmanship of the Secretary, Department of Economic Affairs (DEA), Ministry of Finance. The Final Report on National Infrastructure Pipeline for FY 20-25 of the Task Force was released by the Union Minister for Finance & Corporate Affairs, on 29th April, 2020.

The Final Report of the Task Force projected total infrastructure investment of Rs.111 lakh crore for the period from FY 2019-20 to FY 2024-25, **including Rs. 8.94 lakh crore in irrigation** (water and sanitation) Sector. The meeting of Committee of Secretaries held on 5th March 2020 advised line Ministries/Departments to monitor the implementation of NIP projects and take up key reforms to accomplish the target of infrastructure investments in the next five years.

For monitoring of National Infrastructure Pipeline (NIP) Projects, an Inter- Ministerial Steering Committee (IMSC) of DoWR,RD&GR, Ministry of Jal Shakti has been formed under the Chairmanship of Secretary, DoWR,RD&GR. A list of NIP water resources projects comprising of Irrigation/Flood Control Projects from various State Governments was compiled. Projects under AIBP, CADWM, NMCG are also a part of these NIP Projects. Now, the NIP list is comprised of total 569 (as is being reflected in the portal @ indiainvestmentgrid.gov.in) projects. Out of which, 475 Projects are of State NIP Projects and rest 94 are Central NIP Projects.

Further, in pursuance to DO Letter of Secretary, Department of Economics Affairs dated 12.02.2021 and Discussion of meeting chaired by Hon'ble Finance Minister on 26.02.2021 it was decided to setup PPP/PD Cell in CWC under the guidance and supervision of Chairman, CWC.

Accordingly, a PPP/PD Cell has been created in PMO, CWC for development of NIP Projects with following objectives:

a. Development of investible projects in coordination between the Central Government and State Government and thereby grow the pipeline of investible projects in India and in turn increase private investment.

b. To identify issues that needs to be resolved in order to attract and finalize the investments and put forth these before Inter-Ministerial Steering Committee (IMSC).

9 PLANT & EQUIPMENT

PLANNING & CONSTRUCTION SCHEDULING

Control Board (CB) and Plant & Machinery (P&M) Directorate under the Performance Overview & Management Improvement Organization (POMIO) of CWC is actively involved in the following activities:

1) Techno-economic appraisal of Major & Multipurpose Irrigation and Hydro-Electric Projects regarding the following:

a) Construction Schedule of the project
b) Construction Methodology as per latest available national and international standards
c) Construction Plant & Equipment Planning
d) Cycle Time Analysis of Critical Activities in the project construction
e) Deployment Schedule of Plant & Equipment

2) Consultancy in preparation of chapter on "Construction Methodology and Equipment Planning" of Detailed Project Report (DPR).

3) Performance evaluation of Construction Equipment

4) Providing assistance to Projects/States in procurement and disposal of heavy earth moving and construction equipment by way of tender evaluation, fixing reserve price/transfer value of equipment.

5) Providing technical assistance to Mechanical Engineering Department (MED-18), Bureau of Indian Standards and advice the preparation of BIS/IS code for new construction equipments by updating of the old BIS/IS code.

During the year, 1(one) project reports of Pumped Storage Project was techno-economically examined from the Construction Scheduling, Plant Planning & other aspects.

The project reports was considered acceptable from plant planning angle

State Projects:

Sl.	Project Name	State	Status
1	Upper Sileru Punped Storage project (1350 MW)	Andhra Pradesh	Project cleared from plant planning aspect, clearance conveyed t vide letter dated 10.05.2023

10 INTER-STATE MATTERS

10.1 Inter-State River Water Disputes

CWC provides technical assistance to DoWR,RD&GR, MoJS to settle water related disputes among the States amicably through negotiations. During the year 2023-24, a number of references were received in CWC involving various States. These references were examined and comments/views of CWC were communicated to concerned authorities. The details of some important reference and action taken thereof have been given in subsequent paras.

10.1.1 Pennaiyar River Water Dispute

Govt. of Tamil Nadu has submitted complaint dated 30.11.2019 to the Central Government under Section 3 of Inter State River Water Dispute Act, 1956 with respect to the use, distribution and control of the Inter-State River Pennaiyar and its tributaries with request for constitution of a Tribunal under section 4 of the Act. Accordingly, DoWR,RD&GR, Ministry of Jal Shakti constituted a Negotiation Committee vide Office Memorandum dated 20.01.2020 under the Chairmanship of Chairman, Central Water Commission under Section 4 of the ISRWD Act, 1956. Two meetings of the negotiation committee were held. Second meeting of the Negotiation Committee was held on 07.07.2020. The Negotiation Committee was of the considered view that any further negotiations by this Committee would not be useful and as such, no further meetings of the Committee are proposed. Accordingly, the Negotiation committee submitted its report to DoWR,RD&GR on 31.07.2020.

In the meanwhile, the request by newly elected Government of Karnataka to initiate fresh negotiation with Govt. of Tamil Nadu was addressed to the Hon'ble Supreme Court through an Affidavit. Subsequently, in pursuance to the Hon'ble Supreme Court Order dated 23.01.2024, Central Government in accordance with Section 4(1) of ISRWD Act, 1956 has constituted a fresh Negotiation Committee under the Chairmanship of Chairman, CWC vide Office Memorandum dated 07.02.2024.

The Committee has held 2 meetings so far. 2nd meeting of the Committee was held on 27th March, 2024 and is in the process to address the ToRs of the Negotiation Committee.

10.2 Inter-State issues

10.2.1 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, a three Member Supervisory Committee was constituted by DoWR,RD&GR to supervise the operation of Babhali Barrage vide its O.M. dated 24th October 2013. Subsequently, in pursuance to Hon'ble Supreme Court order dated 01.08.2016, DoWR,RD&GR re-constituted the Supervisory Committee on Babhali Barrage through O.M dated 14.10.2016. The composition of the re-constituted Committee is as under:

(a)	Member, Central Water Commission(CWC)	Chairman Ex-officio
(b)	Administrative Secretary, WRD, Government of Andhra Pradesh	Member Ex-officio
(c)	Administrative Secretary irrigation & CAD Department, Government of Telangana	Member Ex-officio
(d)	Administrative Secretary, WRD, Government of Maharashtra	Member Ex-officio

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

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

ii) The Committee shall ensure that;

a) Maharashtra maintains storage capacity of the Babhali Barrage at 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 will remain lifted during the monsoon season, i.e. July 01 to October 28.

c) During the non-monsoon season i.e., from October 29 till the end of June next year, the quantity of water which Maharashtra utilizes from Babhali Barrage should not exceed 2.74 TMC of which 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 Andhra Pradeshon 1st March every year.

Five meetings of Supervisory Committee have been held on 27.02.2014, 30.06.2014, 17.10.2014, 4.2.2015 and 23.6.2016. As per direction of Member (WP&P), CWC and Chairman of Supervisory Committee on Babhali Barrage, the opening and lowering of the gates at the beginning and end of monsoon period and releasing of the water on 1st March was successfully carried out during 2023-24 as per the Judgement dated 20.02.2013 of Hon'ble Supreme Court and as per precedent followed in the past.

10.2.2 Committee to resolve issues related to Mayurakshidam project and cost sharing of Phulbari dam

1. Mayurakshi dam project.

Mayurakshi river has its origin on the slopes of Trikut hills, Deoghar, Jharkhand and after flows through Jharkhand and Mayurakshi river enters in West Bengal before flowing into the Hooghly River. Govt. of West Bengal has planned a dam at Massanjore village on Mayurakshi river in Santhal pargana of Bihar (now Jharkhand) and barrage d/s of the dam on the river in West Bengal territory and four other barrages/weirs namely i.e. Kandishala weir (across Bakreswar river), Kultore Barrage (Kopai river), Deocha Barrage (Dwarka river) and Baidhara Barrage (Brahmani river) for providing irrigation in West Bengal and Bihar (now Jharkhand). An agreement was signed between erstwhile Bihar (Now Jharkhand) and West Bengal on 12thMarch, 1949 regarding rehabilitation and resettlement of affected project families due to construction of Massanjore dam. A supplementary agreement was also signed between them on 19thJuly, 1978. Mayurakshi Dam was constructed at Massanjore in Dumka district of Jharkhand for gross capacity of 0.5 MAF and FRL of 398 ft. by 1955.

Govt. of Jharkhand complained that the demand of water has increased considerably and considering the present situation, the agreements signed earlier, need to be amended and water may be released to Jharkhand on volumetric basis from Massanjore dam,etc.

The matter has been under discussion in the meetings of Standing Committee of Eastern Zonal Councils and also in the meetings of Eastern Zonal Council since 2018. As per decision taken in 25th meeting of the Eastern Zonal Council (EZC) held on 17th December, 2022 at Kolkata, DoWR, RD & GR, MoJS on 03.05.2023 constituted a committee under the chairmanship of Member (WP&P), CWC with representation from CWC; DoWR, RD & GR; Govt. of West Bengal; Govt. of Jharkhand to prepare proposal for sharing of water of the Mayurakshi Sub-basin of Damodar Sub-basin of Ganga basin between the States of West Bengal and Jharkhand for consideration of the respective State Governments;

The Committee so far held three meetings on 02.06.2023, 01.09.2023 & 12.12.2023. Committee has acquired technical data (i.e. inflow at dam and barrages, water utilization, water demand, etc.) from states of West Bengal and Jharkhand. HSO, CWC has carried out the water availability study at dam site and other barrages site. The

water availability study was discussed in the 3rd meeting. As Govt. of Jharkhand desired to acquaint itself with the data furnished by Govt. of Bengal, further discussion on the issue was postponed to the next meeting.

2. Cost sharing of Phulbari dam:

Govt. of West Bengal under Teesta Barrage project constructed a pick up barrage across river Mahananda at Fulbari in Jalpaiguri District at about 15 km west of Siliguri town along with Mahananda Main Canal (MMC) of 32.22 km length from Mahananda barrage to Dauk barrage. An agreement was signed between Bihar (erstwhile) and West Bengal on 19th July, 1978 the agreement inter-alia has provisions that Bihar can draw water from Mahananda Barrage for irrigating approximately 67,000 acres in Bihar depending on the Mahananda resources only. Off-takes may be taken from the West Bengal Canal system if this is economical and reduces land acquisition. The cost of the Mahananda Barrage at Fulbari will be shared between Bihar and West Bengal in the proportion of the irrigation areas in the respective states.

Govt. of Bihar proposed to utilise its share from Mahananda barrage through a project namely "Upper Mahananda Irrigation Schemes". The irrigation scheme proposes to divert its share of water from Mahananda Main Canal through Dy7(R) in the territory of West Bengal. However, Govt. of West Bengal has taken a stand that no water is available out of Mahananda resources in the months of March,April and May to meet the demandand it is difficult to acquire land for construction of 8 km link canal within the territory of West Bengal.

The matter has been under discussion in the meetings of Standing Committee of Eastern Zonal Councils and also in the meetings of Eastern Zonal Council since 2014. As per decision taken in 25th meeting of the Eastern Zonal Council (EZC) held on 17th December, 2022 at Kolkata, DoWR, RD & GR, MoJS on 03.05.2023 constituted a committee under the chairmanship of Member (WP&P), CWC with representation from CWC; DoWR, RD & GR; Govt. of West Bengal; Govt. of Bihar to prepare proposal for cost sharing of Phulbari Dam between Bihar and West Bengal on Upper Mahananda Water Scheme for consideration of the respective State Governments.

The Committee so far held three meetings on 02.06.2023, 01.09.2023 & 12.12.2023. Water availability studies carried out by CWC, Govt. of West Bengal and Govt. of Bihar were discussed in detail and in 2nd meeting, it was agreed that water availability at Mahananda barrage at Phulbari from Mahananda resource only, carried out by CWC in 2019 is acceptable. In 2nd meeting, Govt. of Bihar was asked to carry out the simulation study of demand using the 10 daily water availability figures arrived in study carried out by CWC in 2019.

In the 3rd meeting, Govt. of Bihar informed that they have carried out simulation study and mentioned that original demand of 420.45 MCM for the Upper Mahananda Irrigation Scheme is not successful, especially in the months of March, April and May. The said water requirement is for planned irrigated area of 40687 ha with 8137 ha being under Jute crop in summer season. Accordingly, Govt. of Bihar re-adjusted the cropping pattern by totally removing the jute crop and by shifting the area under jute crop to maize crop (Rabi season) and re-calculated the demand as 354.23 MCM which has 76% success rate for planned irrigated area of 39874.49 ha. After detailed discussions, Govt. of West Bengal was requested to carry out feasibility study with regard to laying up pipeline or construction of a canal in West Bengal territory for carrying of the share of water of Bihar into its territory.

10.2.3 Providing views / inputs on miscellaneous inter-State issues

Inputs / reports on various inter-State issues have been furnished to DoWR, RD&GR / concerned Organizations of CWC during the period of 2023-24. The said inter-State issues include Water Resources Development in Narmada Basin; Agreement on sharing of Mahi River water;Godavari-Cauvery Link Project;

concerns Govt of Telnagana on expanding / constructing projects by Andhra Pradesh as part of overall Pollavaram Project; Govt. of Odisha concern on complete stoppage of water to downstream from Kalma Barrage in river Mahanadi by State of Chhattisgarh; MoU between the Surat Municipal Corporation and CWC regarding Design consultancy for construction of new conventional barrages across River Tapi. In addition to the above issues, inputs on various VIP References and Grievances regarding inter-State issues / projects have also been furnished to the DoWR, RD&GR /concerned Organizations.

10.2.4 Inter-State issue raised before Zonal Councils

IMO being nodal Organization for coordination of matters related to various Zonal Councils and its Committees meetings, consolidated reply of CWC on Draft Agenda Items of Standing Committee of the Zonal Councils, follow up action taken on the issues contained in the Minutes of Zonal Council Meetings which pertains to CWC / DoWR, RD&GR, etc. have been furnished to Inter State Council Secreteriate as and when sought during the year 2023-24.

During 2023-24, issues of Palamuru Rangareddy Lift Irrigation System (LIS)and Nakkalagandi LIS taken up by the State of Telangana from the foreshore of Srisailam Reservoir, Irrigation issues - Reference of Section 3 of ISWRD Act, 1956, unauthorized projects taken up by Karnataka across the River Krishna, conferment of National Status for Kaleshwaram and PalamuruRangareddy (LIS) Irrigation Project were raised before Southern Zonal Council and comments of IMO, CWC were conveyed to Inter State Council Secreteriate on these issues. Chief Engineer, IMO, CWC attended meetings of the Southern Zonal Council as and when convened during the year 2023-24.

Issues were also raised before other Zonal Councils and inputs/comments as under were conveyed to ISC Secreteriate from time to time.

1. A proposal for Committee to resolve issues related to Mayurakshi Dam project and cost sharing of Phulbari Dam as per decisions taken in 25th Eastern Zonal Council(EZC) meeting
2. Information regarding items for inclusion in the agenda of the 26th meeting of the Eastern Zonal Council.
3. Updated status /ATR on the agenda items of 20th meeting of standing committee of Northern Zonal Council(NZC).
4. Updated status /ATR on the decisions taken in the 25th meeting of Eastern Zonal Council
5. Updated status / ATR on agenda items of 26th meeting of the Eastern Zonal Council
6. Inputs on the agenda item "Maintaining water quality in river Yamuna in Delhi" proposed for inclusion in the 21st meeting of the Standing Committee of the Northern Zonal Council.
7. Inputs on items "Diversion of Chakki River water by Himachal Pradesh" for inclusion in the agenda of the 21st meeting of the Standing Committee of the Northern Zonal Council.
8. ATR/Updated Status on the items discussed in the 31st Meeting of Northern Zonal Council.

Chief Engineer, IMO, CWC attended meetings of the NZC and EZC as and when convened during the year 2023-24.

10.3 Appraisal of Hydrelectric and Pumped Storage Projects

IMO has examined 8 no. of HEP and 7 no. of PSP project from inter-State angle point of view in Ganga and Brahmputra basin. After detailed deliberations and inputs from various stakeholders, out of the same 3 HEP and 1 PSP were accepted from inter-State angle.

Comments on following projects in Ganga and Brahmaputra basins were conveyed to the concerned Organisation during 2023-24

1. NABA , HEP Arunachal Pradesh
2. Niare , HEP Arunachal Pradesh
3. Lugupahar , PSP , Jharkhand
4. Teesta Intermediate , HEP , West Bengal
5. Musakhand PSP , Uttar Pradesh
6. Kamala , HEP Arunachal Pradesh
7. Kandhaura PSP , Uttar Pradesh
8. UP-01 PSP , Uttar Pradesh
9. ArakotTiuni, HEP , Uttarakhand
10. Panari PSP, Madhya Pradesh
11. Musakhand PSP , Uttar Pradesh

Following projects in Ganga and Brahmaputra basin were accepted from Inter-state angle during 2023-24

1. Selim , HEP , Meghalaya
2. Umngot , HEP Meghalaya
3. Anjaw ,HEP Arunachal Pradesh
4. Kynshi PSP, Meghalaya

In Peninsular river basins, Feasibility Reports in respect of 33 Pumped Storage Projects have been received from the project developers through Central Electricity Authority for examination from inter-State angle and comments conveyed to the project developers and CEA, New Delhi. Out of the examined Feasibility Reports, Feasibility Report of 3 Nos. of PSPs namely Saundatti PSP (1260 MW) of Karnataka, Pane PSP (1500 MW) of Maharashtra and Raiwada PSP (850 mw) of Andhra Pradesh have been considered acceptable inter State angle.

10.4 Inter-State Projects- Control Boards/ Committees

10.3.1 Bansagar Control Board

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

The Union Minister of Jal Shakti is the Chairman of the Board and the Union Minister of Power, Union Minister of State for Jal Shakti, 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, which manages the day to-day affairs of the Board. The 77th meeting of Executive Committee of Bansagar Control Board was held on 13.02.2023 at New Delhi under the Chairmanship of Chairman CWC / Executive Committee, BCB.

Bansagar Dam on Sone River, a joint venture of the States of Madhya Pradesh, Uttar Pradesh and Bihar was executed by Water Resources Department, Madhya Pradesh under the directions of the Bansagar Control Board. Execution of the canal works in respective territorial jurisdiction is being carried out by the concerned States independently and work of Power Houses was 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 capital expenditure incurred on Bansagar Project (Unit-1) upto March 2015 is Rs.1696.06 crore.

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

River Sone has immense potential for development of irrigation and power to benefit the famine and scarcity hit areas in addition to providing much needed power for exploiting the industrial potential of the area which is rich in minerals. The project will cater for the irrigation needs of large parts of chronic scarcity affected areas in Shahdol, Sidhi, Satna and Rewa Districts of Madhya Pradesh, Mirzapur District of Uttar Pradesh and Palamau District of Jharkhand. The project will provide annual irrigation to 2.49 lakh hectares in Madhya Pradesh. 1.50 lakh hectares in Uttar Pradesh and 0.94 lakh hectares in Bihar

towards stabilizing its existing Sone Canal System. The State Government of Madhya Pradesh, Uttar Pradesh and Bihar fund the project in the ratio of 2:1:1.

10.3.2 Betwa River Board

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

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

As per Betwa River Board Act 1976, Chairman, CWC is the Chairman of Executive Committee of Betwa River Board subject to the general superintendence and control of the Board. The management affairs of the Board are vested in the Executive Committee in accordance with rules and the directions of the Board. The Executive Committee may exercise any power and do any act which may be exercised by the Board. Chairman, Executive Committee has been delegated with emergency powers to take decision on urgent proposals, subject to ratification by the Executive Committee in its next meeting. The 93rd meeting of Executive Committee of Betwa River Board was held on 11.01.2023 at New Delhi under the Chairmanship of Chairman CWC / Executive Committee, BRB.

The Rajghat Dam with appurtenant structures has been constructed across river Betwa to provide irrigation facility to 1.38 lakh Ha in Uttar Pradesh and 1.21 lakh Ha in Madhya Pradesh with power generation of 45 MW (15 x 3 = 45MW) through Rajghat Hydro Electric Project which is at the toe of dam on left bank. All 03 (Three) units of Power House were commissioned during 1999-2000. Power generation during 2023-24 is 1047.54 lakh units. The cost as well as benefits of the project is to be shared equally by both the States. As per the Betwa River Board Act 1976, the entire expenditure on Rajghat Dam, Rajghat Power House and appurtenant works and all other expenditure incurred by the Board is to be equally shared by both Uttar Pradesh and Madhya Pradesh as proposed in the budget of the Board. The project was completed in June 2005 and is in O&M stage since October, 2005.

The status of contribution made by Govt. of U.P and M.P and expenditure for the period from 2005-06 to 2023-24 is placed at **Table 10.1** below. The reservoir (FRL 371.00) filled up to 371.00m during the year 2023-24.

Table 10.1: Status of contribution made by Govt. of U.P and M.P and expenditure for the period from 2005-06 to 2023-24

Year	Budget Allocation (Rs. in crore)	Share of M.P Govt. (Rs. in crore)	Share of U.P Govt. (Rs. in crore)	Contribution made by U.P Govt. (Rs. in crore)	Contribution made by M.P Govt. (Rs. in crore)	Revenue received (Rs. in crore)	Yearly Expenditure (Rs. in crore)
2005-06	4.5	2.25	2.25	-	-	0.62	9.499
2006-07	9.20	4.60	4.60	-	-	1.00	11.14
2007-08	9.30	4.65	4.65	6.65	11.406	1.2456	10.55
2008-09	13.50	6.75	6.75	6.755	4.50	1.72	14.85
2009-10	19.66	9.83	9.83	10.00	4.50	1.51	17.92
2010-11	20.88	10.44	10.44	4.50	4.50	1.93	16.96
2011-12	26.31	13.155	13.155	10.00	6.50	7.82	20.05
2012-13	30.60	15.30	15.30	15.30	5.00	8.93	20.62
2013-14	30.00	15.00	15.00	15.30	5.00	0.91	22.97
2014-15	26.00	13.00	13.00	13.00	4.00	1.58	24.97
2015-16	32.00	16.00	16.00	13.00	2.00	0.95	22.13
2016-17	34.00	17.00	17.00	13.00	10.00	0.59	23.59
2017-18	46.14	23.07	23.07	13.00	14.93	0.41	28.80
2018-19	41.00	20.50	20.50	13.00	18.00	0.59	22.88
2019-20	45.165	22.825	22.825	13.00	9.80	0.59	28.75
2020-21	48.96	24.48	24.48	25.00	14.35	0.51	30.32
2021-22	45.29	22.645	22.645	22.65	14.50	0.89	28.59
2022-23	38.90	19.45	19.45	19.45	16.00	1.31	30.16
2023-24	50.00	25.00	25.00	18.00	8.99	1.76	33.63

10.3.3 Ghaggar Standing Committee

The Ghaggar Standing Committee was constituted in February 1990 to examine and coordinate the irrigation, flood control, and drainage works in Ghaggar basin and lay down priority for their implementation and accord clearance to individual schemes in Ghaggar basin from inter-state angle. The Members of Committee are from Erstwhile Ministry of Water ResourcesJal Shakti, Northern Railway, Central Water Commission and Irrigation Departments of the State of Punjab, Haryana and Rajasthan.

Hon'ble Supreme Court vide order dated 17-Aug-2022 has directed that the concerned States namely, the States of Punjab and Haryana are required to act and take measures recommended by CWPRS, Pune, recommended vide its final mathematical model study report so that the problem of over flooding of Ghaggar basin to the detriment of 25 villages, which has remained unresolved for last many years can be resolved.

The last hearing in Hon'ble Supreme Court was held on 15.11.2022. In this hearing, the Hon'ble Supreme Court has directed the following:

i. The concerned States are directed to prepare and submit the proposed Detailed Project Reports to implement the recommendations made in the final Model Study Report submitted by CWPRS, Pune and the orders passed by this Court within a period of four weeks.
ii. Before submitting the proposed Detailed Project Reports before the Court, the same shall be shared by concerned States with CWCwho shall then appraise the Court whether the proposed Detailed Project Reports are in consonance with the recommendations made by the CWPRS, Pune or not.
iii. In the Detailed Project Reports, the concerned States shall fix the time-limit which shall be reasonable and which may not delay the implementations of the recommendations because every year at least minimum 25 villages are suffering because of the flood. Accordingly, Punjab and Haryana Govt submitted DPRs to CWC HQ and currently are in appraisal process.
iv. Compliance reports incorporating chronological developments were submitted to EE, UYD, YBO for further submission to Hon'ble Supreme Court vide letter dated 31.10.2022, 23.12.2022 & 09.03.2023.

10.3.4 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, U.P. and Delhi against adverse effect of flood control works done 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, CWC, Ministry of Surface Transport and Irrigation Department of States of Haryana, Uttar Pradesh and NCT of Delhi.

The 93rd meeting of Yamuna Standing Committee (YSC) was held on 18.01.2022 under the Chairmanship of Member (RM), CWC cum Chairman, Yamuna Standing Committee (YSC).

In this meeting Yamuna Standing Committee (YSC) conveyed No objection to the project "Nav Bharat Udyan – a part of Amrut Bio-Diversity Park" Project at village Indraprasth near Pragati Maidan, New Delhi, subjected to some conditions.

'Nav Bharat Udyan' a part of 'AMRUT Bio-diversity Park' will come up on 30.0 acres (appx.) land on the western bank of Yamuna. This Park is a part of ceremonies to commemorate 75 glorious years of India's Independence. It would improve the bio-diversity in the region and would reduce the pollution level of Yamuna. It would be environment friendly project. It would provide recreational activities for the public and at the same time showcasing the "Journey of India" apart from an "Iconic Tower" as the new symbol of the Capital of India.

11 ENVIRONMENTAL MANAGEMENT OF WATER RESOURCES PROJECTS

11.1 Environment Management

The Environment Management Organization of CWC is involved in Post Project Environment (including Social) Impact Assessment (EIA) Study of completed water resources projects and monitoring of implementation of environmental safeguards stipulated at the time of granting the environmental clearance to water resources projects.

11.2 Post Project Environmental (including Social) impact Assessment study of Completed water resources Projects

Post Project Environmental Evaluation Study has been carried out for the completed water resources projects of which comprehensive EIA study was not carried out prior to or during their implementation. The objective of the study is to assess both favourable and unfavourable effects of the water resource projects and to formulate future strategies to mitigate the unfavourable impacts to the extent possible. Till now, Post Project Environmental Evaluation Study of 10 projects have been completed.

A Guideline for "Environmental Impact Assessment Studies of Completed Water Resources Projects" & "Rapid Environmental Impact Assessment Studies of Completed Water Resources Projects" is being prepared.

11.3 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 water resource projects.

11.3.1 Constitution of NEMCRVP

Member (WP&P), CWC, is the Chairman of NEMCRVP. The representatives from Ministries of Agriculture & Farmer's Welfare; Environment,

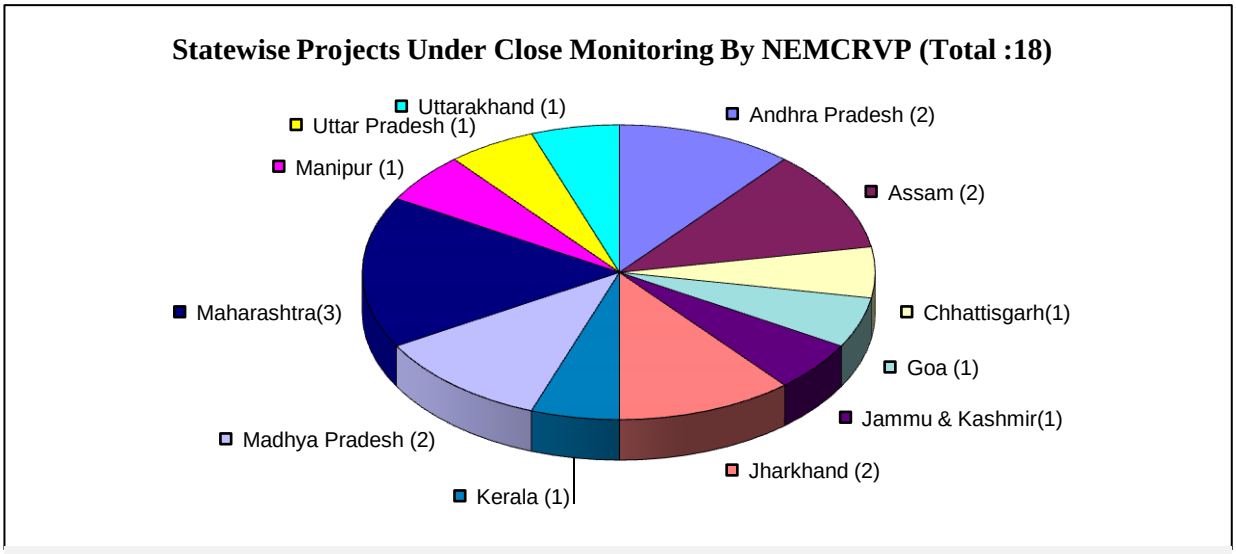


Fig.11.1: State wise Projects under Close Monitoring by NEMCRVP

Forests & Climate Change; Water Resources, River Development and Ganga Rejuvenation; Tribal Affairs; NITI Aayog; CEA and CWC are Members of the Committee. Chief Engineer (EMO), CWC is the Vice Chairman and Director (EM), CWC is the Member Secretary of the Committee. Environmental Management Directorate, CWC, functions as the secretariat of NEMCRVP.

11.3.2 Functions of NEMCRVP

The NEMCRVP visits the projects and holds meetings with the State Governments and Project Authorities for implementation of environmental safeguards as stipulated in environmental and forest clearances. It encourages the constitution of State Environmental Monitoring Committee (SEMCs) and Project Environmental Management Committee (PEMCs).

12 EXTERNAL ASSISTANCE

12.1 External Assistance for Development of Water Resources

External assistance flows into 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 and multipurpose projects. The Erstwhile Ministry of Water Resources, River Development & Ganga Rejuvenation and its organizations assist the State Governments in tying up for external assistance from different funding agencies to fill up the resource gaps, both in terms of funds and technological update for rapid development of the country's water resources.

12.1.1 Role of CWC

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

1. Providing assistance to the State Govts. for preparation of project proposal for obtaining external assistance for water sector projects.
2. Techno-economic examination of the projects posed for external assistance and coordination with State and concerned Departments/Ministries.

12.1.2 Techno- Economic Appraisal & Clearance of Projects

Three Preliminary Project Reports (PPRs) and Four Detailed Project Reports (DPRs) of externally aided irrigation, flood control and multipurpose projects have been appraised in CWC during 2023-24. The details of these projects are provided in **Table 12.1 (a)** and **(b)** respectively.

Table 12.1(a): Preliminary Project Report (PP)

Sl.	Name of Project	Receiving Date	Status
1.	Preliminary Project Report (PPR ID-12090) "Maharashtra Resilience Development Programme (MRDP)" received from Govt. of Maharashtra through DoWR, RD & GR for World Bank Funding. Estimated Cost = Rs. 3200 Crore.	10.07.2023	PPR was examined in the specialized directorates, based on their recommendations, PPR was considered in the 10th Screening Committee meeting held under the chairmanship of Chief Engineer (PPO), CWC on 04.10.2023. The PPR (ID-12090) was discussed and recommended by Screening Committee for conveying "in-principle" consent of CWC subject to fulfillment of some additional conditions at DPR stage.
2.	Preliminary Project Report (PPR ID-12153) "Bihar Integrated Water Resources Management Project (BIWRMP)" received from Govt. of Bihar for World Bank Funding through DoWR, RD & GR. Estimated Cost = Rs. 4415 Crore.	21.09.2023	PPR was examined in the specialized directorates, based on their recommendations, PPR was considered in the 11th Screening Committee meeting held under the chairmanship of Chief Engineer (PPO), CWC on 23.01.2024. The PPR (ID-12153) was discussed and recommended by Screening Committee for conveying "in-principle" consent of CWC for DPR preparation subject to fulfillment of some additional conditions at DPR stage.
3.	Preliminary Project Report (PPR ID-12218) Karnataka Multisector Disaster and Climate Resilience Project received from Govt. of Karnataka for World Bank Funding through DoWR, RD & GR. Estimated Cost = Rs. 5000 Crore.	21.12.2023	Two meetings held on 12.02.2024 and 16.02.2024 under the chairmanship of Chief Engineer (PPO), CWC. Finally, in-principle consent of the PPR for preparation of DPR subject to fulfillment of some additional conditions at DPR stage was conveyed to EA & IC Section, DoWR, RD & GR vide letter dated 20.02.2024.

Table 12.1(b) : DPR/ Feasibility Study Report

Sl.	Name of Project	Status
1.	DPR of Climate Resilient Brahmaputra Integrated Flood and Riverbank Erosion Risk Management Project in Assam- Dibrugarh and Tinsukia Sub Project (Zone-A), Assam received through e-PAMS dated 10.04.2023. Estimated Cost: Rs. 778.7849 Crores (@ PL March, 2023)	Approved in the 154th meeting of Advisory Committee of DoWR, RD & GR on consideration of Irrigation, Flood Control and Multipurpose projects held on 08.12.2023.
2.	DPR of Climate Resilient Brahmaputra Integrated Flood and Riverbank Erosion Risk Management Project in Assam- Morigaon, Nagaon, Tezpur Sub Project (Zone-B), Assam received through e-PAMS dated 13.12.2022. Estimated Cost: Rs. 676.5080 Crores (@ PL March, 2023)	Approved in the 154th meeting of Advisory Committee of DoWR, RD & GR on consideration of Irrigation, Flood Control and Multipurpose projects held on 08.12.2023.
3.	DPR of Climate Resilient Brahmaputra Integrated Flood and Riverbank Erosion Risk Management Project in Assam- Guwahati West, P.G.P Sub Project (Zone-C), Assam received through e-PAMS dated 19.12.2022. Estimated Cost: Rs. 269.5371 Crores (@ PL March, 2023)	Approved in the 154th meeting of Advisory Committee of DoWR, RD & GR on consideration of Irrigation, Flood Control and Multipurpose projects held on 08.12.2023.
4.	DPR of Climate Resilient Brahmaputra Integrated Flood and Riverbank Erosion Risk Management Project Dhubri Sub Project (Zone-D), Assam received through e-PAMS dated 28.02.2023. Estimated Cost: Rs. 542.4982 Crores (@ PL March, 2023)	Approved in the 154th meeting of Advisory Committee of DoWR, RD & GR on consideration of Irrigation, Flood Control and Multipurpose projects held on 08.12.2023.

13 INTERNATIONAL COOPERATION WITH NEIGHBOURING COUNTRIES

13.1 Introduction

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

13.2 Cooperation with Nepal

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

A Treaty on Integrated Development of Mahakali (Sharda) River including Sharda Barrage, Tanakpur Barrage and Pancheshwar Multipurpose Project, namely "**Mahakali Treaty**" was signed between Governments of India and Nepal on 12th February 1996, and it came into force on 5th June, 1997. The Treaty is valid for a period of 75 years.

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

13.2.1 India – Nepal Joint Committee on Water Resources (JCWR)

India-Nepal Joint Committee on Water Resources (JCWR) headed by the respective Water Resources Secretary of the two countries was formed in pursuance of the decision taken by the Prime Ministers of Nepal and India during the visit of the Hon'ble Prime Minister of Nepal to India from 31stJuly to 6th August, 2000. The first meeting was held during 1st-3rd October 2000, at Kathmandu, Nepal. The JCWR has met 9 times so far and the last meeting was held on 23rd September, 2022at Kathmandu, Nepal. JCWR has been functioning with the mandate to act as an umbrella Committee for all Committees and Groups formed for deliberation on water related issues between the two countries..

13.2.2 India-Nepal Joint Standing Technical Committee (JSTC)

During the 3rd meeting of India-Nepal Joint Committee on Water Resources (JCWR), it was decided to have a 3-tier mechanism to expedite the decision making process and the implementation of decisions undertaken at the institutional interactions. Joint Standing Technical Committee was constituted to coordinate all existing Committees and sub Committees under JCWR. Chairman, GFCC, Patna has been nominated as Indian Team Leader and Sr. Jt. Commissioner (Ganga), Erstwhile MoWR as Member Secretary from Indian side. The first meeting of JSTC was held on 8th-9th December, 2008 at New Delhi under the Chairmanship of Chairman GFCC. The JSTC has met seven times so far and the last meeting was held on 21-22nd

September, 2022 at Kathmandu, Nepal in which all outstanding technical issues between the two countries were discussed.

13.2.3 India-Nepal Joint Committee on Inundation and Flood Management (JCIFM)

In pursuance of the decision taken during the 4th meeting of JCWR held in 2009, **Joint Committee on Inundation and Flood Management (JCIFM)** with Member(C), GFCC, Patna as Team Leader from Indian 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 Inundation and Flood Management (JCIFM). JCIFM implements the decisions of JSTC in inundation and flood management issues and address the issues related to flood in this regard. JCIFM has met 13 times and the last meeting was held during 11th-17th March, 2019 at Kathmandu, Nepal.

13.2.4 Joint Team of Expert (JTE)

An understanding was reached between his Majesty's Government of Nepal and Government of India during the visit of the Hon'ble Prime Minister of Nepal to India in December 1991 on preparation of Detailed Project Report (DPR) of SaptaKosi High Dam Multipurpose project. The JTE was constituted, with Member (RM), CWC as Team Leader from the Indian Side, to finalize the modalities of the investigations and the method of assessment of benefits of the proposed project. It was constituted in the year 2000, with the following mandate:

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

The last (17th) meeting of the India-Nepal Joint Team of Experts (JTE) on SaptaKosi high dam Multipurpose Project and Sun Kosi storage-cum-diversion scheme was held in October, 2023 at Birat Nagar, Nepal.

13.2.5 Status of projects jointly implemented by India and Nepal

1) SaptaKosi High Dam Multipurpose Project & Sun Kosi Storage-cum Diversion Scheme, Indo-Nepal

Field investigation studies and preparation of DPR for SaptaKosi High Dam Multipurpose Project and Sun Kosi Storage-cum-Diversion Scheme have been taken up jointly by Government of India and HMG Nepal. A Joint Project Office (JPO) has been set up in Nepal in August, 2004 for investigation and preparation of DPR within a period of 30 months, which has been subsequently extended upto 31st March, 2026.

As per the directions of 9th JCWR, based on salient features/data of proposed upstream projects in Kosi Basin, as shared by Government of Nepal, the JPO-SKSKI, Birat Nagar, Nepal prepared a draft report for revised parameters of Sapta Kosi High Dam Multipurpose Project [**SKHDMP**]. The Report was presented to 17th JTE durng 9th-11th Oct 2023 at Birat Nagar, Nepal. The JTE has now decided, that governing water level of SKHDMP reservoir may be taken as **304.80 m** by reducing height of the dam substantially, for further studies including assessment of EIA & RR studies and FRL as 299.00 m for power potential studies. However, the governing level and FRL of SKHDMP may be reaffirmed once the parameters and other features of upstream projects in Kosi River Basin including Dudh Kosi Storage Project, Lower Arun and Sun Kosi-l Projects are finalised.

The field investigation for preparation of DPR is still under progress. The project work is hampered mainly due to local disturbances in Nepalese territory.

2) Pancheshwar Multipurpose Project

In pursuance of the Mahakali Treaty signed between Governments of India and Nepal in 1996, India and Nepal jointly undertook investigations & studies and prepared a Detailed Project Report (DPR) of Pancheshwar

Multipurpose Project. However, some issues between India and Nepal remained unresolved. Later, as per decision taken during the 3rd meeting of JCWR held in 2008, the Pancheshwar Development Authority (PDA), a bi--National entity between India and Nepal with its office at Mahendranagar, Nepal, was constituted vide Erstwhile MoWR O.M No.Z-14012/3/2013-Ganga/2302-2314 dated 7th August, 2014 to finalise DPR of Pancheshwar Multipurpose Project and to undertake its execution, operation and maintenance. Eight meetings of the Governing Body (GB) of the PDA have been held so far. The last (8th) meeting was held on 6th / 7th July, 2023. at Pokhara, Nepal.

The DPR of Pancheshwar Multipurpose Project was prepared/updated by Pancheshwar Development Authority (PDA) through M/s WAPCOS Ltd India. The final draft DPR was forwarded to the two Governments in December, 2016 by PDA for their observations. As there were a number of issues which required further working to make the DPR mutually acceptable to the two Governments, the PDA, as per the decision taken by its Governing Body, established a Team of Experts/ Officials (ToE) in 2017 to resolve such issues. Five meetings of the ToE have been held so far. The last (fifth) meeting of ToE was held in October, 2023 at Kathmandu, wherein substantial progress has been made towards resolving issues. The Project has also been discussed in 9th Joint Committee on Water Resources (**JCWR**) on 23rd Sep, 2022 for early resolution of pending issues.

13.3 Cooperation with Bhutan

A scheme titled **"Comprehensive Scheme for Establishment of Hydro-meteorological and Flood Forecasting Network on rivers common to India and Bhutan"** is in operation since 1979. The network consists of 36 hydro-meteorological/ meteorological stations located in Bhutan maintained by Royal Government of Bhutan (RGoB), out of which only 27 nos. are being funded by Government of India. Central Water Commission utilizes the data received from these stations for formulating the flood forecast.

A Joint Experts Team (**JET**) consisting of officials from the Governments of India and Royal Government of Bhutan was constituted in 1985, later modified in 1988 and further reconstituted in August, 1992 with Chief Engineer, CWC, as Team Leader from Indian Side. However, in October 2020, the JET has been re-composed with Chief Engineer (T&BDBO), CWC as the Team Leader (Indian Side). The Terms of References of JET are as follows:

a) To formulate programme for the Five- Year Plan for continuation of/ improvement in the ongoing scheme under operation.
b) To formulate year-to-year programme of work within the overall plan as per (i) above.
c) To review the progress of work vis-à-vis the programme laid down.
d) To recommend the releases to be made to the Royal Govt. of Bhutan on the basis of progress achieved/likely to be achieved after discussion/random general checks.
e) To look into any other specific point related to the scheme which may crop up from time to time.

So far thirty eight meetings of the JET between Government of India and Royal Government of Bhutan (RGoB) have been held. The 38th meeting of JET was held during 06th-07th December 2023 at Darjeeling, India.

A Joint Group of Experts (JGE) on Flood Management headed by Commissioner, Brahmaputra & Barak Basin (B&BB), Erstwhile MoWR, RD & GR has been constituted in August 2004, between India and Bhutan to discuss and assess the probable causes and effects of recurring floods and erosion in the southern foothills of Bhutan and adjoining plains in India and to recommend appropriate and mutually acceptable remedial measures to both Governments. The first meeting of JGE was held in Bhutan from 1st to 5th November, 2004. The JGE has met 10 times and the last meeting was held during 28th -29th February, 2024 at New Delhi, India.

In accordance with the decision taken during the first meeting of JGE, a Joint Technical Team (JTT) on Flood Management between the two Countries was constituted. During the 2nd meeting of JGE held in February 2008, the reconstitution of Joint Technical Team (JTT) had been agreed with Chief Engineer, CWC as its Team Leader (Indian Side). Further, the JTT has been re-composed in October 2020, with Chief Engineer (BBO), CWC as the Team Leader (Indian Side). So far, seven meetings of the Joint Technical Team (JTT) between Government of India and Royal Government of Bhutan (RGoB) have been held. The 7th meeting was held during 05th– 06th October, 2023 at Phuentsholing, Bhutan. CWC is providing technical assistance for development of hydropower potential in Bhutan. The Bhutan Investigation Division (BID), CWC, Phuentsholling is coordinating with RGoB and carrying out necessary field works in this respect.

13.4 Cooperation with China

The Government of India had entered into a MoU with China in the year 2002 for sharing of hydrological information on Yarlung Zangbo/ 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 Yarlung Zangbo /Brahmaputra during flood season. The MoU on River Brahmaputra was further renewed in 2008, 2013 and 2018.

During the visit of the Chinese Premier to India in April, 2005, an another MoU was signed on 11th April 2005 for supply of hydrological information by China to India in respect of Langquin Zangbo/ Sutlej river in flood season. The MoU on River Langquin Zangbo/ Sutlej was further renewed in 2010 and 2015.

During the visit of the Hon'ble President of the People's Republic of China in November 2006, it was agreed to set up an Expert Level Mechanism (ELM) to discuss interaction and co-operation on provision of flood season hydrological data, emergency management and other issues regarding trans-border Rivers as agreed between them.

Accordingly, the two sides have set up the Joint Expert Level Mechanism. The Expert Group from Indian side is led by a Joint Secretary level officer. The 12th meeting of Expert Level Mechanism was held during 12-13th June, 2019 in Ahmedabad, India. The special meeting of ELM through DVC was held on 8th September, 2021 for discussion on agenda, date, venue of 13th ELM etc. and water cooperation related issues with China. 13th meeting of ELM was held through DVC on 18-May-2022, in which Chinese side proposed two recommendations on the revision of the MOU on Langqen Zangbo/Sutlej River (i) The payment for flood season hydrological data provision shall be waived. (ii) The Indian side shall provide to the Chinese side hydrological data of downstream hydrological stations on Sutlej River. 14th meeting of ELM was held on 21-22 -Jun-2023 at New Delhi in which following issues were discussed (i) Sharing of hydrological data of Brahmaputra River in its lower reaches by the Indian side and also for Sutlej River to Chinese side and (ii) Aspects relating to the climate change and linking the same with the basin level planning as reasoned by the Chinese side, as appropriate, in addition to other requisite inputs.

13.5 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. 38th meeting of the JRC was held at New Delhi in August, 2022, wherein various matters pertaining to cooperation in Water Resources sector with Bangladesh were discussed.

Under bilateral arrangements, India provides the flood data of the sites namely, Pandu, Goalpara & Dubri on river Brahmaputra, Silchar & Badarpurghat on Barak and Domhani &

Gazaldoba on river Teesta, Sonamura & Amarpur on Gumti, NH-31 on Jaldhaka (Dharla), Kailashahar on Manu & Ghughumari on Torsa (Dudhkumar), Khowai Town on Khowai and Dharmnagar on Juri during monsoon to Government of Bangladesh for use of their flood forecasting and warning arrangements. 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.

13.6 Co-Operation with Denmark

After meeting Prime Minister of Denmark H.E. Ms. MetteFrederiksen during her visit to India on 09th October 2021, Hon'ble Prime Minister, inter-alia made following declaration:

- Establish a Centre of Excellence for Smart Water Resources Management (CoESWaRM)
- Establish a Lab for Clean Rivers in Varanasi on the lines of Smart City Lab in Panji

In follow up of above declaration, during visit of Prime Minister to Denmark, on 03rd May 2022, Letter of Intent regarding purpose, co-operation areas and modes of co-operation regarding declarations was signed between Ministry of Jal Shakti, GoI and Ministry of Environment, Govt. of Denmark.

During visit of Hon'ble Minister of Jal Shakti to Denmark in September 2022, MoU between the Govt. of the Republic of India and the Govt. of Denmark on cooperation in the field of Water Resource Development and management was signed on 12th September, 2022.

Central Water Commission and Danish side signedTerms of Reference (ToR) and Work-plan on 21.02.2024 for establishing the Centre of Excellence (CoE) for Smart Water Resource Management. The Steering Committee (SC) of CoE was constituted by DoWR, RD & GR on 08.03.2024. The first meeting of Steering Committee was held on 26.04.2024 under Chairmanship of Chairman, CWC, in which following three areas were identified for planning the modelling, software developments, capacity building and trainings, which could be further revised:

i. Flood forecasting with accurate inundation modelling
ii. GLOF model studies
iii. Hydrological prediction modelling with aspects of climate change.

First activity i.e. Flood forecasting is being firmed up in CWC.

13.6.1 Comments /views on documents on international cooperation

IMO has provided the technical inputs / suggestions for modification / inclusion / deletion / alteration to DoWR, RD & GR, MoJS on following international matters related to water:

1. G7 Summit 2023 in Hiroshima, Japan
2. 11th session of India-South Africa Joint Ministerial Commission
3. Proposed MoU between Supreme Council for Environment, Bahrain and Ministry of Environment, Forest and Climate Change, India.
4. Draft Implementation Plan of the BRICS MoU on Environment Cooperation.
5. Final draft of the 8th BRICS Environment Working Group meeting report.
6. Letter of Intent signed between Tamil Nadu Water Resource Conservation and Rivers Restoration Corpn. Ltd. with Danish Environment Protection Agency on 24.2.2023.
7. Draft UNGA resolution on Water.
8. Regarding Visit of EAM to Tanzania and Zanzibar.
9. Draft Text of Memorandum of Cooperation on the Joint Credit Mechanism between the Govt. of Japan and the Govt. of the Republic of India.
10. Status of activities/meetings under India-USA MoU.

11. PPT on the Status of activities under India - Tanzania MoU
12. Draft Memorandum of Understanding on Establishment of India Israel Centre of Water Technology (CoWT) by Ministry of Housing and Urban Affair in collaboration with Embassy of Israel and IIT-Madras.
13. Questionnaire on effective methods to promote the uptake and impact of PPPs and other blended finance solutions.
14. Talking Points for the meeting of Hon'ble Minister of Jal Shakti with Canadian Counterpart
15. Draft MoU between MoJS, GoI and Ministry of Water United Republic of Tanzania.
16. Draft Text of Memorandum of Cooperation on the Joint Crediting Mechanism between the Government of India with Government of Singapore.
17. Draft Text of Memorandum of Cooperation on the Joint Crediting Mechanism between the Governments of India with Government of South Korea.
18. Draft Declaration on Resilient Food Systems, Sustainable Agriculture and Climate Action.
19. Visit of Prime Minister of United Kingdom to India.
20. 6th Meeting of India-Australia JWG on Agriculture
21. Visit of the President of France to India.
22. 22nd Session of India-Italy Joint Commission for Economic Cooperation (JCEC)
23. Draft MoU between Water Resources Department (WRD), Govt of Bihar and Deltares, The Netherlands.
24. Draft MoU between Water Resources Department, Govt. of Bihar and University Corporation for Atmospheric Research acting on behalf of National Centre for Atmospheric research (NCAR).
25. Agenda items in r/o Ministerial meeting of 37th Session of the Regional Conference for Asia and the Pacific (APRC), Colombo, Sri Lanka.
26. Draft agreement Between Governments of the Shanghai Cooperation Organization Member States on Cooperation in Environmental Protection were sent to Consultant, National Water Mission.
27. Draft MoU between India and Nepal on enhancing Cooperation in the water sanitation and hygiene sector including waste management.
28. Draft MoU between Water Resources Department, Govt. of Bihar and IHE Delft Institute for Water Education Delft, the Netherlands.
29. Memorandum of Understanding (MoU) proposed between India and Nigeria for cooperation in the field of Agriculture and allied sectors.
30. Zero draft outcome documents for the 4th International Conference on SIDS
31. Draft proposal regarding ADB-GCF Green Finance Facility (GFF) for India.
32. Visit of H.E. Mr. KyriakosMitsotakis, Prime Minister of Greece to India .
33. Visit of Prime Minister to UAE in February 2024.
34. Joint Action Plan on India-Denmark Green Strategic Partnership
35. Matters relating to Article 6.8 of the Paris Agreement,
36. DRAFT UN system-wide strategy for water and sanitation.
37. 16th Session of India-Austria JEC.
38. Visit of Hon'ble External Affair Minister to Republic of Korea and Japan.
39. Consolidated draft of the SCO CHS Statement on ensuring safety of drinking water and sanitation.
40. ToR & Work plan for Establishment of Centre of Excellence (CoE) for Smart Water Resources Management under the Indo-Danish Green Strategic Partnership was prepared and got signed by both the sides on 21 February 2024.

14 WATER RESOURCES DATA MANAGEMENT

14.1 Development of Water Resources Information System (DWRIS)

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

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

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

14.2.1 Hydrological Observations

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, India has been divided into 23 river basins. The collection of hydro-meteorological data for all the river basin in a scientific manner is essential for achieving various objectives viz. planning and development of water resources projects, studies related to assessment of impacts due to climate change, water availability studies, design flood and sedimentation studies, flood level/inflow forecasting, solving of International & Inter-State issues, river morphology studies, Reservoir siltation studies, development of inland waterways, research related activities etc.

As on April 2024, Central Water Commission is maintaining a network of 1543 Hydrological Observation (HO) stations (1522 operational and 21 under rview) in different river basins of the country to collect (i) water level, (ii) discharge, (iii) water quality and (iv) silt. This includes 717 new stations opened during the XII five year plan. In addition to this, Meteorological parameters including snow observations are also recorded at some key stations. This will help in addressing the data requirement of the country more precisely and in better scientific manner.

As on 01.01.2024, CWC also operates 81 exclusive meteorological observations stations in various basins in the country.

14.2.2 Monitoring of Glacial Lakes/Water Bodies in Himalayan Region

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

CWC took up the work of monitoring of glacial lakes and water bodies. In order to make inventory and monitoring of glacial lakes and water bodies present in the Himalayan Region, an MoU was signed with NRSC, Hyderabad in 2009. As per inventory created in 2009, there are 2027 nos of glacial lakes and water bodies (GL/WB) with more than 10 Ha water spread area, out of which 477 have more than 50 Ha water spread

area. Monitoring of these lakes has been taken up. 477 glacial lakes/water bodies with water spread area more than 50 ha have been monitored every year during monsoon season (June–October) of the years from 2011-2021.

CWC has increased the monitoring of glacial lakes/water body based on remote sensing from 477 to 902. The process of monitoring of GL/WBs has been automated to large extent to reduce processing time. The open-source satellite images at 10 m resolution are being used. The SAR images are also being used for detecting lakes even in cloudy condition.

The monthly monitoring reports from June to October are being shared with Ministry of Jal Shakti, concerned field offices of CWC, concerned Himalayans States and other stakeholders.

14.3 Computerisation Activities in CWC

Software Management in Central Water Commission is a sub-component of Data Bank and Information System of Memorandum for Expenditure Finance Committee for "Development of Water Resources Information System" for Finance Commission ending March, 2021 (2021-2022). SMD is entrusted with the work of management of CWC's requirement of IT hardware/ software and IT services. Presently, the Local Area Network of CWC comprises around 6000 nos. IT equipment and 1510 nos. networking nodes located in Sewa Bhawan premises.

Software Management Directorate of Central Water Commission is in existence for more than 25 years and its domain is increasing day by day as all the IT related works are delivered by the way of technology support to the end users of CWC (HQ as well as Regional Offices). Domain refers to the industry or activity sector in which an organization performs day to day business transactions and technology refers to hands-on experience of a particular information technology, for instance, system and database administration, programming, and networking. SM Dte., Central Water Commission has been equipped with domain as well as technological experience to deal with any upcoming challenges involving own officers and outsourced officials to cater to the need as and when required. The existing IT resources in CWC need regular up- gradation and upkeep to match with the technological development in the field of Information technology which needs to be embraced at organizational level in a very dynamic manner. Strengthening of the IT hardware/ software/ network resources is a continual activity. In addition, contemporary thrust has been provided to promote e-governance activities in CWC in line with focus of Government of India.

The major activities in this regard during 2023-24 were as under:

1. Upgradation of IP Based CCTV camera system in CWC (HQ).
2. Procurement of Cloud Services from Meity Empanelled vendors and hosting of portals from on-prem to cloud.
3. Maintenance and Management of the existing IT hardware/ software/ network resources in CWC.
4. Implementation of Human Resources Management System (eHRMS-DoPT) and SANDES messaging app in CWC.
5. Awarding work for AMC of CWC website.
6. Procurement of IT consumables as per requirement of office.
7. Procurement and distribution of Desktops and Laptop for CWC officers through GeM portal.
8. Management of IT helpdesk to resolve e-governance related issues of all CWC users in CWC HQ and all regional offices.
9. Regular management and new creation of VPN for accessing the e-office.
10. Procurement of other IT T&P items as per requisition.
11. Implementation of SPARROW for Group C employees.
12. Regular management of NIC email ids

of around 3500 employees.

13. Management of APAR management system for the employees who are not yet in SPARROW.
14. Management of hardware and software component of AEBAS (AADHAAR Enabled Biometric Attendance System).
15. Maintenance and management of Data centre in SMD which is being used for hosting portals during development stage and providing secure internet to CWC users.
16. Development of 04 portals under DGQI.
17. Arranging to provide APIs for Open Govt. Data Platform (OGD).
18. Management of DGQI report card of DGQI 2.0 for CWC prepared by NITI Aayog.

Table 14.1: Physical and Financial Progress during FY 2023-24

(Rs in Lakhs)

Budgetary Sub- Head	**RE 2023-24**	**Actual Expenditure during 2023-24**	**% of expenditure up to the month against RE**	**Remarks**
	Major Head -2701: Major and Medium Irrigation 80.800.11- Development of Water Resources Information System			
11.00.13 –OE (Office Expenses)	05.00	5.03	100.6 %	
11.00.19 – DE (Digital Equipment)	178.79	176.78	98.88 %	Procurement of consumables IT items
11.00.28 – PS (Professional Services	100.00	96.37	96.37 %	
11.00.29 – R&M (Repair & Maintenance)	55.00		126.82%	AMC of IT items
	Major Head -4701 : Capital Outlay on Medium Irrigation 80.800.06- Development of Water Resources Information System			
06.00.71- ICT (Information, Computer, Telecommunications Equipment)	327.65	305.04	93.10%	Purchase of IT related T&P items.

15 TRAINING

15.1 Introduction

One of the important functions of Central Water Commission is capacity building of the professionals as well as non-professionals associated with water resources sector. In order to impart knowledge and develop technical and managerial skills of in-service officers of CWC and other Central/State Government Departments and their Organisations, CWC conducts and co-ordinates training programmes/seminars/ workshops in the field of water resources. CWC accomplishes this objective through a dedicated unit at HQ namely Training Directorate 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 of the National level seminars, conferences, workshops etc. in the field of water resources

15.2 National Water Academy (NWA)

National Water Academy, Pune under Central Water Commission, which is attached office of Department of Water Resources, RD & GR (DoWR, RD & GR), Ministry of Jal Shakti is functioning as "Centre of Excellence" in field of training and capacity building of Water Resources Professionals. NWA has an extensive pool of faculty, Central Water Engineering Services officers being a major resource pool imparting training with focus on applied learning concepts coupled with guest faculty drawn from multi-dimensional, multi-organizational, multi-disciplinary serving & retired professionals.

The NWA, Pune is Central Training Institute (CTI) mandated to conduct Induction Training Program to Central Water Engineering Services Group 'A' & Group 'B' Officers, scientific cadre officers; Mandatory Cadre Training Programs for CWES Group A & Group B Officers; Capacity Building for Stakeholders in field of Water Resources Development and Management (mainly comprising of in-service professionals from State Government/Central Government/ PSUs & Private etc.); core area trainings; training on areas of emerging technologies, Mass Awareness Programs for School Teachers; NGOs, Media, PRI etc; Demand Based Programs for Indian and Foreign Nationals etc. In addition, mandate of the Academy include assistance to State Government institutes for their specific training needs and collaboration with international agencies like WMO, COMET, ICID etc. for training & other purposes.

In addition to the above, training programs are also being conducted focusing on cutting-edge technology areas which includes analysis & design of structure of water resources projects including hydropower projects, mathematical modelling for flood management and overall management of water sector. NWA, for over last 36 years, is addressing the wider training needs of water resources professionals both technical (Engineering) and non-technical (non-Engineering).

In its national role, the NWA is concentrating on conducting training courses for all water sector professionals, in the specialized and emerging areas. Major beneficiaries of these programs are State Govt. officers, officers of Central Water Commission, Central Organisations, School Teachers, Media Professionals, NGOs & Panchayat Raj functionaries, Foreign Nationals etc. 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 been recognized as Regional

Training Centre (RTC) of the World Meteorological Organization (WMO), and is conducting Distance Learning Programs on the topics of Hydraulics, Hydrological Sciences and Hydrometeorology in association with WMO for Asian countries.

15.3 Progress of Training Activities

NWA has fully resumed residential training (face-to-face) after the COVID situation. In addition to the residential training programs, NWA is continuing to conduct training programs in distance learning mode through its MOODLE Learning Management System (LMS) – e-learning portal. Also, it has started conducting training in Hybrid & blended mode.

Since its inception in the year 1988, NWA has conducted a total of 954 training programs up to 31st March 2024 and training total of 54009 officers. During the year 2024, 101 training programmes (residential – in NWA & Outside NWA; DL; Hybrid) were conducted as given in table below benefitting 9313 officers from Central/ State Governments, Central & State PSUs, Academic Institutions, Schools, NGOS, etc. in these programs with 121 weeks of training.

Mode of Training	No. of Trainings	Remarks
Residential Programs	54	At NWA :44; Outside NWA:09
Hybrid (DL + Residential)	04	
Distance Learning	43	
Total	**101**	

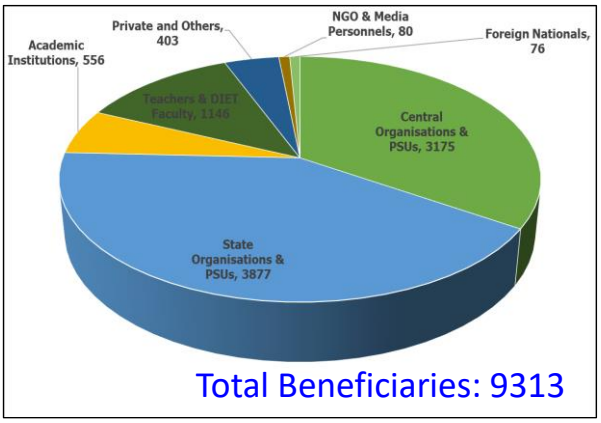
Table 15.1: Training courses conducetd by NWA, Pune during 2023-24

Category of Training	No. of Programs	Total Beneficiaries	Remarks
Cadre Training Group 'A'	06	116	1 ITP for CWES Gr A for 34 weeks; 5 MCTPs.
Cadre Training Group 'B'	04	200	MCTP for JEs and AD-II.
Other Cadre Training Programs	06	157	ITP for JEs of NWDA; CGWB, NERIWALM, Hydromet Cadre CWC & MTS of CWC.
Technical Training Programs	22	1972	Under NHP, in collaboration with IEWP, NMCG,CMIS, DRIP etc.,
Workshop on Training Need Assessment	01	176	Conducted as a part efforts under the aegis of Training Oversignt Committee (ToC).
Faculty Development Program	01	33	As Follow-up of TNA Workshop, Training Managers from the State and Central Organizations
Customized Programs	09	350	Telangana, Leh & Ladakh, North Eastern Region, Assam Arunachal Pradesh, West Bengal, Bihar etc.
Water Policy & Governance	30	4026	Webinar Series ISWRD (16 Weekly Webinars), International Water Cooperation (11 Weekly Webinars), Dam Safety Aspects (02), Residential Training of Water law & River Valley Disputes (as per CBC) ACBP.

DL Program as RTC of WMO	01	76	Basic Hydrological Science for National and International Participants
Financial & Procurement Management	06	403	Workshop & Webinars on Pension Matter, Delegation of Financial Powers, PFMS on e-module, Procurement challenges, e-Gem etc
Mass Awareness Programs	10	1517	For School Teachers, NCC Cadets & Others Stakeholders
Non-Technical Programs	05	287	MDP, Overview of WRs, Post Retirement, RTI Audit, Workshops etc.
Total	**101**	**9313**	

The list of training courses, workshops and seminars organized/ conducted/ coordinated by Training Unit of CWC and by NWA during 2023-24 are given at Annexure 15.1 and Annexure 15.2, respectively.

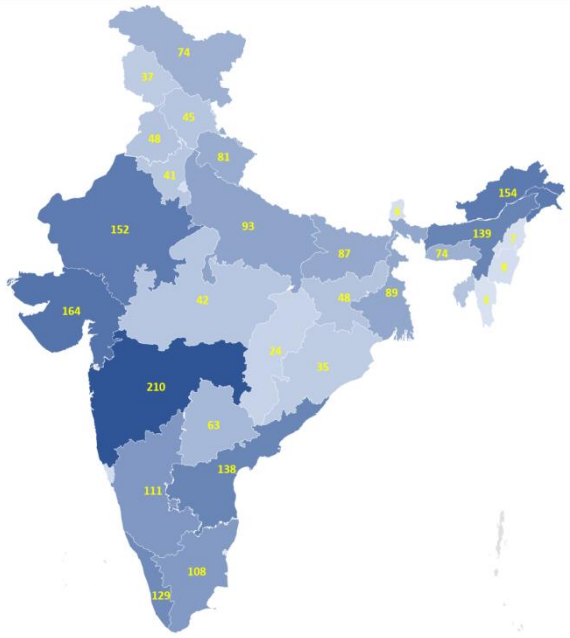
Beneficiaries during the year 2023-24



Category of Beneficiary	Number of officers trained
Central Organisations & PSUs	3175
State Organisations & PSUs	**3877**
Academic Institutions	**556**
Teachers & DIET Faculty	**1146**
Private and others	**403**
NGO & Media Personnels	**80**
Foreign Nationals	**76**
Total	**9313**

Beneficiaries from State and Union Territories during the year 2023-24

Andhra Pradesh	138
Arunachal Pradesh	154
Assam	139
Bihar	87
Chhattisgarh	24
Goa	12
Gujarat	164
Haryana	41
Himachal Pradesh	45
Jharkhand	48
Karnataka	111
Kerala	129
Madhya Pradesh	42
Maharashtra	210
Manipur	8
Meghalaya	74
Mizoram	3
Nagaland	7
Odisha	35
Punjab	48
Rajasthan	152
Sikkim	6
Tamil Nadu	108
Telangana	63
Tripura	48
Uttar Pradesh	93
Uttarakhand	81
West Bengal	89
Chandigarh	3
Dadra and Nagar Haveli and Daman and Diu	1
Delhi	5
Jammu and Kashmir	37
Ladakh	74
Puducherry	1



Beneficiaries	No of Participants
States and Union Territories	**2280**
Other Central Organizations	**1597**
Total	**3877**

15.4 Achievements /Significant Activities during the Year 2023-24 (Training and Capacity Building)

A. Physical Progress of training activities

NWA's achievement for 2023-24 in terms of number of trainings, training weeks, Officers Trained is highest in any year till date. This output is achieved in spite of vacancy at faculty and support staff level. The achievement of NWA for 2023-24 vis-a-vis average of last 15 years is as given below:

Achievement of NWA	Training Programs/Events	Training Weeks	Officers trained
Annual Average of last 15 years (2008-09 to 2022-23)	42	67	3003
Achievement of 2023-24	**101**	**121**	**9313**

B. Workshop on Training Need Assessment:

For the first time, one day National Level "Training Need Assessment" Workshop to assess the training needs of Water Resources Sector was conducted in Delhi. 176 participants from Central, State Organisations, WALMIs/IMTIs, academic institutions, NGOs etc., attended the Workshop. Based on the inputs received during the workshop from different stakeholders, a comprehensive TNA Report has been prepared and submitted to Ministry.

Secretary, DoWR,RD & GR, MoJS inaugurating the Workshop on Training Need Assessment along with other dignitaries

Five breakaway sessions were conducted to discuss the training needs of the following five sub-sectors of WRD&M:

I. Irrigation Water Management & Water Use Efficiency (IWM & WUE)
II. Dam Safety Aspects
III. Participatory Irrigation Management
IV. Ground Water Resource Assessment & Management
V. Advanced and Emerging Technologies & their Application in WRD&M

Dignitaries during the Workshop on Training Need Assessment.

C. **Cadre Training Programs**: Cadre Training Programs for CWES Group A (ITP; MCPT for JTS, STS, JAG, SAG) and CWES Group B (JE, AD-II) were conducted in time bound manner so as to facilitate timely promotions. A total of 10 Cadre Training's were conducted against the approved 09 programs.

D. **Faculty Development Program**: As a follow-up of TNA Workshop, Faculty Development Program for Capacity Building & Professional Development of Trainers was conducted for the first time at NWA which received overwhelming response from the Central, State Training Institutes, WALMIs/IMTIs tec.

E. **Capacity Building of North Eastern Region and Hilly States** – As directed by Chairman, CWC, specific training were conducted to address the training and capacity building needs of special areas like North Easter Regions and Hilly States

a) Familiarization with DPR Preparation of SMI, FMP, AIBP, RRR Projects at Leh (UT of Ladakh)
b) Survey, Investigation and Preparation of Detailed Project Report for River Valley Projects – at Guwahati for Govt of Assam (2 batches)
c) Flood Protection, Anti-Erosion and River Training Works – at NEHARI for NE Region,
d) Application of Remote Sensing and GIS- at Itanagar for Govt of Arunachal Pradesh.

F. **Capacity Building needs of Specific State** : As directed by Chairman, CWC, the following four programs for the State Government officials at state location were conducted in order to address their specific requirements were conducted:

a) Preparation of DPR for Flood Management, River Training Works, Anti-erosion for WRD of Govt of Bihar at WALMI, Patna;
b) Increasing WUE in Irrigation Sector for Govt of Bihar at WALMI Patna
c) RS & GIS applications in WRM for officials of WMIFMP & Irrigation Water Ways Department, Govt of West Bengal at Kolkata;
d) Training Workshop on Introduction to GEE for AP SW at Vijayawada.

G. **Training Programs on specific topics** – As directed by Chairman, CWC, the following training were also conducted during 2023-24 .

a) Pumped Storage Hydroelectric Project :
b) Coastal Management Information System :
c) Numerical Modelling using Delft3D Software under CMIS

H. **Training Programs in Dam Safety Aspects** : Consequent upon enactment of Dam Safety Act, initiatives were taken by NWA to

create awareness on provisions of Dam Safety Act and to train officials of dam owners. The following training events were conducted during theyear:

a) Webinar on Legal and Institutional Framework of Dam Safety in India
b) Webinar on Dam Safety Aspects
c) Customized program for Govt of Gujarat on Dam Safety Aspects - an overview
d) Dam Safety Aspects for all Stakeholders
e) Dam Safety Instrumentation
f) DHAMRA applications (2 batches)

I. **New Areas of Training** : The following new areas were introduced during 2023-24

a) Modernization of Irrigation Systems using RAP-MASSCOTE Approach
b) Program on "Flood Disaster Management"
c) Training Program on "Post Retirement Prospects and Avenues for CWES Officers

J. **Mass Awareness Activities:** The following mass awareness programs were conducted to create awareness :

- Five Distance Learning Program on the "Overview of Water Resources Sector" was conducted during the year with a participation of 1110 teachers and DIET faculty on Pan India.
- One day Residential Program for School Teachers and DIET Faculty was conducted at NWA, CWC, Pune having participation of 36 number of participants.

DIET Faculty and School Teachers participating in the one day program on "Overview of Water Resources Sector"

- On the directions of DoWR, RD & GR, awareness generation webinars on the following topics were conducted :
  - Webinar on Sexual Harassment of Women in Workplace (142 Participants)
  - Webinar on SC/ST Prevention of Atrocities Act 1989 (65 Participants)
  - Webinar on Constitutional values of fundamentals of Indian Constitution (107 participants)

- A one day training-cum-workshop on "Flood Disaster Management" was conducted for NCC Cadets of 2nd Maharashtra Battalion studying in Army Institute of Technology Pune with a participation of 47 NCC Cadets.

NCC Cadets participating in the Training-cum-Workshop on "Flood Disaster Management"

K. **Knowledge dissemination to all stakeholders** : Two Webinar Series on the following topics were conducted with an objective to disseminate knowledge about the interstate river water disputes, need for cooperation among stakeholders on the subject of international

cooperation in water sector.

a) Interstate River Water Disputes in India (a series of16 weekly webinars)
b) International Cooperation in Water Sector (a series of 11 weekly webinars)

L. Collaboration and Linkages

National Collaboration and Linkages : NWA developed linkages with leading institutions in India and abroad dealing with training related activities in water resources sector for sharing the expertise and imparting trainings.

- Fresh MoU was signed with Indian Institute of Management – Ahmedabad in respect of MCTP Level 4 for SAG CWES Group A
- MoU was also signed between NWA and META (GoM) for collaborative training and capacity building activities.
- NWA has Linkages with many National Level Institutions, State Water Resources Departments, Universities, Private Consultants, NGOs, etc. Experts from these institutions are regularly invited for taking part in various training programs as guest faculty.

- NWA faculty are also invited by WALMIs, NERIWALM, IMD, IITM, CWPRS, IIRS, IIPA etc., for delivering lectures in their programs.
- NWA faculty members are part of the Governing Council of HIRMI, Kurukshetra; WALMI, Aurangabad; IMTI, Trichy; NERIWALM, Tezpur; NEHARI, Guwahati, etc.
- NWA has collaboration with IIT-Roorkee; IIM Ahmedabad; IISc Bangalore; IIM Bangalore; IIM Calcutta; various ISRO units – NRSC, IIRS etc., with MoUs for specific training collaborations
    - Indian Institute of Management, Ahmedabad
    - Indian Institute of Technology – Roorkee
    - Indian Institute of Management, Bengaluru
    - Indian Institute of Science, Bengaluru
    - Indian Institute of Management, Kolkata
    - Asian Institute of Technology, Bangkok
    - IHE- Delft, The Netherlands.

International Linkages

- WMO: NWA is a component of Regional Training Centre(RTC) of India.
- Programs under IEWP : India-EU Water Partnership – PR7 Group represented by CE-NWA. NWA, Pune has been identified as one of the Training Institute Partner to introduce RBM Cycle as a practical tool
- NWA has collaboration with ICID for conducting online training program, on the subjects of Irrigation Management.
- Association with Asian Development Bank Supported – "Support for Irrigation Modernization Program (SIMP)" for conducting training program under this program.

M. Visit of dignitaries

Ms. Debashree Mukherjee, Special Secretary, Ministry of Jal Shakti, Department of Water Resources, RD & GR visited NWA, Central Water Commission today and reviewed the activities of NWA, followed by interactions with CWES Group A probationers who were

undergoing their Induction Training Program and trainee Officers of the Govt. of Gujarat whore currently attending a training program on "Dam Safety Aspects- an Overview" being conducted by NWA.

Secretary, DoWR,RD & GR, MoJS addressing the batch of 33 ITP CWES Group A Probationary Officers

Secretary, DoWR,RD&GR, MoJS & faculty of NWA, CWC, with batch of 33 ITP CWES Group A Probationary Officers

Dr Ranbir Singh, IAS(R) , Chairman, Brahmaputra Board made a visit to National Water Academy , Central Water Commission , Pune on 15th March 2024, and interacted with faculty of NWA. A detailed presentation on various activities of NWA was made to brief him. He expressed great appreciation about works being done by NWA. He also showed keen interest about MOODLE platform being used by NWA for it's various trainings, and gave his views about how it should be made more accessible for water sector professionals to get even more benefits from various trainings being conducted by NWA. He also engaged in very enri ching deliberations on how can NWA and Brahmaputra Board collaborate further for the capacity development of it's officials. He also gave his views on various aspects of water resources that can be taken up for training and capacity building of Brahmaputra Board officials.

Dr Ranbir Singh, IAS(R),Chairman,Brahmaputra Board interacting with NWA faculty & officials

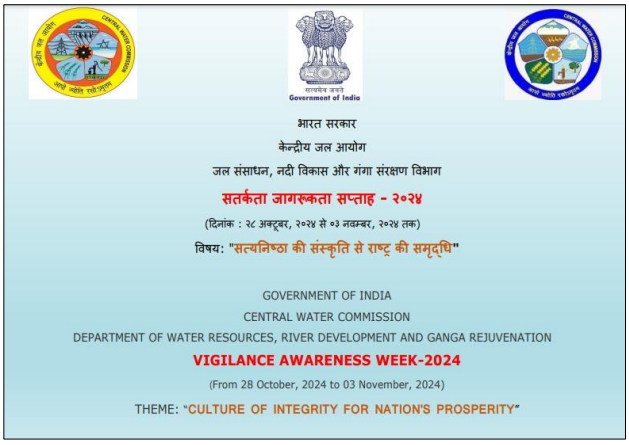
16 VIGILANCE

16.1 Disciplinary Cases

The vigilance/disciplinary cases and complaints received against officers and staff of CWC were given proper and prompt attention. During the year 2023-24 all new cases were taken up with the commitment of "Zero Tolerance Against Corruption".

16.2 Observation of Vigilance Awareness Week

Vigilance Awareness Week 2023 (VAW 2023) was observed in CWC (Headquarters) alongwith all its field offices from 30th October 2023 to 5th November 2023 with the theme of "Say no to corruption; commit to the Nation/ भ्रष्टाचार का विरोध करें; राष्ट्र के प्रति समर्पित रहें".



17

REPRESENTATION OF CWC IN VARIOUS COMMITTEES

17.1 Committees Represented by CWC Officers

Chairman, Central Water Commission and Members, Central Water Commission represent CWC in various Technical Committees of various organisations either as the Chairman or as a Member. List of important Committees on which Chairman, CWC and Member, CWC represent are given in Table 17.1

Table 17.1: List of Important Committees Represented by Chairman and Members of CWC

Sl	Name of Committees/Boards/Panel of Experts/Technical Groups etc.	Representation of CWC
1	Indian National Committee On Irrigation And Drainage (INCID)	Chairman (CWC) as Chairman, Chief Engineer (Environment Management Organization), CWC is the Member-Secretary, The Remote Sensing Directorate, CWC serves as the INCID secretariat.
2	Technical Evaluation Committee (TEC) on North Koel Project	Member (WP&P) as Chairman
3	Committee on Implementation of ShahpurKandi Dam-	Member (WP&P) as Chairman
4	Joint panel of CWC-ICAR	Chairman (CWC) as Chairman and Member (WP&P) as Member
5	Expert Project Review Committee- "Relining of Sirhind Feeder from RD 119700 to 447927 and relining of Rajasthan Feeder from RD 179000 to 496000 of Punjab"	Member (WP&P) as Chairman
6	Steering Committee for implementation of Ken-Betwa Link Project	Member (WP&P) as Chairman
7	Expert Committee on Polavaram Project	Member (WP&P) as Chairman
8	Joint Operation Committee of Rihand Reservoir	Member (WP&P) as Chairman

Sl No.	Name of Committees/Boards/Panel of Experts/Technical Groups etc.	Representation of CWC		Concerned Directorate
		Officer	Position in Committee	
1	Technical Advisory Committee of the Farakka Barrage Project.	Member (D&R)	Chairman	BCD (E&NE)
2	Farakka Barrage Project Advisory Committee (FBP-AC).	Member (D&R)	Chairman	BCD (E&NE)
3	Standing Technical Committee (STC) for deciding project parameters of R-O-R Hydro-power scheme which were initially envisaged as storage scheme.	Member (D&R)	Co-Chairman	CMDD (E&NE)
4	CEDC(Civil Engineering Divisional Council)	Member (D&R)	Member	CMDD(NW&S)
5	National Committee on Dam Safety(NCDS)	Chairman, CWC Member(D&R)	Chairman Vice Chairman	DSM
6	Standing committee on Rihand Dam	Member (D&R)	Member	DSM
7	National Level Steering Committee (NLSC) of DRIP II	Chairman, CWC Member (D&R)	Member Member	DSR
8	Technical Committee (TC) of DRIP II	Member (D&R)	Chairman	DSR
9	Empanelment Committee to examine and recommend the names of various experts to be empanelled as members of Dam Safety review Panel(DSRP)	Member (D&R)	Chairman	DSR* *(Under Review)
10	Committee of International Commission on large dams, India (INCOLD)	Member (D&R)	Member	Emb (NW&S)
11	Governing Body of National Institute of Rock Mechanics (NIRM)	Member (D&R)	Member	FE&SA
12	National Committee on Seismic Design Parameters of River Valley Projects (NCSDP)	Member (D&R)	Chairman	FE&SA
13	Board meeting of Punatsangchhu-I H.E. Project Authority (PHPA)	Member (D&R)	Permanent Invitee	HCD (E&NE)
14	Technical Coordination Committee (TCC) for Punatsangchhu - I H.E Project, Bhutan	Member (D&R)	Co-Chairman	HCD (E&NE)
15	Punatsangchhu-II Hydro Electric Project Authority Meetings.	Member (D&R)	Permanent Invitee	HCD (E&NE)
16	Technical Co-ordination Committee (TCC)	Member (D&R)	Co-Chairman	HCD (E&NE)

Sl No.	Name of Committees/Boards/Panel of Experts/Technical Groups etc.	Representation of CWC		Concerned Directorate
		Officer	Position in Committee	
	of Punatsangchhu-II Hydro Electric Project			
17	Mangdechhu HE Project Authority Meetings.	Member (D&R)	Permanent Invitee	HCD (E&NE)
18	Technical Co-ordination Committee (TCC) Mangdechhu HE Project	Member (D&R)	Co-Chairman	HCD (E&NE)
19	Empowered Joint Group meetings (EJG) (for monitoring of implementation of Hydro-power projects in Bhutan).	Member (D&R)	Permanent Invitee	HCD (E&NE)
20	Programme Advisory Committee (PAC) for Fly Ash Unit constituted by Department of Science and Technology	Member (D&R)	Member	HCD (NW&S)
21	Board of Directors of Tehri Hydro Development Corporation	Member (D&R)	Part Time Director	HCD(N&W)
22	National Institute of Hydrology Society (NIH Society)	Chairman, CWC Member(D&R)	Member Member	Hyd (DSR)
23	Governing Body of NIH	Chairman, CWC Member(D&R)	Member Alternate Member	Hyd (N)
24	Technical Advisory Committee of National Institute of Hydrology.	Chairman, CWC Member(D&R)	Chairman Member	Hyd (N)
25	Indian Meteorological Department (IMD)	Member (D&R)	Hydrological Advisor	Hyd (S)
26	World Meteorological Organization	Member (D&R)	Principal Representative	Hyd (S)
27	National Water Development Agency Society.	Chairman, CWC Member(D&R) Member(WP&P)	Member Member Member	Hyd(S)
28	Governing Body of National Water Development Agency.	Chairman, CWC Member(D&R) Member(WP&P)	Member Member Member	Hyd(S)
29	Technical Advisory Committee of National Water Development Agency.	Chairman, CWC Member(WP&P) Member(D&R)	Chairman Member Member	Hyd(S)

Sl No.	Name of Committees/Boards/Panel of Experts/Technical Groups etc.	Representation of CWC		Concerned Directorate
		Officer	Position in Committee	
30	Governing Council for Central Soil & Materials Research Station.	Member (D&R)	Member	Instrumentation
31	Standing Technical Advisory Committee (STAC) to the Governing Council for CSMRS, New Delhi.	Member (D&R)	Chairman	Instrumentation
32	Advisory Committee for consideration of Techno Economic viability of Major & Medium Irrigation, Flood Control and Multipurpose project proposals.	Chairman, CWC Member(WP&P) Member(D&R) Member(RM)	Member Sp. Invitee Sp. Invitee Sp. Invitee	PA(N)
33	Committee of CEA to accord of techno-economic appraisal of Power Schemes.	Member (D&R)	Permanent Special Invitee	PAO/CEA
34	High Powered Steering Committee for Implementation of National Projects.	Chairman, CWC Member (D&R)	Member Sp. Invitee	PPO
35	Indian National Committee on Surface Water	Chairman, CWC Member (D&R)	Chairman Member	WSR Dte &INCSWSecretariat
36	Monitoring Committee for monitoring the overall progress relating to the preparation of PFR/DPR of proposed Upper Siang Multipurpose Storage Project (USMSP)	Member(D&R)		
39	Consultancy Evaluation Committee (CEC) for Engagement of Project Management Consultancy (PMC) Services for Ken-Betwa Link Project Authority (KBLPA)	Member (D&R)	Chairman	Design(NW&S)
40	Constitution of Committee to assess the various issues of the Indira Gandhi Feeder Canal /Rajasthan Feeder	Member (D&R)	Chairman	Design (N&W)
41	Committee to assess the technical viability of enhancing the capacity of Head Regulator of Indira Gandhi Feeder at Harike to 18,500 cusecs	Member (D&R)	Chairman	Design (N&W)
42	Committee tor conducting a joint detailed technical study to formulate an integrated plan to combat threat of erosion posed by	Chairman, CWC Member(D&R)	Chairman Member	

Sl No.	Name of Committees/Boards/Panel of Experts/Technical Groups etc.	Representation of CWC		Concerned Directorate
		Officer	Position in Committee	
	Ganga- Padma river system in West Bengal			
43	Committee for carrying out anInternal Review of the India Bangladesh Treaty of 1996 on Sharing of the Ganga/Ganges Waters at Farakka"	Member (D&R)	Chairman	CE,HSO
44	Technical Committee for technical issues in connection with the preparation of PFR/DPR of proposed Upper Siang Multipurpose Storage Project (USMSP)	Chairman, CWC	Member (D&R)	Emb (E&NE)
45	Committee to revise and update the Guidelines for planning and design of Piped Irrigation Networks(PIN).	Chairman		BCD(E&NE)
46	Sub Committee for assisting the steering Committee in resolution of Ongoing difference with Pakistan on Kishenganga and Ratle HEPs w.r.t aspects pertaining to Pondage	Chairman		HCD(E&NE)
47	Committee to "Finalize norms for Clearances of DPR aspects in respect of Pumped Storage Plants "	Member (D&R)		HCD(E&NE)
48	A Technical Committee for examining the issue of Land subsidence in Joshimat, Uttarakhand			Emb (E&NE)
49	Executive committee of Betwa River Board	Chairman, CWC	Chairman	CB & P&M
50	Executive committee of Bansagar Control Board	Chairman, CWC	Chairman	CB & P&M

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 an apex body to promote, coordinate and support R&D works related to Surface Water in India. INCSW is headed by Chairman, CWC with Director WS&RS Directorate & INCSW Sectt., CWC as Member Secretary. There are 12 members representing DoWR/CWC, CSMRS, CWPRS, NIH, DST/DSIR/CSIR, Min. of Agriculture, WALMIs, IITs, and NGOs etc. INCSW's main objective is to promote research work in the field of Water Resources Engineering (Surface Water aspect) by providing platform 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 DoWR,RD&GR, Ministry of Jal Shakti. The secretariat support to INCSW is provided by CWC. The work of secretariat is two-fold (a) Regular secretariat work for managing service requests of PIs for R&D schemes and (b) Innovative work.

During the year 2023-24, the following activities were undertaken:

i. Coordination of Research Schemes related to Surface Water:

91 research schemes are being managed by INCSWunder R&D Programme of DoWR,RD&GR. Out of which, Final Reports of 28 schemes has been recommended for acceptanceduring 2021-22. Further, Overhead charges of 02 schemes were also recommended for release during 2023-24

Standing Advisory Committee (SAC) of DoWR, RD & GR, Ministry of Jal Shakti headed by Secretary (DoWR, RD & GR) approved 11 new research topics for Invited Research. Thereafter, detailed proposals of these 11 topics were invited from identified institutes/organizations. Proposals of 06 topics were received and they are under process at various stages.

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 Members of the Surface Water Group and Chief Engineer (P&D) is Member of the Hydrological Observations and Instrumentation Group.

17.2.2 Technical Advisory Committee of NIH

The research programmes and other technical activities of NIH are monitored and guided by Technical Advisory Committee of NIH headed by Chairman, CWC. Member (D&R) and Chief Engineer, Hydrological Studies Organization are also its Members. 77 meetings of TAC of NIH have been held so far. The last meeting was held on 19th February 2024.

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 Members of the Surface Water Group and Chief Engineer (P&D) is Member of the Hydrological Observations and Instrumentation Group.

17.2.3 Technical Advisory Committee of Farakka Barrage Project

The TAC of Farakka Barrage Project is headed by Member (D&R), CWC which generally meets once every year and takes decisions about various works to be executed for efficient and safe functioning of the project. Various problems, special studies and related design work were referred to D&R wing from time to time. Member (D&R) held discussions with the Farakka Barrage project authorities from time to time and Chairs the Technical Advisory Committee meeting of Farakka Barrage Project. 118th meeting of TAC of FBP was held on 30th January2024.

17.2.4 Standing Technical Advisory Committee of CSMRS

The 38th Standing Technical Advisory Committee (STAC) meeting of CSMRS was held under the chairmanship of Chairperson on 29.01.2024.

The Standing Technical Advisory Committee (STAC) was constituted under the Chairmanship of Member (D&R), CWC 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.

17.2.5 Committee for the "Study on the issue of floods and siltation in river Ganga & its tributaries due to Farakka Barrage in the State of Bihar"

A Committee headed by Chairman, CWC and having representatives of Govt of Bihar as well as experts /officers from M/oJS, NIH, CWC was constituted on the subject in January 2020. The consultancy work was awarded to RMSI Pvt. Ltd under NHP and the project started on 01.04.2021. The Committee unanimously accepted the Final Report in the 9th meeting held on 15.12.2022. Major finding of the study was that the simulated backwater effect due to Farakka Barrage in the Ganga river is observed up to 48.3 km upstream of Farakka Barrage for an extreme flooding condition (Design flood of Farakka Barrage of 100 year return period=76455 cumec) .

17.2.6 Consultancy services of physical based mathematical modelling for estimate of sediment rate and sediment transport in 7 river basins of India (under NHP)

Consultancy services of physical based mathematical modelling for estimation of sediment rate and sediment transport in 7 river basins of India (under NHP): Awarded to M/s Haskoning DHV Consulting Pvt. Ltd with effective date 16.11.2020 (18+12 months). Final report of the project has been accepted and approved by the TARC on 30.09.2022. Phase- II of the project has been commenced from 16.11.2022. Under the capacity building 01 training and 01 workshop were organized during the phase-II of the project. Final Report of Phase-II of project was accepted by the committee on 09.01.2024 during the 18th TARC meeting.

17.3 Association with Bureau of India Standards (BIS)

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

CWC is represented by its officers of the rank of Chief Engineer and Director in the 17 Sectional Committees of WRDC and 08Sectional Committees of CEDC besides few other Sectional Committees and Council. Design Standards Dte. is the LiaisonDirectorate in CWC dealing with works of WRDC & CEDC of Bureau of Indian Standards at CWC.

The draft codes and amendments to BIS Codes for adoption and printing are scrutinisedin CWC and submitted for approval of Chairman, then communicated to BIS. During the current financial year, 16draft standards/amendments toBIS codes have been approved by Chairperson, WRDC for adoption and printing.

17.4 Indian National Committee on Irrigation and Drainage (INCID)

The Indian National Committee for Irrigation & Drainage (INCID) was reconstituted in August, 2019 by DoWR,RD&GR as National committee for International Commission on Irrigation and Drainage(ICID)and is engaged in bringing the technological improvements in irrigation sector in India. INCID is headed by Chairman, CWC and its Member-Secretary is Chief Engineer (EMO) with secretariat at Remote Sensing Directorate of CWC.

The objectives of the INCID include:

1. Stimulating and promoting the development and application of irrigation, drainage, river training, and flood control techniques within India;
2. Integrating the efforts of Central Government, State Governments, academic institutions, and private sector in the field of agriculture water management; and
3. Co-operating with the International Commission on Irrigation and Drainage (ICID) for the distribution and interchange of information concerning irrigation, drainage, river training, and flood control between the National Committees of the participating countries.

The major activities/ achievement for INCID during the year 2023-24 are as under:

A. **25th International Congress on Irrigation & Drainage & 74th IEC of ICID**

INCID organized the 25th International Congress on Irrigation & Drainage and 74th IEC Meeting of ICID at Radisson Blu Resort, Visakhapatnam, Andhra Pradesh during 2 – 8th November, 2023 in Parnership with the state govt. of Andhra Pradesh, CWC and ICID. This marked the return of the prestigious and mega event to India after a gap of almost 6 decades. The ICID Congress and IEC had participation of about 1200 delegates from about 45 countries.

The 25th ICID Congress was jointly inaugurated by the Hon'ble Minister (Jal Shakti). Govt. of India and theHon'ble Chief Minister of Andhra Pradesh. The Hon'ble Minister (Jal Shakti), Govt. of India delivered the inaugural ND Gulhati Memorial Lecture. The theme for the 25th ICID Congress was 'Tackling Water Scarcity in Agriculture' and detailed deliberations were held to address these issues in the form of two questions.

- *Alternative water resources could be tapped for irrigated agriculture*
- *On-farm techniques can increase water productivity*

Various technical sessions, technical tours, cultural evening, cultural tours, industry session, etc. were organized during the event along with Technical sessions of the various Working Groups of ICID and IEC Meetings of ICID.

B. **ICID WHIS Awards 2023**

ICID, every year, announces awards namely: World Heritage Irrigation Structures (WHIS) and the Water Saving (WatSave) awards. On behalf of ICID, INCID every year invites nominations from the major irrigating States in prescribed format and recommends the deserving proposals to ICID, which further evaluates the nomination through a jury of international experts. Maximum four awards under the WHIS category are given to one country per year and one award under each of the four sub-categories of WatSave awards per year per country.

India has won four (4 nos) of WHIS awards 2023 which are listed below. The WHIS Awards were presented to the winners during the 25th ICID Congress and 74th IEC Meeting held during 2 – 8 November 2023:

1. Prakasham Barra (Old Krishna Anicut)(Andhra Pradesh)
2. Srivaikuntam Anicut (Tamil Nadu)
3. Balidiha Irrigation Project (Odisha)
4. Jayamangalam Anicut (Odisha)

18 PUBLICITY & PUBLICATIONS

18.1 Activities of Information System Organisation

The Information System Organisation (ISO), CWC brings out various publications at regular intervals on statistics related to water resources development and management and related aspects. Committees for improvement of all these 3 publications have been constituted with the approval of Member (WP&P), CWC. The details of publications are given below:

i) Pricing of Water in Public System in India (Periodicity - Annual)

This publication was brought out at quinquennial basis (once in 5 years) till 2022 and now it will be released on Annual basis. It contains Information on water rates for Lift and Flow Irrigation from Irrigation Departments of different States/UTs and Finance Accounts published by different States/UTs. The important information available in the publication is as under:

- System of Assessment and Collection of Revenue: State-wise the Capital Expenditure, Revenue and Operational Expenses in respect of Major & Medium Irrigation Projects.
- States/UTs-wise Irrigation charges for crops
- States/UTs-wise water rates (flow & lift irrigation) for specific crops viz. paddy, wheat, sugarcane, cotton etc.
- Governing Principles for fixation of Ground Water Abstraction and Water
- Details of Water Projects (Major & Medium)

The latest edition of this publication is of 2022 and is available at the website of CWC.

Note: A workshop on 'Methodology adopted for fixation of Water rates and Physical & Financial Aspects of Major and Medium Irrigation Projects in India' was organized by CWC, DoWR, RD & GR, MoJS, GoI on 24.08.2023 at New Delhi.

ii) Comprehensive Flood Management in India (Periodicity: 5 years)

The publication is brought out at quinquennial basis (once in 5 years) and intended to provide documentation of available data on comprehensive flood management in India. The information given in the publication is collected from FMP Directorate of CWC and Finance Accounts published by different States. The publication provides the following information on flood management in India:

- Constitutional Provisions for Flood Management
- Approaches towards Flood Management
- Flood Management Programme
- Outcome of Flood Management Measures
- Efforts of Central Government for Flood Management in the Country
- Distribution of revenue expenditure by minor head of account and State
- Distribution of capital expenditure by minor head of account and State
- Quantum of Damage due to Floods/Heavy Rains

The latest available edition of this publication is of 2018 and is available at the website of CWC. The next edition of the publication i.e. for the year 2023 is at final stage.

iii) Hydrological Data (Unclassified) Book (Periodicity- Annual)

This annual publication provides information of Hydrological Data for un-classified basins

collected from the observation sites of CWC. The important information included in the publication is as follows:

- List of all basins (unclassified), assessment of water resources and an account of per capita availability of water
- Salient features of each basin like geographical location, major tributaries, soil characteristics, availability of minerals, major industries and important irrigation projects
- An account of average annual flow, estimated utilizable flow and total storage capacity (completed and on-going projects) in different river basins
- Drainage area, hydrological observation sites, peak water level in different basins as well as maximum and minimum observed water levels and discharge at various sites in a river basin
- Annual dependable flow of water at terminal sites of river basins for the last thirty years
- Time series data of Sediment load by site in river basin, Tolerance limits of selected water quality parameters for inland surface water on the basis of its use, Critical absolute values of water quality parameters crossing tolerance limits (season-wise and basis-wise)
- Maximum and Minimum values of water quality parameters by site-wise and river basin-wise.
- Land use statistics: land utilization pattern of the unclassified river basins, gross and net area irrigated, source-wise and basin-wise.
- Basin-wise(unclassified) basic parameters of Ground water resource availability, utilization and stage of development

The latest available edition of this publication is of October, 2021 which is available at the website of CWC. The next edition of this publication is under process.

iv) Water and Related Statistics (Periodicity: 2 Years)

The publication titled 'Water and Related Statistics' is brought out on biennial basis (once in 2 years). The information given in this publication is collected from various Directorates of CWC, various Ministries/Departments and other Organizations. This publication provides data/information on global water scenario; water and related aspects, financial aspects of water and related sectors and environmental aspects of water resources development activities in the country. It consists of data/information related to the following three chapters viz. i) Water and Related Resources, ii) Financial Performance and iii) Environmental Performance.

The latest available edition of this publication is of October, 2021 and is available at the website of CWC.

v) Water Sector at a Glance erstwhile 'Abstract on Water Sector' (Periodicity: Annual)

This publication provides a gist of water resources and related aspects at all India level. It is brought out on annual basis. The information given in this publication is collected from various Directorates of CWC, various Ministries/Departments and other Organizations. The first edition of this publication was released in December, 2020 with the name of 'Abstract on Water Sector-2020' while the second edition of this publication was released in November, 2022 with the name of 'Water Sector at a Glance-2021' and is available at the website of CWC. This publication provides a gist on the following 8 Sections viz. i) National Water Policy, 2012 ii) Water Resources at a Glance iii) Land-Use Statistics iv) Major and Medium Irrigation and other Projects v) Flood Management vi) Navigation-Inland Water and Transport vii) Hydro-Electric and viii) International Treaties and Cooperation.

vi) Financial Aspects of Irrigation Projects (Medium and Major) in India (Periodicity: 5 Years)

This publication is brought out at quinquennial basis (once in 5 years) and contains information on financial aspects related to irrigation projects

at States/UTs level as well as all India level. The important information available in the publication are as under:

- Capital Expenditure, Working Expenses and Gross Receipts in respect of:
  - Major & Medium Irrigation Projects
  - Minor Irrigation Projects
  - CAD Programme
- State-wise status of Accelerated Irrigation Benefits Programme (AIBP) - Central Loan Assistance (CLA)/ Grant Released for Major, Medium and ERM Projects
- Number of Water Users Associations (WUAs) formed and area covered State-wise
- Central Assistance releases under CAD Programme by States

The source of information for this publication is Financial and Revenue Accounts of the Union and State Governments brought out by the Comptroller & Auditor General of India and the Accountant General of the States respectively. The latest edition of this publication is of December, 2020 and available at the website of CWC. The next edition of 2025 is under process.

18.2 Publication of Journals/ bulletins

18.2.1 Jalansh- The Monthly Newsletter of CWC

Central Water Commission initiated publication of monthly newsletter titled "Jalansh" in August, 2018. The main purpose of this newsletter is to appraise the stakeholder organizations and public at large about the activities of Central Water Commission and other pertinent information related to water sector. Limited copies of the Newsletter is printed and distributed to limited audience. The softcopy is hosted on CWC website and also sent by email to a large no. of recipients for wider dissemination. During 2023-24, total of 12 monthly newsletters (from April-23 to March-2024) were published. These can be accessed from URL: http://cwc.gov.in/Jalansh

Hindi is the most commonly spoken language in India, so the hindi edition of Jalansh is also being published along with its English version. These can be accessed from URL: http://cwc.gov.in/hi/Jalansh

These publications are reviewed by the Editorial Board constituted under the Chairman-ship of Chief Engineer (HRM), CWC.

18.3 Compilation of News articles related to Water and allied sector

CWC is compiling the news articles related to water and allied sector published in various newspapers on daily basis and uploads the same on CWC website for wide dissemination. Such compilation can be used by officers of Central and State organisations as well as general public for keeping them updated on latest events taking place in the sector.

These can be accessed from following URL: http://cwc.gov.in/news-clipping

18.4 Engineering Museum

The Central Water Commission (CWC) is a premier technical organization driving sustainable water management in India. Through its Engineering Museum at Kalindi Bhawan, New Delhi, CWC showcases traditional and modern water management technologies, emphasizing the critical need for judicious water use. The museum's exhibits include working models, hydrological instruments, and visual displays that demonstrate key engineering principles behind irrigation systems, flood control, and water storage solutions. The integration of traditional practices, like rainwater harvesting, with cutting-edge technologies, such as automated irrigation and smart water management systems, highlights the evolution of water resource management.

As part of its Information, Education, and Communication (IEC) initiative under the Ministry of Jal Shakti, CWC organizes 10 educational visits for school students. These

programs aim to provide technical knowledge on hydrological systems and water conservation while fostering critical thinking to address challenges such as water scarcity, pollution, and climate change. Students are exposed to innovative solutions, empowering them to adopt sustainable practices and disseminate these ideas within their communities.

CWC's technical outreach extends beyond education. Participation in 23 exhibitions across India serves to disseminate water conservation techniques, such as drip irrigation and wastewater treatment, tailored to regional needs. These events facilitate knowledge transfer to farmers, villagers, and other stakeholders, ensuring practical implementation of efficient water management strategies.

The documentaries related to water sectors further strengthens technical understanding by highlighting data collection methods and their role in disaster forecasting, flood management, and climate-resilient water policies. This initiative underscores the importance of precision in data-driven decision-making to address complex water challenges.

While CWC has made significant strides, challenges such as inadequate public awareness, policy gaps, and the need for advanced technologies persist. Moving forward, expanding public-private partnerships, promoting R&D, and leveraging global expertise will be critical. By integrating technical advancements with community-level initiatives, CWC is paving the way for a water-resilient India amidst increasing pressures from population growth, industrialization, and climate change.

Details of the school visits are enclosed in Annexure-1 and details of the events/exhibitions are enclosed in Annexure-2.

Table 18.1: List of School Visits in F. Y 2023-24

Sl.No	Particulars of Activities	Proposed date of visit	Status
1	Guru Purnima	24th July, 2023	Visit done Successfully
2	National Sports Day	29th August,2023	Visit done Successfully
3	World Literacy Day	8th September,2023	Visit done on 18.09.2023 on World Water Monitoring day
4	World Rivers Day	26th September,2023	Visit done Successfully on 17.10.2023
5	World Students Day	15th October, 2023	Visit done Successfully on 11.01.2024
6	Constitution Day	26th November,2023	Visit done Successfully on 12.01.2024
7	National Energy Conservation Day	14th December, 2023	Drawing Competition done in KV Sec 3 on 25.01.2024
8	World Hindi Day	10th January 2024	Drawing Competition done in KV JNU on 21.03.2024
9	National Science Day	28th February 2024	Visit done Successfully on World Water Day 22.03.2024
10	International Day of Action for Rivers	14th March 2024	Visit done Successfully on 23.03.2024

Table 18.2: List of Exhibitions & Events FY 2023-24

S. No.	Period	Place	Exhibition name	VIP Reference
1	22-23 April	JNU, New Delhi	10th Annual Day of Pravasi Odia Vikas Samiti	Surya Narayan Mishra, President, Pravasi Odia Vikas Samiti
2	10-11 June	IITM, Gwalior	Rashtriya Jal sammelan, Bainsli Vimarsh	Sh OPS Bhadauria, Minister of State, Urban Development and Housing Department
3	18-Jun	IIC, Lodhi Road	One-day national workshop on 'Integrated Management of Sediments in River Basins and Reservoirs for Sustainable Development"	--
4	21-23 July	Pragati Maidan	Govt Achievement & Scheme Expo	ShDharambeer Singh, MP, Mahendergarh, Haryana
5	04-Aug	Bisalpur Dam, Deoli	Outreach Program on Bisalpur Dam	--
6	18-20 Aug	Guwahati	Empowering India 2023	Sh Brijendra Singh, MP, Hissar
7	23-25 Aug	Singola, Maha.	Samridhh Maharashtra	Sh Ranjit Singh Naik Nimbalkar, MP, Madha
8	24-28 Aug	Patuli, Kolkata	10th Indian National Exh.	ShKripanath Mallah, MP, Karimganj, Assam
9	25-26 Aug	New Delhi	7th World Water Summit 2023	--
10	14-16 Sep	Jaipur	Jaipur Expo 2023	Sh Kirori Lal Meena, MP, Rajya Sabha
11	14-15 Sep	RIC, Jaipur	International Conference on Dam Safety 2023	--
12	28-30 Oct	Mathura	2nd Ujjwal UP 2023	Smt Hema Malini, MP, Mathura
13	01-03 Nov	Latur, Maha.	PragatisheelMaharshtra	Sh Sudhakar Tukaram Shringare, MP, Latur
14	14-27 Nov	Pragati Maidan, ND	IITF-2023	Sh Pradeep Singh Kharola, IAS, Rtd.
15	26-Oct	New Delhi	Jal Prahari Samman Samaroh 2023	--
16	8-10 Dec	Kurukshetra, Haryana	Vision Haryana-Atmanirbhar Bharat ki Aor	Sh Nayab Singh Saini, MP, Kurukshetra
17	21-23 Dec	Ghaziabad, UP	Rise in India	Sh Anil Agrawal, MP, Rajya Sabha
18	20-29 Dec	South 24 Paragnas,West Bengal	"27th Sundarban Kristi Mela O Loko Sanskriti Utsab"	Sh. N.K Premachandran, Honable MP(LS)
19	29-31 Jan 2024	Udaipur, Raj.	Unnati 2024	Sh Arjun Lal Meena, MP, Udaipur
20	07-09 Feb	Dilli Haat, Janakpuri	Govt. Development Scheme Expo	Virender Singh, MP, Ballia
21	15-17 Feb	Haridwar, UK	Viksit Bharat Sankalp 2024	Sh Naresh Bansal, MP (RS)

22	9-11 Feb	Shillong, Meghalaya	International Water Conclave'	Sh Conrad Sangma, CM, Meghalaya
23	13-15 March 2024	Rewa, MP	Utkarsh MP 2024	Sh Janardan Mishr, MP

18.5 Presence on Social Media Platforms

Social Media Platform now-a-days is an important means to communicate with common people, disseminate information and creates awareness. In order to fully harness the facility, CWC is operating accounts on various Social Media platforms such as Facebook, Twitter, Instagram and YouTube for dissemination of information to public at large. The URL for these accounts is as under.

https://twitter.com/CWCOfficial_GoI

https://www.facebook.com/CWCOfficial.GoI

https://www.instagram.com/cwcofficial.goi

https://www.youtube.com/c/CWCOfficialGoI

In addition to above, the Flood Forecasts are issued from the dedicated links given as below:

https://www.facebook.com/CWCOfficial.FF/

https://twitter.com/CWCOfficial_FF

18.6 Azadi ka Amrit Mahotsav

Azadi Ka Amrit Mahotsav is an initiative of the Government of India to celebrate and commemorate 75 years of independence and the glorious history of its people, culture and achievements. It commenced on 12th March 2021 starting a 75- week countdown to our 75th anniversary of independence i.e. 15th August 2023. CWC celebrated Azadi Ka Amrit Mahotsav by organising events/exhibitions and performing various activities at HQ and Field offices.

Outreach Program for Promoting Dam Tourism under AKAM as per the directions of DoWR, RD&GR, National Dam Safety Authority, and under overall supervision of Chief Engineer, T&BDBO, Kolkata through SID , Gangtok was organised at Teesta V in Sikkim in collaboration with NHPC on 24.08.2023.

NDSA, Guwahati under the leadership and supervision of CE, BBO, CWC Guwahati through NEID-III, CWC Itanagar successfully conducted outreach programme on 24-08-2023* under AKAM at Iconic Dam in Arunachal Pradesh i.e., Bichom Dam, Kameng HPS (4 x 150 = 600 MW) in collaboration with NEEPCO Ltd.

Outreach program under Azadi Ka Amrit Mahotsav at Iconic Srisailam Dam to promote Dam Tourism was organized by KGBO, Central Water Commission, Hyderabad, NDSA, Southern Region in collaboration with Water Resource Department, Andhra Pradesh on 03rd and 04th August-2023.

Outreach program under Azadi Ka Amrit Mahotsav at Iconic Hirakud Dam to promote Dam Tourism was organized at Jawahar Minar, Ashok Niwas. The program was organized by M&ERO, Central Water Commission, Bhubaneswar, Ministry of Jal Shakti , Govt of India in collaboration with Water Resource Department, Odisha.

Azadi Ka Amrit Mahotsav celebration at the iconic Salaulim dam, Goa was held from 14th to 15th Aug 2023.

Hon'ble Water Resource Minister Goa & Hon'ble Minister for Social welfare graced the occasion along with Officials of MSO led by CE Sh Virendra Sharma, NDSA Regional Director, Sh R Thangamani, Officials of WRD, Goa and Officials from MoJS were also present.

As a part of Azadi ka Amrit Mahotsav, mass awareness program was organised under MGD-1, UGBO at Meetpur village, Barabanki about mitigation of water pollution in rivers and water bodies .

Villagers gathered and participated in the rally.

18.7 Mass Awareness Activities

1. Empowering India 2023" Exhibition in Guwahati, Assam held during 18.08.2023 to 20.08.2023.The exhibition was inaugurated by Sh. Atul Bora, Honorable Minister of Agriculture, Assam.

At this event, CWC displayed Vision, Mission, Policies and Activities of MoJS and efforts were made to enlighten the visitors about various Government Schemes & Programmes. The exhibition showcased all the information about flagship programmes, schemes, research and development works. Emphasis was also given to showcase all the

information on Flood Forecasting & Early Warning System, Methods of Irrigation, Rain Water Harvesting and Water conservation at home, public areas and farming.

2. Students of Government Girls Sr. Secondary School, Pushp Vihar, Sector 1, New Delhi visited Engineering Museum & National River Water Quality Laboratory (NRWQL), Yamuna Basin Organization, Kalindi Bhawan, New Delhi under the IEC program of MoJS on the Subject of "जल संरक्षण विषय पर स्कूली छात्र - छात्रों के लिये शिक्षा"
   Shri G. K. Agarwal, Chief Engineer, YBO, Shri Ajay Kumar, SE, Planning Circle, Shri H. P. Chaurasia, Executive Engineer, UYD along with the officers of M&E Sub Division & NRWQL educated the students about the various activities of CWC and Water Conservation through a smart class, followed by a Quiz and Prize distribution.

18.8 Publication Registration System

A Publication Registration System for tracking, retention and version control of various publications of CWC has been evolved in-house. It is being implemented from January, 2020 onwards. All the publications would invariably display a registration number on their back cover before printing/publication and hosting on CWC website. The registration number should be one of the prime requisite for getting approval by the competent authority for printing and hosting of the publication on CWC website. This registration is being done by WSE Directorate and a unique registration number is being provided based on the request in prescribed Proforma. Total **91** publications were registered during April, 2023 to March, 2024.

ANNEXURES

Annexure – 5.1

List of Consultancy Projects in D&R Wing during the Year 2023-24

Sl. No.	Name of Project
Construction Stage Projects	
Andhra Pradesh	
1	Polavaram Irrigation Project
Gujarat	
2	Bhadbhut Barrage Project Phase I
3	Surat Municipal Corporation (SMC) Barrage Project
Haryana	
4	AdiBadri Dam, SombSaraswati Barrage Project
Himachal Pradesh	
5	Phina Sigh Medium Irrigation Project
6	Renukaji Dam Project
Jharkhand	
7	North Koel Reservoir Project (Mandal Dam)
8	Icha Dam Under Subarnarekha M.P.Project
Karnataka	
9	Rehabilitation of sluice gates for Krishna Raja Sagar
Madhya Pradesh	
10	Construction of Proposed Intake well in Rajghat Dam Reservoir for drinking water scheme.
11	Daudhan Dam,
12	Karam Medium Irrigation Project
Meghalaya	
13	GanolH.E.Project
Odisha	
14	Kharag HEP (63MW)
15	Upper Indravati Pumped Storage Project, Mukhiguda, (600MW)
16	Hirakund H.E Project AdditionalSpillway
17	Anandpur Barrage Project
18	Chheligada Irrigation Project
Rajasthan	
19	Parwan Project
20	Isarda Major Dam Project in Tonk District

Sl. No.	Name of Project
21	Rehabilitation of Garada Earth dam
22	Navnera Barrage Project
23	Khetri Copper Complex, Tailing Dam
24	Construction of Earthen Dams in Village Bastawa Mata &Indroka, Jodhpur.
Uttar Pradesh	
25	ArjunSahayakPariyojna
26	Kanhar Irrigation Project
27	Vetting of Designs & Drawings of Intake well & Approach Bridge in Rajghat Reservoir
Uttarakhand	
28	LakhwarMulti-Purpose Project
Bhutan	
29	Punatsangchu Stage-I H.E. Project
30	Punatsangchu Stage-II H.E. Project
Nepal	
31	Arun-3 HEP
DPR Stage Projects	
Andaman &Nicobar Islands	
1	Development of Fresh Water Lake at Flat Bay, Port Blair
Arunachal Pradesh	
2	Kaya Valley Irrigation Project
3	Burusuti Irrigation Project
4	Mebo Irrigation Project
Assam	
5	Katakhal Irrigation Project
6	Buroi Irrigation Project
7	Madhura Irrigation Project
Bihar	
8	Kosi Mechi Insta State Link
Haryana	
9	Sharda Yamuna Link
Himachal Pradesh	
10	Satyarkhad Project
11	Kishau Multipurpose Project
Jammu & Kashmir	
12	Barinium Hydroelectric Project

Sl. No.	Name of Project
Jharkhand	
13	Bhuswa Reservoir Scheme
14	Barkattha Reservoir Scheme
15	Bhelwa Reservoir Scheme
16	Khuntishot Reservoir Scheme
17	Bhur Reservoir Scheme
18	Sonadubi Reservoir Scheme
Maharashtra	
19	Intra State Link Projects. Daman Ganga, Ekdare-Godavari link
20	Daman Ganga (Val/Vagh)-Vaitarna–(Upper Vaitarna)-Godaveri(Kadva-Dev) Intra State Link Irrigation Projects.
Meghalaya	
21	Simsang Dam project in South Garo Hills
22	Damring Irrigation Project
Mizoram	
23	Mat - Sekawi HE Project
24	Tlawng HE Project
25	Tuichang HE Project
Rajasthan	
26	Khakha Head, Sri Ganganagar, Gang Canal/ Bikaner canal
Tripura	
27	Preparation of DPR of Haora
Uttar Pradesh	
28	Two Barrages across Ken River in the downstream of existing Bariyapur Pickup weir
29	Consultancy for Design & Preparation of the DPR for the proposed Panchnad Barrage of Yamuna River in District, Auraiya, Uttar Pradesh.
Uttarakhand	
30	Jamrani
West Bengal	
31	Subarnarekha-Mahanadi interlinking Project
Bhutan	
32	Kuri GongriH.E.Project
Indo- Nepal	
33	SaptaKosiMulti-Purpose Project
Sp. Problem Projects	

Sl. No.	Name of Project
Andaman & Nicobar	
1	RK Pur VK Pur Dams and Canals
Arunachal Pradesh	
2	Ranganadi HEP (3*35 MW)
Assam	
3	Barbhag Drainage Development Scheme
4	Amjur Drainage Development Scheme
Bihar	
5	Durgawati Dam Project
Chattishgarh	
6	Rehabilitation of Dam Chattisgarh under DRIP
Delhi	
7	Request for in-principal approval for construction of new Barrage near to Existing Barrage across Yamuna at Wazirabad.
Gujarat	
8	Sardar SarovarH.E.Project
Haryana	
9	Remedial measures to check recurring damages on D/S side of Hatnikund Barrage on river Yamuna
Himachal Pradesh	
10	ShongtongKarchamH.E.Project(450 MW) H.P
11	KarchamWangtooHEP(1000 MW)
12	Uhl- III , H.E.Project
13	Maintaining Full Reservoir Level (FRL) in Bhakra Dam and Pong Dam.
Madhya Pradesh	
14	IndraSagar Dam Multi Purpose Project
15	Imphal Barrage-Replacement of Gates & Hoisting arrangement.
Odisha	
16	Upper Indravati hydro Electric Project
Punjab	
17	Committee for assisting the various issues of Indira Gandhi Feeder /Rajasthan Feeder canal.
18	Setting up of Mini Hydel Projects on Bhakra Main Line (BML) Canal at 27 sites with a total capacity of 63.75 MW in Punjab.
19	Issue of blockage of Fazila Drain in Fazila
Rajasthan	

Sl. No.	Name of Project
20	Gantry Crane's lifting beam issue in Rajghat dam, Betwa River Council, Jhansi
Telengana	
21	Srisailam left bank Hydroelectric Project
22	Srisailam Project Hydro Electric (EDA)
Tripura	
23	Construction of Inlet at Feni River
Uttarakhand	
24	TapovanVishnugad HEP
25	Naitwar Mori Hydroelectric Project.
Uttar Pradesh	
26	Development of cracks on top of existing earthen section of Kanhar Dam
West Bengal	
27	Farakka Barrage Project
28	Bindu Barrage, Jaldhaka, H.E. Project

Annexure-5.2

Status of Hydro Electric Projects under Appraisal in D&R Wing of CWC

Sl.No	Name of the State	Project's Name	Status
1	Andhra Pradesh	Standalone Pumped Storage component of Pinnapuram Integrated Renewable Energy Project,(1200MW-PFR)	**Conditional Clearance**
2	Andhra Pradesh	Upper Sileru Pumped Storage Project (9 x 150 =1350 MW).	**Cleared**
3	Andhra Pradesh	Singanamala Pump Storage Project (800 MW).	UnderExamination/ Comments Issued
4	Andhra Pradesh	Paidipalem East Pump Storage Project (1200MW)	Under Examination / Comments Issued
5	Odisha	Khadaga Hydro Power Project.	Comments Issued
6	Himachal Pradesh	Jangi ThopanPowari Project (902 MW)	Comments issued
7	Karnataka	Standalone Pumped Storage component of Saundatti Integrated Renewable Energy Project,(1260MW)	Comments issued
8	Odisha	Upper Kolab Pumped storage Project (UKPSP 32 MW)	Comments issued
9	Odisha	Balimela Pumped Storage Project (500MW).	Comments issued
10	Tamil Nadu	Sillahalla Pumped Storage HEP Stage-I (1000 MW)	Comments issued
11	Madhya Pradesh	MP30 Gandhisagar Pumped Storage Project(1920MW)	Comments issued/ Under Examination
12	Andhra Pradesh	Somasila PSP	Comments Issued
13	Andhra Pradesh	Karrivalasa PSP	Comments Issued
14	Andhra Pradesh	Kurukutti PSP	Comments Issued
15	Andhra Pradesh	Chitravathi PSP (500 MW)	Under Examination
16	Andhra Pradesh	Owk FSP	Comments Issued
17	Andhra Pradesh	Gandikota Pump Storage Project(4 x 250 MW)	Under Examination
18	Andhra Pradesh	Yerravaram PSP	Comments Issued
19	Kerala	Idukki Extension Scheme	Under Examination/ Comments Issued
20	Rajasthan	Sukhpura PSP (2560MW)	Comments Issued

21	Andhra Pradesh	Paidipalem North PSP (1000 MW)	Under Examination/ Comments Issued
22	Rajasthan	Shahpur PSP (1800MW)	Comments Issued
23	Maharastra	Pane PSP (1500 MW)	Under Examination/ Comments Issued
24	Karnataka	Narihalla PSP (300 MW)	Under Examination/ Comments Issued
25	Andhra Pradesh	Kamalapadu PSP (950 MW)	Comments Issued
26	Maharashtra	Patgaon PSP (2100 MW)	Comments Issued
27	Maharashtra	Malshej Ghat Bhorande PSP (1440 MW)	Under Examination
28	Madhya Pradesh	Indirasagar Omkareshwar PSP(525 MW)	Comments Issued / Under Examination
29	Madhya Pradesh	Tekwa-2 Pump Storage Project (800 MW)	Comments Issued / Under Examination
30	Andhra Pradesh	Aravetipalli Pump Storage Project (1320 MW)	Under Examination/Comments issued
31	Andhra Pradesh	Gadikota Pump Storage(1200 MW)	Under Examination
32	Andhra Pradesh	Rayavaram PSP (1500 MW)	Under Examination/ Comments issued
33	Maharashtra	Koyna Nivakane PSP (2700MW)	Under Examination / Comments issued
34	Maharashtra	Nayagaon 2000 MW PSP	Under Examination/ Comments issued
35	Jammu & Kashmir	Bonar Lolab	Comments issued
36	Himachal Pradesh	Luhri Stage-II H.E.Project (172 MW)	Comments issued (returned by CEA)
37	Himachal Pradesh	ReoliDugliH.E.Project	**Cleared** / Comments issued
38	Himachal Pradesh	Purthi HEP H.E Project (Pre-DPR)	Comments issued
39	Himachal Pradesh	Bardang HEP	Comments issued
40	Himachal Pradesh	Gyspa Dam Project	Comments issued
41	Uttarakhand	Devsari HEP(162 MW)	Comments issued
42	Jammu & Kashmir	Uri-I Stage II(240 MW) HE Project	**Cleared**
43	Himachal Pradesh	Sach Khas HE Project (Pre DPR)	Comments issued
44	Himachal Pradesh	Tandi-Rashil HE Project(Pre-DPR)	Comments issued (returned by CEA)
45	Jammu & Kashmir	Dulhasti Stage – II HE Project (260MW)	Comments Issued/ **Cleared**

46	Uttarakhand	Sirkari Bhyol Rupsiabagar HEP	**Cleared**
47	West Bengal	Teesta Intermediate HEP 90 MW	Comments issued
48	Arunachal Pradesh	Anjaw HEP (270 MW)	Under Examination/ Comments issued
49	Arunachal Pradesh	Niare H.E.Project(770+90 MW)	Under Examination / Comments Issued
50	Arunachal Pradesh	Demwe Upper Stage-I HEP	Comments Issued
51	Sikkim	Memorandum of changes from concurred Feasibility Report of Rangit H.E Project Stage-IV	Under Examination
52	Meghalaya	Simsang Dam Project in South Garo Hills District	Comments Issued
53	Arunachal Pradesh	Oju HE Project (1878 MW)– Pre DPR	Comments Issued
54	Arunachal Pradesh	Emra II HE Project (315 mw)	Comments Issued
55	Arunachal Pradesh	Naba HE Project (1105 MW)	Comments Issued/ Under Examination
56	Andhra Pradesh	Dengser HE Project (640 MW)	Comments Issued / Under Examination
57	Arunachal Pradesh	Nafra HE Project (120 MW)	Comments Issued
58	Meghalaya	Myntdu Leshka Stage -II HEP (3 x 70 MW)	Comments Issued/ **Cleared**
59	Meghalaya	Umngot HEP (210 MW)	Under Examination / Comments Issued
60	Arunachal Pradesh	Kamla HE Project (1720 MW)	Comments Issued
61	Meghalaya	Selim HEP(2 x 29 =58 MW)	Under Examination / Comments Issued
62	West Bengal	Memorandum of changes in respect of Teesta-VI H.E.Project (4*125=500).	Under Examination
63	Karnataka	Sharavathy Pumped Storage Project (8x250 MW)	**Cleared**
64	Maharashtra	WarasgaonWarangi PSP (1500 MW)-PFR	Comments issued / Under Examination
65	Maharastra	Bhavali PSP (1500MW)	Under Examination
66	Andhra Pradesh	Pinnapuram (MoC Proposal) PSP (1680 MW)	**Cleared**
67	Andhra Pradesh	Yaganti Pump Strage Project (1000 MW)	Comments issued

68	Andhra Pradesh	Raiwada PSP (900 MW)	Under Examination/ Comments issued
69	Andhra Pradesh	Vemapalli PSP (1500 MW)	Comments issued /Under Examination
70	Andhra Pradesh	Pedakota Pumped Storage Project 1800 MW	Under Examination
71	Arunachal Pradesh	Naba Hydroelectric Project (1105 MW)	Comments issued
72	Jharkhand	DVC-Lugupahar PSP (approx. 1500 MW)	Comments issued / Under Examination
73	Karnataka	Saundatti PSP (1600 MW)	Comments issued
74	Madhya Pradesh	Panari PSP (1800 MW)	Comments issued
75	Maharashtra	Shirwata PSP (1800 MW)	Comments issued/ Under Examination
76	Maharashtra	Bhivpuri PSP (1000 MW)	Under Examination
77	Maharashtra	Tarali Pump Storage project (1500 MW)	Comments issued/ Under Examination
78	Meghalaya	Kynshi-PSP-ROR-Solar Integrated Project Stage IA (1172 MW)	Comments issued / Under Examination
79	Odisha	Upper Indravati Pumped Storage Project (600 MW)-PFR	**Cleared**
80	Rajasthan	Bastawa Mata Dam Projects,	Under Examination
81	Rajasthan	Sirohi PSP (1200 MW)	Comments issued
82	Rajasthan	Shahpur Pumped Storage Project (1800 MW)	Comments issued
83	Uttar Pradesh	Musakhand PSHP (600 MW)	Comments issued / Under Examination
84	Uttar Pradesh	Kandhaura PSP (1680 MW) / Under Examination	Comments issued

85	Uttar Pradesh	UP01 Pump Storage project (3360 MW)	Comments issued
86	Andhra Pradesh	Veeraballi PSP (1200 MW)	Comments issued
87	Andhra Pradesh	Gujjili PSP (1400 MW),	Under Examination
88	Andhra Pradesh	Chittamvalasa PSP (800 MW),	Under Examination
89	Uttarakhand	Arakot – Tiuni HEP (70 MW)	Under Examination
90	Jammu & Kashmir	MoC - Kiru HEP (4*156 = 624 MW),	Under Examination

Sl.No.	**Name of the Country**	**Project's Name**	**Status**
1	Nepal	Lower Arun HE Project (669 MW)	**Cleared**
2	Nepal	Arun-4 HEP (490MW)	Under Examination/ Comments issued
3	Nepal	West Seti H.E.P	Comments issued

Annexure-5.3

Status of Irrigation Projects under Appraisal in D&R Wing of CWC

Sl.No	Name of the State	Project's Name	Status
1	Rajasthan	Eastern Rajasthan Canal Project	Comments Issued (Returned)
2	Madhya Pradesh	Parbati-Kuno-Sindh Link(ERCP-PKC)	Comments Issued
3	Karnataka	Bhandura Nala Diversion Scheme.	**Cleared**
4	Karnataka	Kalasa Nala Diversion Scheme.	**Cleared**
5	Rajasthan	Revised DPR of Transfer of Rajasthan Share of Yamuna Water at Tajewala Head Works to Churu and Jhunjhunu Districts of Rajasthan by underground conveyance system and its utilization.	Comments Issued
6	Rajasthan	Gang Canal Automation	**Cleared**
7	Odisha	Upper Udanti Irrigation	Comments Issued
8	Madhya Pradesh	ERM of Sanjay Sarovar Project	**Cleared**
9	Telangana	PalamuruRangareddy Lift Irrigation Scheme,	Under Examination
10	Telangana	Sammakka Sagar Project (Thupakulagudem Barrage)	Under Examination
11	Telangana	Muktheshwar (ChinnaKaleshwaram) Lift Irrigation Scheme,	Under Examination
12	Telangana	Sita Rama Lift Irrigation Project Phase – I	Under Examination
13	Odisha	Govindapalli Irrigation Project	Comments Issued
14	Madhya Pradesh	Restoration of Ken Canal System Under Ken-Betwa Link Project, DPR	Comments Issued(returned)
15	Arunachal Pradesh	Flood Protection and River Front Development work on Yomgo River at Aalo Township under West Siang District.	Comments Issued (DPR is withdrawn by Project authority)
16	Arunachal Pradesh	Flood Management Work at Sub-Basin Kley River at Ziro Lower Subansiri District.	Comments Issued
17	Arunachal Pradesh	Anti Erosion Work & River Front Development on Kameng River in East Kameng District.	Comments Issued (final comments)

18	Arunachal Pradesh	River Training Work on Yomgo River at Kabu Village,	Comments Issued (DPR is withdrawn by Project authority)
19	Assam	Climate Resilient Brahmaputra Integrated Flood and River Erosion Risk management Project in Assam (Zone-A)	**Cleared by FMP**
20	Assam	Climate Resilient Brahmaputra Integrated Flood and River Erosion Risk management Project in Assam(Zone-B)	**Cleared by FMP**
21	Assam	Climate Resilient Brahmaputra Integrated Flood and River Erosion Risk management Project in Assam (Zone-D) –	Final Comments issued
22	Uttarpradesh	Renovation and modernization of the Ganga Main Canal system stage-1 (F-branch, Z-distributary, GG-distributary and BB-distributary)	Comments issued(awaited for reply from project authority)
23	Orissa	Govindapali Irrigation Project	Comments issued
24	Uttarpradesh	PKC Link Project & ERCP Link Project	Comments issued
25	Jammuand Kashmir	Ujh Multipurpose Project (89.50 MW)	Comments issued
26	Uttarakhand	Song Dam Drinking Water Project, Dehradun (Water supply Project)	Under Examination

Annexure- 5.4

Status of Multipurpose Projects under Appraisal in D&R Wing of CWC

Sl.No.	Name of the State	Project's Name	Status
1	Karnataka	Mekedatu Balancing Reservoir cum Drinking Water Project (PFR)	Comments Issued
2	Karnataka	Upper Krishna Project, Stage-III	Comments Issued (Returned)
3	Madhya Pradesh	Comprehensive Report of Ken Betwa Link Project	**Cleared**
4	Andra Pradesh – Tamilnadu	Godavari(Inchampalli) – Cauvery (Grand Anicut) Link Project	Comments issued
5	Telangana	Sita Rama Lift IrrrigationProject&Sitamma Sagar Multi-Purpose Project	Under Examination
6	Himachal radesh	Kishau Multi- Purpose Project	Comments issued
7	Arunachal Pradesh	Upper Siang Multi-Purpose Project	Comments issued
8	Jammu and Kashmir	Ujh Multipurpose Project (89.50 MW)	Comments issued
9	Arunachal Pradesh	Dibang Multi-purpose Project (2880 MW),	Under Examination

Annexure-5.5

Status of Projects received for Hydrological Studies under D&R Wing of CWC

Sl No	Name of State	Project's Name	Status
1	Madhya Pradesh	Karam Dam Medium Irrigation Project	**Cleared**
2	Madhya Pradesh	Revival of Swarna Rekha River in Gwalior City	**Cleared**
3	Madhya Pradesh	Revised Pre-DPR chapters of MP 30 Gandhi Sagar Pumped Storage Project (1920 MW)	**Cleared**
4	Rajasthan	11 Projects under Modified Parbati Kalisindh Chambal (PKC) link project	**Cleared**
5	Rajasthan	Revised PFR of Diversion of Surplus Water of Sabarmati Basin for filling of Jawai Dam, Rajasthan	comments issued
6	Madhya Pradesh	Tekwa-2 PSP and Indirasagar-Omkareshwar PSP under Survey and Investigation and preparation of DPR	**Cleared**
7	Madhya Pradesh	7 projects in Upper Chambal Projects under Modified Parbati Kalisindh Chambal link Project	**Cleared**
8	Rajasthan	Sirohi Pump Storage project (1200 MW)	**Cleared**
9	Uttar Pradesh	Design Flood Review of Bariarpur Weir	**Cleared**
10	Uttar Pradesh	Design flood study of Parichha Weir	**Cleared**
11	Uttar Pradesh	Hydrological studies of Pailani and Banda Barrages on Ken river	comments issued
12	Uttar Pradesh	DPR of Restoration of Ken Canal System under Ken-Betwa Link Project,	**Cleared**
13	Bihar	Flood Control and Drainage in Saran District of Bihar	**Cleared**
14	Bihar	BIHAR KOSI FLOOD RISK MITIGATION PROJECT (BKFRMP), Bihar	**Cleared**
15	Bihar	PFR (PPRID-12153) of "Bihar Integrated Water Resources Management Project	**Cleared**

		(BIWRMP)" for external funding, Bihar	
16	Haryana	Loharu Canal Project, Haryana	**Cleared**
17	Jammu & Kashmir	Kirthai-II, HEP, J&K	**Cleared**
18	PUNJAB	Rehabiltation/Relining of Ferozepur Feeder Canal	**Cleared**
19	PUNJAB	Updated Pre-Feasibility Report (PFR) regarding the 2nd Ravi Beas Link, Punjab	**Cleared**
20	PUNJAB	Updated Pre-Feasibility Report (PFR) regarding the 2nd Ravi Beas Link, Punjab	**Cleared**
21	Jharkhand	DPR Lugu Pahar Pump Storage Project, Jharkhand	**Cleared**
22	Jharkhand	DPR of Balpahari Multipurpose Project (Scaled Down)	Under Examination
23	Jharkhand	Design Flood Review of Ranjit Sagar Dam	comments issued
24	Rajasthan	Gang Canal Automation	**Cleared**
25	Uttarakhand	KishauMulti Purpose Project, Uttarakhand	**Cleared**
26	Uttarakhand	Joshiyara barrage of ManeriBhali Stage-II HEP (4X76 MW) under DRIP, Phase-II	**Cleared**
27	Uttarakhand	Consultancy for the study for reassessing the design flood for TapovanVishnugad HEP, Uttarakhand.	**Cleared**
28	Uttarakhand	Bokang Bailing HEP	**Cleared**
29	Uttarakhand	Arakot-Tiuni HEP, Uttarakhand	**Cleared**
30	Himachal Pradesh	Detailed Project Report(DPR) Proposal for Project Name Providing flood protection work on River Beas from Palchan to Aut RD 0/0 to 70/200KM (Left and Right bank) in Distt. Kullu (HP)	comments issued

31	Haryana	Hathnikund Dam on River Yamuna, Haryana	Under Examination
32	Uttar Pradesh	Kandhaura Pumped Storage Project (1680 MW)	**Cleared**
33	Uttar Pradesh	UP-01 (3660 MW) Pumped Storage Project	comments issued
34	Uttar Pradesh	Feasibility Report for Musakhand PSP (600 MW), Uttar Pradesh	**Cleared**
35	Uttarakhand	Review of hydrological studies of lakhwarMPP,Uttarakand	Under Examination
36	West Bengal	Sunderbans upper delta climate Resilient development project	Under Examination
37	Arunachal Pradesh	Construction of flood management border area programme to protect various village of Koyu Kora Circle at Singen,NgeleSichi,Hingen,HippoSijju, Tene,Dobu, Ngopi,Saku and Doge River	**Cleared**
38	Arunachal Pradesh	Hydrology Integrated flood and river erosion management project in Buri Dehing Basin	**Cleared**
39	Arunachal Pradesh	Flood management work in Sigen river to protect Gensi town and WRC field at Gensi	**Cleared**
40	Arunachal Pradesh	Nafra HEP	**Cleared**
41	Arunachal Pradesh	Anti erosion work along Onkhar Nallah to protect Bomba, Gyankhar, Paidhar, Maidung, Jaleng and Bumteng Villages in Tawang District (Onkhar River)	**Cleared**
42	Arunachal Pradesh	River training and flood management on the banks of Khud river at Kimin in Papumpare District	**Cleared**
43	Arunachal Pradesh	Naba Hyd Project	**Cleared**
44	Arunachal Pradesh	OjuHyd Project	**Cleared**
45	Arunachal Pradesh	Mebo Irrigation Project	**Cleared**

46	Arunachal Pradesh	Kurung HEP	**Cleared**
47	Arunachal Pradesh	Kamala HEP	**Cleared**
48	Arunachal Pradesh	Kameng HEP(600 MW)	**Cleared**
49	Arunachal Pradesh	Anti erosion work in Siang river to protect Yingkiong Township(Siang River)	comments issued
50	Arunachal Pradesh	Anti erosion work at Zemithang, BTK and Namtsering Villages in Border Area of Tawang District(Nyamjang Chu River)	comments issued
51	Arunachal Pradesh	Subansiri Upper HEP	**Cleared**
52	Arunachal Pradesh	Etalian	**Cleared**
53	Arunachal Pradesh	Kurung	Under Examination
54	Arunachal Pradesh	Flood Protection work in Noa Dehing basin in Noa Dehing and Jengthu	comments issued
55	Arunachal Pradesh	Nafra (120MW)	Under Examination
56	Arunachal Pradesh	Attunli 680(MW)	Under Examination
57	Arunachal Pradesh	Niare	Under Examination
58	Assam	Anti-Erosion measures at different reaches of river Longa and Garuphella	**Cleared**
59	Assam	Climate Resilient Brahmaputra Integrated Flood and River bank Erosion Risk Management Project in Assam-Morigaon,Nagaon,Tezpur Sub project	**Cleared**
60	Assam	Climate Resilient Brahmaputra Integrated Flood and Riverbank Erosion Risk Management Project In Assam-BarpetaGoalpara Dhubri sub project	**Cleared**
61	Assam	Climate Resilient Brahmaputra Integrated Flood and Riverbank Erosion Risk Management Project In Assam- Dibrugarh and Tinsukia sub project (Zone-A)	**Cleared**

62	Assam	Climate Resilient Brahmaputra Integrated Flood and River bank Erosion Risk Management Project in Assam-Guwahati West ,P.G.P Sub project(Zone-C)	**Cleared**
63	Assam	Protection of Indo-Bangladesh border area from Harinagar B.S.F.B.O.P Camp to Bhanga B.S.F.B.O.P. Camp from erosion of river Kushiyara at different reaches	**Cleared**
64	Assam	Protection of Indo-Bangladesh border area from HoritikarB.S.F.Camp to Lafashail against erosion of river Kushiyara at its L/B at different reaches	**Cleared**
65	Assam	Protection of Majuli Island from Flood and Erosion of river Brahmaputra (Phase V)	**Cleared**
66	Assam	Anti-Erosion measures at different reaches of river Longa and Garuphella	**Cleared**
67	Meghalaya	Mawblei H. E. Project (2*70 MW)(DF)	**Cleared**
68	Meghalaya	Umngot HEP	Under Examination
69	Meghalaya	Damring Irrigation Project	Under Examination
70	Mizoram	Tuichang HEP	**Cleared**
71	Mizoram	Tlawng River near Intake Structure of Aizawl Water Supply Scheme Phase-II	comments issued
72	Mizoram	Mat Sekawi HEP	Under Examination
73	Mizoram	Tlwang HEP	**Cleared**
74	Nagaland	DPR FOR ANTI EROSION WORKS ON CHATHE RIVER FROM PATKAI 4TH MILE BRIDGE - DISTRICT CHUMOUKEDIMA NAGALAND	Under Examination
75	Sikkim	Chuzachen	**Cleared**
76	Sikkim	Baccha, Rimbikhola, RingyangKhola Project	Under Examination

77	Sikkim	Glof Study OF Teesta-III HEP	**Cleared**
78	West Bengal	Teesta Intermediate HEP (90 MW)	Under Examination
79	Assam	R/S to B/Dyke from Bahari to Baghbar including protection of Bahari and its adjoining areas along with channelization of river Brahmaputra and reclamation of eroded land within the reach(Review)	Under Examination
80	Andhra Pradesh	FSR of Chittamvasala PSP	**Cleared**
81	Andhra Pradesh	Feasibility report for 1000 MW Paidipalem North PSP	**Cleared**
82	Andhra Pradesh	Feasibility report for 1200 MW Paidipalem East PSP	**Cleared**
83	Andhra Pradesh	FSR of Veeraballi PSP	**Cleared**
84	Andhra Pradesh	FSR of Kamalapadu PSP	comments issued
85	Andhra Pradesh	Yaganti PSP 1000 MW	comments issued
86	Andhra Pradesh	Aravetipalli PSP (1320 MW)	Under Examination
87	Andhra Pradesh	FSR of Vampalli PSP	Under Examination
88	Andhra Pradesh	FSR of Raiwada PSP	Under Examination
89	Andhra Pradesh	Rayavaram PSP (1500MW)	Under Examination
90	Goa	Anjunem Irrigation Project	**Cleared**
91	Karnataka	Saundati PSP (1600MW)	**Cleared**
92	Karnataka	Narihalla PSP (300 MW)	**Cleared**
93	Karnataka	Re-assessment of design flood of Lakya Dam tailing reservoir	**Cleared**
94	Maharashtra	Nira Deoghar Project	**Cleared**
95	Maharashtra	Pane Pumped Storage Project (1500 MW)	**Cleared**
96	Maharashtra	FSR of Tarali Pumped Storage Project (1500 MW)	**Cleared**
97	Maharashtra	FSR of Patgaon Pumped Storage Project	**Cleared**

98	Maharashtra	Preliminary Project Report (PPRID 12090) of "Maharashtra Resilience Development Program (MRDP)"	**Cleared**
99	Maharashtra	Detailed Project Report of Warasagoan Pumped Storage Hydro-electric Project	comments issued
100	Maharashtra	FSR of Malshej Ghat Pumped Storage Project	comments issued
101	Maharashtra	Bhivpuri PSP (1000 MW)	Under Examination
102	Maharashtra	Shirawta Pumped Storage Project (1800MW)	comments issued
103	Maharashtra	WarsagaonmWarangi PSP (1500 MW)	**Cleared**
104	Maharashtra	Savitri PSP	Under Examination
105	Maharashtra	Kalu PSP	Under Examination
106	Maharashtra	Kengadi PSP (600MW)	Under Examination
107	Maharashtra	Virdi (Large MI Project)	**Cleared**
108	Odisha	Balimela PSP	**Cleared**
109	Odisha	Khairibandhan Medium Irrigation Project	**Cleared**
110	Odisha	Upper Indravati PSP	**Cleared**
111	Odisha	Upper Kolab Pumped Storage Project	comments issued
112	Odisha	Govindapalli	comments issued
113	Tamil Nadu	Sillahalla PSHEP-Stage-I (1000MW)	**Cleared**
114	Tamil Nadu	Climate adaptation in Vennar Sub-basin in Cauvery Delta project-2	comments issued
115	Telengana	Sita Rama Lift Irrigation Project-Consolidated DPR of SRLIP and SSMPP	**Cleared**
116	Telengana	Design Flood Review Kinnersani Project	**Cleared**
117	Telengana	DR.B.R.Ambedkar Wardha Project	comments issued
118	Uttar Pradesh	Panchnad Barrage, UP	**Cleared**

119	Uttar Pradesh	Design flood Review study of Erach dam	**Cleared**
120	Andhra pradesh	Pedakota PSP	Under Examination
121	Bihar	Urban Hydrology 2D model for city of Patna	Under Examination
122	Delhi	Urban Hydrology 2D model for city of Delhi	Under Examination
123	Karnataka	PPR of Karnataka Multisector Disaster and Climate Resilience Project	comments issued

Annexure- 5.6

Technical evaluation of Site Specific Seismic reports carried out during 2023-24

1. Bhadbhut Project, Gujarat
2. Ukai Project, Gujarat
3. Kirthai-II HEP, Jammu & Kashmir
4. Panam Project, Gujarat
5. Hir Project, Gujarat
6. Dharoi Project, Gujarat
7. Mach Project, Gujarat
8. Saundatti PSP Project, Karnataka
9. Shetrunji Dam, Gujarat
10. Simsang Dam Project, Meghalaya
11. Sharavathy PSP, Karnataka
12. Sarasvati River Rejuvenation and its Heritage development project, Haryana
13. Arun-4 Hydro Electric Project, Nepal
14. Vijayanagar PSP, Karnatka
15. Conventional Barrage Project Rundh-Bhatha Village, Gujarat
16. ReoliDugli HEP, Himachal Pradesh
17. Shahpur PSP, Rajasthan
18. Bhavali PSP (1500 MW), Maharashtra
19. Somasila PSP, Andhra Pradesh
20. Sardar Sarovar Dam, Gujarat
21. Mawblei Project, Meghalaya
22. Bhandardara Dam, Maharashtra
23. Tarali PSP, Maharashtra
24. Singnamala PSP, Andhra Pradesh
25. Bhivpuri PSP, Maharashtra

Annexure-5.7

Technical Examination of Projects carried out during 2023-24 for Seismic and Foundation Aspects

Sl.	Name of the Project	Date of Observation/ Received	Status
1.	Upper Sileru PSP (1350 MW), Andhra Pradesh	13.06.2023	DPR Cleared
2.	MP 30 Gandhi Sagar PSP (1440MW), Madhya Pradesh	05.10.2023	DPR Cleared
3.	Gandikota PSP(4x250 MW), Andhra Pradesh	15.03.2024	Compliance Received
4.	Chitravathi PSP(2x250 MW), Andhra Pradesh	21.08.2023	Compliance Received
5.	REOLI DUGLI HEP, Himachal Pradesh	19.06.2023	Observations issued
6.	Paidipalem North PSP (1000 MW), Andhra Pradesh	05.04.2023	Observations issued
7.	Idukki Extension Scheme, Kerala	10.07.2023	Observations issued
8.	Teesta Intermediate HEP (90 MW), West Bengal	24.05.2023	Observations issued
9.	Singanamala PSP (800 MW), Andhra Pradesh	21.06.2023	Observations issued
10.	Shahpur PSP (1800 MW), Rajasthan	25.05.2023	Observations issued
11.	Pane PSP (1500 MW), Maharashtra	30.10.2023	Compliance Received
12.	Sirohi PSP (1200 MW), Rajasthan	25.05.2023	Observations issued
13.	Narihalla PSP (300 MW), Karnataka	06.09.2023	Compliance Received
14.	Veeraballi PSP (1800 MW), Andhra Pradesh	18.03.2024	Observations issued
15.	Gujjili PSP (1400 MW), Andhra Pradesh	07.08.2023	Compliance Received
16.	Pinnapuram PSP, Andhra Pradesh	18.09.2023	DPR Cleared
17.	Vemapalli PSP (1500MW), Andhra Pradesh	07.08.2023	Compliance Received
18.	Tarali PSP (1500 MW), Maharashtra	28.09.2023	Compliance Received
19.	UP-01 OCPSP (3660 MW), Uttar Pradesh	18.01.2024	Observations issued
20.	Raiwada PSP (800 MW), Andhra Pradesh	03.08.2023	Observations issued
21.	Patgaon PSP (2100 MW), Maharashtra	21.06.2023	Observations issued
22.	Malshej Ghat Bhorande PSP (1440 MW), Maharashtra	21.07.2023	Compliance Received
23.	Yaganti PSP (1000 MW), Andhra Pradesh	16.08.2023	Observations issued
24.	EMRA-II HEP (315 MW) , Arunachal Pradesh	20.09.2023	Observations issued
25.	WarasgaonWarangi PSP (1500 MW), Maharashtra	28.11.2023	Compliance Received

Annexure-5.8

Status of Technical Examination of DPRs of H E /Irrigation Projects in Instrumentation Directorate for FY 23-24

Sl. No.	Name of the Project state wise	Date of receipt of DPR	Date of issue of LAST observation / Comments	Date of receipt of LAST compliance by Project Authority	Date of clearance	"Status and issues affecting their clearance/ reason for delay in clearance"
State- Andhra Pradesh						
1	Upper Sileru PSP (9x150=1350 MW)	23.08.2022	12.05.2023	12.05.2023	16.05.2023	DPR has been cleared in respect of instrumentation aspect on 16.05.2023.
2	Pinnapuram (MoC Proposal) PSP (1680 MW)	05.04.2023	12.10.2023	14.10.2023	28.02.2024	DPR has been cleared in respect of instrumentation aspect on 28.02.2024.
3	Chitravathi PSP (500 MW)	21.08.2023	21.03.2024			Last Comments issued on 21.03.2024.
4	Aravetipalli PSP (1320 MW)	21.08.2023	04.10.2023			Last Comments issued on 04.10.2023.
5	Gandikota PSP (4x250 MW)	29.08.2023	05.03.2024	14.03.2024		Under Examination
6	Yaganti Pump Strage Project (1000 MW)	09.08.2023	04.10.2023			Last Comments issued on 04.10.2023.
7	Raiwada PSP (900 MW)	18.11.2023	06.02.2024	15.02.2024		Under Examination
8	Kamalapadu PSP (900 MW)	08.01.2024	06.02.2024			Last Comments issued on 06.02.2024.
9	Vempalli PSP (1500 MW)	08.01.2024	06.02.2024	15.02.2024		Under Examination
10	Rayavaram Pumped Storage Project (1500 MW)	31.01.2024	13.03.2024	-	-	Last Comments issued on 13.02.2024.
11	Singanamala PSP (800 MW)	03.02.2024	06.02.2024	15.02.2024		Under Examination

12	Pedakota Pumped Storage Project 1800 MW	06.03.2024				Under Examination
State- Arunachal Pradesh						
13	Anjaw HEP (270 MW)	02.08.2023	28.02.2024			Last Comments issued on 28.02.2024.
14	Naba Hydroelectric Project (1105 MW)	13.09.2023	04.10.2023			Last Comments issued on 04.10.2023.
15	Kamala Hydroelectric project (1720 MW)	14.03.2024	15.03.2024	15.03.2024		Under Examination
16	Oju Hydroelectric project (2220 MW)	02.02.2024	05.03.2024			Last Comments issued on 05.03.2024.
State- Gujarat						
17	Surat Municipal Corporation (SMC) Barrage Project	08.02.2024	20.02.2024			Estimate for Technical & Design consultancy charges sent on dated 20.02.2024
State- Himachal Pradesh						
18	Renukaji Dam Project	30.10.2023	22.02.2024			Estimate for Technical & Design consultancy charges sent on dated 22.02.2024
19	Uhl-III H.E Project (100 MW)	11.02.2022	23.06.2023			Last Comments issued on 23.06.2023.
State- Jharkhand						
20	DVC-Lugupahar PSP (approx. 1500 MW)	21.08.2023	06.12.2023			Last Comments issued on 06.12.2023.
State- Karnataka						
21	Saundatti PSP (1600 MW)	06.07.2023	07.03.2024			Last Comments issued on 07.03.2024.
22	Sharavathy PSP (8X250 MW) (8X250 MW)	25.08.2023	01.03.2024	05.03.2024	19.03.2024	Pre-DPR has been cleared in respect of instrumentation dated 19.03.2024.
23	Narihalla PSP (300 MW)	09.08.2023	04.10.2023			Last Comments issued on 04.10.2023.

State-	**Madhya Pradesh**					
24	MP 30 Gandhi Sagar PSP (1920MW),	20.06.2023	21.03.2024			Last Comments issued on 21.03.2024.
25	Daudhan Dam	25.07.2023	04.08.2023			(Construction Stage)Last Comments issued by Email on dated 04.08.2023.
26	Panari Pump Storage project (1800 MW)	28.08.2023	04.10.2023			Last Comments issued on 04.10.2023.
27	PKC Link Project & ERCP Link Project	01.11.2023	15.03.2024			Last Comments issued on 15.03.2024.
State-	**Maharashtra**					
28	WarasgaonWarangi PSP (1500MW)	04.08.2023	22.11.2023			Last Comments issued on 22.11.2023.
29	Shirwata PSP (1800 MW)	28.08.2023	04.10.2023			Last Comments issued on 04.10.2023.
30	Bhivpuri PSP (1000 MW)	28.08.2023	21.03.2024			Last Comments issued on 21.03.2024.
31	Bhavali PSP (1500 MW)	28.11.2023	22.02.2024	02.03.2024		Under Examination
32	Pane Pump Storage project (1000 MW)	16.01.2024	14.03.2024			Last Comments issued on 14.03.2024.
33	Koyna Nivakane PSP (2700 MW)	18.01.2024	28.02.2024			Last Comments issued on 28.02.2024.
34	Tarali Pump Storage project (1500 MW)	25.01.2024	15.03.2024			Last Comments issued on 15.03.2024.
35	Nayagaon OCPSP (2000 MW)	06.02.2024	14.03.2024			Last Comments issued on 14.03.2024.
State-	**Meghalaya**					
36	Myntdu Leshka Stage-II HE Project (210 MW)	24.08.2023			02.11.2023	DPR has been cleared in respect of instrumentation aspect on 02.11.2023.
37	Kynshi-PSP-ROR-Solar Integrated Project Stage IA (1172 MW)	06.10.2023	15.03.2024			Last Comments issued on 15.03.2024.
38	Umgot H E Project (3*70 = 210 MW)	01.02.2024	22.02.2024			Last Comments issued on 22.02.2024.
39	Selim H E Project (2*29 = 58 MW)	01.02.2024	22.02.2024			Last Comments issued on 22.02.2024.
State-	**Odisha**					

40	Upper Indravati PSP, (600 MW)	19.07.2023	31.08.2023	26.09.2023	20.10.2023	DPR has been cleared in respect of instrumentation aspect on 20.10.2023.
41	Upper Indravati PSP, (600 MW)	12.03.2024	21.03.2024			Estimate for Technical & Design consultancy charges sent on dated 21.03.2024
42	Govindapali Irrigation Project	16.10.2023	11.12.2023			Last Comments issued on 11.12.2023.
43	Kharag HEP (63MW)	12.03.2024	21.03.2024			Estimate for Technical & Design consultancy charges sent on dated 21.03.2024
State-	**Rajasthan**					
44	Bastawa Mata D am Projects, Rajasthan	05.11.2023	23.01.2024			(Construction Stage) Last Comments issued by Email on dated 23.01.2024.
45	Sirohi Pumped Storage Project (1200 MW)	16.01.2024	15.03.2024			Last Comments issued on 15.03.2024.
46	Shahpur Pumped Storage Project (1800 MW)	02.02.2024	21.03.2024			Last Comments issued on 21.03.2024.
State-	**Tamil Nadu**					
47	Sillahalla St-I PSP (1000 MW)	20.09.2023	27.09.2023			Last Comments issued on 27.09.2023.
State-	**Uttarakhand**					
48	Lakhwar MPP	13.12.2023	29.01.2024			(Construction Stage) Last Comments issued on dated 29.01.2024
State-	**Uttar Pradesh**					
49	Musakhand PSHP (600 MW)	29.11.2023	11.03.2024			Last Comments issued on 11.03.2024.
50	Kandhaura PSP (1680 MW)	16.01.2024	11.03.2024			Last Comments issued on 11.03.2024.
51	UP01 Pump Storage project (3360 MW	25.01.2024	12.03.2024			Last Comments issued on 12.03.2024.
State-	**West Bengal**					
52	Teesta Intermediate HEP (90 MW)	24.02.2024	26.02.2024			Last Comments issued on 26.02.2024.
State-	**Jammu & Kashmir**					

53	Dulhasti HE Project, Stage-II (260 MW)	25.07.2023	25.09.2023	10.10.2023	25.10.2023	Pre-DPR has been cleared in respect of instrumentation aspect on 25.10.2023.
54	Ujh Multipurpose Project (89.50 MW)	11.03.2024	21.03.2024			Last Comments issued on 21.03.2024.
Country- Nepal						
55	West Seti Hydroelectric Project (750MW)	31.01.2024	12.03.2024			Last Comments issued on 12.03.2024.

Annexure-5.9

Draft standards/amendments to IS Codes approved by Chairman, CWC during 2023-24 for adoption and printing

Sl.	Code	Subject	Date of approval
1	WRD/10/16243	Measurement and Control of Sediments in natural Lakes Guidelines (IS 19027: 2023)	18.10.2023
2	WRD/01/20086	Hydrometry - Measurement of Liquid Flow in Open Channels -Velocity area methods using point velocity measurements (IS 1192: 2023)	09.11.2023
3	WRD/21/15620	IS 10386 (Part6) - Safety Code for Construction Operation and Maintenance of River Valley Projects: Part 6 Construction	01.12.2023
4	WRD/21/16993	IS 10386 (Part8) - Safety Code for Construction Operation and Maintenance of River Valley Projects: Part 8 Open Excavation	01.12.2023
5	WRD/09/17616	IS 6934 - Hydraulic Design of Ogee Overflow and Orifice Spillways- Recommendations (Third Revision)	01.12.2023
6	WRD/23/16701	Estimating Unit Rate of Concrete Used in Mechanized Construction of River Valley Projects - Proforma IS 4851:2023	20.01.2024
7	WRD/23/16703	Estimating Unit Rate of Random Rubble Masonry Used in Construction of River Valley Projects – Proforma IS 4852:2023	20.01.2024
8	WRD/23/16704	Analysis of Unit Rate of Excavation of Tunnels by Cyclic Drilling and Blasting – Proforma IS 10061:2023	20.01.2024
9	WRD/23/16705	Analysis of Unit Rate of Earthwork Used in Construction of River Valley Projects – Proforma IS 10160:2023	20.01.2024
10	WRD/23/16708	Analysis of Unit Rate of Quarrying Rock by Mechanical Means – Proforma IS 10062:2023	20.01.2024
11	WRD/06/20273	Glossary of terms Relating to River Valley Projects Part 17 Water Requirement of Crops (First Revision)	20.01.2024
12	WRD/01/20344	Measurement of fluid flow by means of pressure differential devices inserted in circular cross-section conduits running full-	07.02.2024

		Part 3: Nozzles and Venturi nozzles	
13	WRD/06/19372	Proforma for Reporting Progress During Construction for River Valley Projects part 2 Hydel Works – (First Revision) IS 13218 (Part 2)	20.02.2024
14	WRD/06/19440	Preparation of Project Report for River Valley Projects – Guide (Second Revision) IS 4186	20.02.2024

Annexure-7.1

List of the Irrigation / Multipurpose Projects Accepted by the Advisory Committee of DoWR, RD&GR during 2023-24

Sl. No.	Name of the Project	State	Type of the project	Estimated Cost (in Crore)	Intended Benefits
1.	Extension Renovation and Modernisation of Sanjay Sarovar Project District Seoni and Balaghat	Madhya Pradesh	Irrigation (Major)	Rs. 332.54 Cr. (at March, 2023 PL)	CCA- 81,829 Ha.
2.	3rd RCE of Shahpurkandi Dam Project	Punjab and J&K	Multipurpose	Rs 3394.49 Cr. (at Oct, 2022 PL)	CCA- 37,173 Ha.
3.	Kaddem-Gudem Lift Irrigation Scheme	Telangana	Irrigation (Major)	Rs. 138.45 Cr. (at March, 2015 PL)	CCA- 12,141 Ha.
4.	Modikuntavagu Irrigation Project	Telangana	Irrigation (Medium)	Rs. 500.2553 Cr. (at 2021-22 PL)	CCA- 5,500 Ha.
5.	RCE of Bhaunrat Dam Project	Uttar Pradesh	Irrigation (Medium)	Rs. 1252.12 Cr. (at March, 2022 PL)	CCA- 9,850 Ha.
6.	NiraDeoghar Irrigation Project	Maharashtra	Irrigation (Major)	Rs. 3591.46 Cr. (at June, 2022 PL)	CCA- 62,706 Ha.
7.	2nd Revised Cost Estimate of Kanhar Irrigation Project	Uttar Pradesh	Irrigation (Major)	Rs. 3,459.80 Cr. (at 2022 PL)	CCA- 26,075 Ha.
8.	Khairibhandan Barrage Project	Odisha	Irrigation (Medium)	Rs. 314.55 Cr. (at 2023 PL)	CCA- 6,950 Ha.
9.	Renovation & Modernization of the Main Gang Canal System, Stage-I (F-Branch, Z-Distributary, GG- Distributary & BB- Distributary), Rajasthan	Rajasthan	Irrigation (Major)	Rs. 695.16 Cr (at 2022-23 PL)	CCA- 109650 Ha
10.	1st Revised Cost Estimate of Amreng Irrigation Project (Medium) of KarbiAnglong Autonomous Council (KAAC)	Assam	Irrigation (Medium)	Rs 704.29 Cr (at 2023-24 PL)	CCA- 6800 Ha.
11.	1st Revised Cost Estimate of Kosi-Mechi Intra State Link Project of Bihar, Govt. of Bihar (Estimated Cost , BC Ratio. 2.23:1)	Bihar	Irrigation (Major)	Rs 6282.32 Cr (at 2022-23 PL)	CCA- 2.15 Lakh Ha

Annexure - 7.2

List of the Flood Control Schemes Accepted by the Advisory Committee of DoWR,RD&GR during 2023-24

Sl. No.	Name of the Project	State	Type of the project	Estimated Cost (in Crore)	Intended Benefits
1.	Anti-erosion work over pachin river from DPS bridgepointRechi to Pagatara under Itanagar	Arunachal Pradesh	Flood Control	Rs. 88.36 Cr. (at Nov, 2022 PL)	Area benefitted-Approx. 450 Ha.
2.	Erosion control and Flood management over Sibokorong river under Pasighat sub-division	Arunachal Pradesh	Flood Control	Rs 35.50 Cr. (at Dec, 2022 PL)	Area benefitted-Approx. 120 Ha.
3.	Anti-erosion work over Senki river at Chandranagar, Itanagar	Arunachal Pradesh	Flood Control	Rs 73.21 Cr. (at Nov, 2022 PL)	Area benefitted-Approx. 68 Ha.
4.	Raising, Strengthening and Puccikaran of Left KamlaBalan embankment & Right KamlaBalan embankment Phase-I (Pipraghat Bridge to Thangha bridge) LKBE between Km27.10 to km 66.30 & RKBE between km23.20 to km 64.00.	Bihar	Flood Control	Rs 325.1232 Cr. (at 2019 PL)	Area benefitted-48,000 Ha.
5.	Flood protection work along right bank of Kali river at Army Camp-2 battalion campus Galati in Block Dharchula, District Pithoragarh, Uttarakhand	Uttarakhand	Flood Control	Rs. 40.601 Cr. (at Oct, 2022 PL)	Area benefitted-14.0 Ha.
6.	"Raising, strengthening and Puccikaran of left and right KamlaBalan embankment (Phase-II) from km 66.300 (FatkiKutti) to km 92.500 (Punach) of L.K.B.E. and from km 64.00 (Thengha) to km 94.00 (Palwa) of R.K.B.E.	Bihar	Flood Control	Rs 297.07 Cr. (at 2022 PL)	Area benefitted-72,300 Ha.

7.	Reconstruction and improvement of the existing flood management infrastructures in the district of Uttar Dinajpur, DakshinDinajpur&Malda	West Bengal	Flood Control	Rs. 496.70 Cr. (at 2023 PL)	Area benefitted-5,86,146 Ha.
8.	Anti-erosion work on left edge of Ganga river near Gandhitola in Manihari Block Katihar District to protect KatiharManihari Railway line and Karikoshi Embankment	Bihar	Flood Control	Rs. 45.1930 Cr. (at 2022 PL)	Area benefitted-50,000 Ha.
9.	Construction of Sikrahana Right Embankment (from km 0.00 to km 56.22)	Bihar	Flood Control	Rs. 239.6268 Cr. (at 2022 PL)	Area benefitted-69,606 Ha.
10.	Anti-erosion work at Dibang river basin under Dambuk Sub-division, Lower Dibang Valley District	Arunachal Pradesh	Flood Control	Rs. 144.64 Cr. (at January, 2023 PL)	Area benefitted-Approx. 2,645 Ha.
11.	Climate Resilient Brahmaputra Integrated Flood and Riverbank Erosion Risk Management Project in Assam- Dibrugarh and Tinsukia Sub Project (Zone-A)	Assam	Flood Control	Rs. 778.7849 Cr. (at March, 2023 PL)	Area benefitted-63,500 Ha.
12.	Climate Resilient Brahmaputra Integrated Flood and Riverbank Erosion Risk Management Project in Assam- Morigaon, Nagaon, Tezpur Sub Project (Zone-B)	Assam	Flood Control	Rs. 676.5080 Cr. (at March, 2023 PL)	Area benefitted-46,876.25 Ha.
13.	Climate Resilient Brahmaputra Integrated Flood and Riverbank Erosion Risk Management Project in Assam- Guwahati West, P.G.P Sub Project (Zone-C)	Assam	Flood Control	Rs. 269.5371 Cr. (at March, 2023 PL)	Area benefitted-75,558 Ha.
14.	Climate Resilient Brahmaputra Integrated Flood and Riverbank Erosion Risk Management Project Dhubri Sub Project	Assam	Flood Control	Rs. 542.4982 Cr. (at March, 2023 PL)	Area benefitted-Approx. 24,920 Ha.

	(Zone-D)				
15.	Construction of New Embankment from Hasanpur-Baniya to Saguni in length of 8.330 km with protection work.	Bihar	Flood Control	Rs. 59.7604 Cr (at 2022 PL)	Area benefitted-Approx. 2500 Ha
16.	BagmatiBudhiGandak river link channel (Construction of BelwaMeenapur link channel).	Bihar	Flood Control	Rs. 130.56 Cr (at 2022 PL)	Area benefitted-Approx. 93000 Ha
17.	Construction Of Anti-Erosion And Flood Management Work Over Pappu River At Pappu Valley	Arunachal Pradesh	Flood Control	Rs. 118.06 Cr (at Jan 2023 PL)	Area benefitted-Approx. 1607 Ha
18.	Anti Erosion Work Over Khud River at Kimin in Papumpare District	Arunachal Pradesh	Flood Control	Rs. 41.34 Cr (at Sep 2023 PL)	Area benefitted-Approx. 48 Ha

Annexure - 7.3

The list of H.E Project accepted by TEC during 2023-24

Sl. No.	Name of the Project	State / Country	Installed Capacity (MW)
1.	Upper Sileru PSP	Andhra Pradesh	1350
Total			1350

Annexure - 7.4

Present Status of Projects declared as National Projects

Sl. No.	Name of the Project	1) Irrigation (Ha) 2) Power (MW) 3)Storage (MAF)	Year-wise Central Assistance released under Scheme of National Project (Rs in Crores)	Status
1.	Gosikhurd, Maharashtra	1) 2.50 lakh 2) 26.5MW 3) 0.93 MAF (1147.14 MCM-Gross)	2008-09= 450.00 2009-10= 720.00 2010-11= 1412.94 2012-13= 405.00 2017-18= 166.59 2018-19=195.81 2019-20=50.34 2020-21=135.244 2021-22=146.548 2022-23=101.57 **Total= 3784.0445**	Project is under execution.
2.	Shahpurkandi, Punjab	1) 0.37 lakh 2) 206MW 3) 0.012MAF 120.71 MCM (Gross)	2009-10= 10.80 2010-11=15.236 2018-19=3.705 2019-20=56.295 2020-21=147.466 2021-22 = 49.1438 2022-23=33.76 **Total= 316.4058**	Project is under execution..
3.	Teesta Barrage, West Bengal	1) 9.23 lakh (5.27 Lakh-NP Component) 2) 1000 MW 3) Barrage	2010-11= 81.00 2011-12= 97.20 **Total= 178.20**	Project is at standstill since 2014-15 due to land acquisition issues.
4.	Saryu Nahar Pariyojana, Uttar Pradesh	1) 14.04(NP comp. 4.73) 2) - 3) Barrage	2012-13= 67.98 2013-14= 380.75 2014-15= 210.855 2015-16= 500.00 2016-17= 62.00 2018-19=305.00 2019-20=358.22 2020-21=358.30 2022-23=14.512 **Total = 2257.612**	Project is under execution. The project was inaugurated by the Hon'ble Prime Minister Shri Narendra Modi on 11th December, 2021.
5.	Polavaram Irrigation Project, Andhra Pradesh	1) 4.36 lakh ha 2) 960 MW 3) 1.73 MAF 4) 23.44 TMC of water to Vizag city for drinking and Industrial Purpose and Diversion of 80 TMC to Krishna.	2014-15= 250.00 2015-16= 600.00 2016-17= 2514.16 2017-18= 2000.00 2018-19=1400.00 2019-20=1850.00 2020-21=2234.20 2021-22=1898.8	Project is under execution. Central Assistance of Rs. 562.47 Cr also provided under AIBP prior to declaration of National Project.

Sl. No.	Name of the Project	1) Irrigation (Ha) 2) Power (MW) 3)Storage (MAF)	Year-wise Central Assistance released under Scheme of National Project (Rs in Crores)	Status
			2022-23=1670.61 **Total= 14418.39**	
6.	Renukaji, HP	1) Drinking water 2) 40 MW 3) 498.33 MCM (Live)	2016-17=446.96 2021-22=1048.535 **Total= 1495.495**	Pre-construction activities are in progress. Revised cost finalised as 6946.99 Cr. at PL October, 2018. One–time special grant of Rs 446.96 Cr was provided as per order of Hon'ble Supreme Court. Subsequently, an amount of Rs. 10.61 Crore has been released further to Himachal Pradesh vide letter dated 11.08.2021 of DoWR,RD&GR to transfer it to Himachal Pradesh Power Corporation Limited (HPPCL) for depositing the same with the Hon'ble High Court Shimla towards land acquisition of Renuka Dam in the matter of Regular First Appeal RFA 161/2019 in compliance to Hon'ble High Court Order dated 30.07.2021. On Account Payment of Central Assistance under AIBP Capital Asset (PMKSY) in 2021-22 for Rs 1037.925 Cr were issued vide DoWR,RD&GR Letter dated 03.03.2022.
7.	Lakhwar Multipurpose Project, Uttarakhand	1) 0.338 2) 300MW 3) 587.84 MAF (Gross)/ 39.415 MCM(Drinking)/ 39.415 MCM (Industrial)	2022-23=38.58 **Total=38.58**	Pre-construction activities are in progress. RCE of the project amounting to Rs. 5747.17 at PL 07/2018 was accepted during

Sl. No.	Name of the Project	1) Irrigation (Ha) 2) Power (MW) 3)Storage (MAF)	Year-wise Central Assistance released under Scheme of National Project (Rs in Crores)	Status
				141stAdvisory Committee meeting held on 11.02.2019. Lakhwar MPP was accepted by Investment Clearance Committee of DoWR,RD&GR in its 16th meeting held on 02.11.2021 for Rs. 5747.17 Cr at PL July 2018. Funding of Lakhwar MPP has also been approved by Cabinet Committee on Economic Affair (CCEA) in its meeting held on 15.12. 2021.
8.	Ken Betwa, Link Project, Madhya Pradesh & Uttar Pradesh	1) 9.08 Lakh 2) 130 MW 3) 3495 MCM (Live)	2021-22=4639.46 2022-23=626.43 **Total=5265.89**	Project is under execution. Funding of Ken-Betwa Link Project has been approved **by** Cabinet Committee of Economic Affair (CCEA) in its meeting held on 08.12.2021. KBLP Phase- II have been accepted by Advisory Committee of DoWR,RD&GR in its 148th meeting held on 17.01.2022. Ken Betwa Link Project Authority (KBLPA) and steering committee constituted via Gazette notification dated 09.02.2022.
9.	Ujh Multipurpose Project, J&K	1) 0.91 lakh 2) 89.5 MW 3) 925 MCM (Gross)/ 20 MCM (Drinking)/	-	Estimated cost of Rs. 11907.77 Cr. (at December, 2019-PL) was accepted by Advisory

Sl. No.	Name of the Project	1) Irrigation (Ha) 2) Power (MW) 3)Storage (MAF)	Year-wise Central Assistance released under Scheme of National Project (Rs in Crores)	Status
		20 MCM (Industrial)		Committee of DoWR,RD&GR in its 148th Meeting of held on 17.01.2020.
10.	Kulsi Dam Project, Assam	1)0.395 lakh GIA 2) 55 MW 3) 525.64 MCM (Gross)	-	Under appraisal in CWC / CEA. The State is to decide ownership, funding of their part and enter into Memorandum of Agreement (MoA) with the State of Meghalaya.
11.	Noa-Dihing Dam Project, Arunachal Pradesh	1) 0.036 lakh. 2) 72MW 3) 322.00 MCM (Gross)	-	Under appraisal in CWC / CEA. The State is to decide funding of their part.
12.	Kishau, HP/ Uttarakhand & Himchal Pradesh	1) 0.97 Lakh 2) 600 MW 3)) 1824 MCM (Gross)/ 617 MCM (Drinking)	-	Revised DPR under preparation by Project Authority. Timeline of 24 months for preparation and clearance of DPR has been submitted by Kishau Corporation limited (KCL). Inception Report' in view of upgradation/revision of Kishau DPR has been submitted by KCL vide letter dated 18.04.2022.
13.	Bursar, J&K	1) 1.74 lakh (indirect) 2) 800 MW 3) 616.74 MCM	-	Under appraisal in CWC/CEA. Command Area is yet to be submitted by NHPC/Govt of J&K and Himachal Pradesh.
14.	Gyspa Project, HP	1) 0.50 lakh ha 2) 300 MW 3) 912.78 MCM (Live)	-	The work of DPR under preparation is held up due to agitation by local people.
15.	Upper Siang, Arunachal Pradesh	1) Indirect 2) 9750 MW 3) 1.44 MAF 4) Flood moderation	-	DPR under preparation

Sl. No.	Name of the Project	1) Irrigation (Ha) 2) Power (MW) 3)Storage (MAF)	Year-wise Central Assistance released under Scheme of National Project (Rs in Crores)	Status
16.	2nd Ravi Vyas Link, Punjab	Harness water flowing across border (about 715.42 MCM. in non-monsoon period)	-	Under PFR stage

Annexure - 8.1

State-Wise and Project-Wise List of Projects under AIBP - Target & Achievements of Monitoring Visits during 2023-24

Sl. No	State/Project Name	Major/ Medium/ ERM	Date of Visit	Remarks
	ANDHRA PRADESH			
1	Yerrakalva Res.	Med.	05/10/2023 & 10/02/2024	Ongoing
2	Tadipudi LIS	Maj.	(05-06)/10/2023 & 08/02/2024	Ongoing
3	Pushkara LIS	Maj.	20/06/2023 & 09/02/2024	Ongoing
4	Gundlakamma	Maj.	**i)** 20/06/2023 ii) 23/06/2023	Ongoing
5	Thotapally Barrage	Maj.	i) 10/11/2023 & ii) 28/02/2024	Ongoing
6	TarakaramathirthaSagaram	Med.	i) 12/10/2023 & ii) 27/02/2024	Ongoing
7	Musurumilli	Med.	i) (19-20)/06/2023 & ii) 09/02/2024	Ongoing
8	Maddigedda Res. Project	Med.	--	Completed
	TOTAL=08			
	ASSAM			
9	Dhansiri	Maj.		Completed
10	Champamati	Maj.		Completed
11	Borolia	Med.	i) 16/08/2023 & 25/01/2024	Ongoing
12	ERM of Sukla Irrigation Project	ERM	(i) 18/07/2023 (ii) 16/08/2023 (iii) 05/01/2024	Ongoing
	TOTAL=04			
	BIHAR			
13	Durgawati	Maj.	(22-23)/11/2023	Ongoing
14	Punpun	Maj.	07/02/2024	Ongoing
	TOTAL=02			
	CHHATTISGARH			
15	Kelo Project	Maj.	(16-18)/05/2023 & (23-25)/01/2024	Ongoing
16	Kharung	ERM	19/03/2024	Completed
17	Maniyari Tank (ERM)	Maj	18/03/2024	Completed

Sl. No	State/Project Name	Major/ Medium/ ERM	Date of Visit	Remarks
	TOTAL=03			
	GOA			
18	Tillari	Maj.		Completed
	TOTAL=01			
	GUJARAT			
19	Sardar Sarovar	Maj.	i) (27-28)/07/2023 ii) (20-22)/12/2023	Ongoing
	TOTAL=01			
	HIMACHAL PRADESH			
20	Nadun Medium Irrigation project	Med.	12.10.2023	Ongoing
	TOTAL=01			
	UT of JAMMU & KASHMIR			
21	Rajpora Lift	Med.	--	Completed
22	Tral Lift	Med.	--	Completed
23	Restoration & Mod. Of Main Ravi Canal	ERM	--	Completed
	TOTAL=03			
	UT of LADAKH			
24	PrakachikKhows Canal	Med.	01/11/2023	Ongoing
	TOTAL=01			
	JHARKHAND			
25	Subernarekha Multipurpose	Maj	(04-06)/12/2023	Ongoing
	TOTAL=01			
	KARNATAKA			
26	Karanja	Maj.		Completed
27	Bhima LIS	Maj.	--	Completed
28	Upper Tunga Irrigation Project	Major	i)(17-19)/07/2023 ii) (13-16)/02/2024	Ongoing
29	Sri Rameswar Irrigation	Major		Completed
30	NLBC System Project(New ERM)	ERM		Completed
	TOTAL=05			
	KERALA			
31	Muvattupuzha	Maj.		Ongoing
32	Karapuzha	Med.	15/11/2023	Ongoing

Sl. No	State/Project Name	Major/ Medium/ ERM	Date of Visit	Remarks
	TOTAL=02			
	MADHYA PRADESH			
33	Indira Sagar Unit II (Ph I &II)	Maj.	---	Completed
34	Indira Sagar Canal Ph. III	Maj.	---	Completed
35	Indira Sagar Unit IV	Maj.	---	Completed
36	Indira Sagar Unit V	Maj.	---	Completed
37	Bansagar Unit-II	Maj.	---	Completed
38	Sindh Phase II	Maj.		Completed
39	Mahi	Maj.	---	Completed
40	Bariarpur LBC	Maj.		Completed
41	Mahan	Maj.	---	Completed
42	Omkareshwar, Ph.-II	Maj.	---	Completed
43	Omkareshwar, Ph.-III	Maj.	---	Completed
44	Omkareshwar, Ph.-IV	Maj.	---	Completed
45	Bargi Diversion Ph– I	Maj.		Completed
46	Bargi Diversion Ph -II	Maj.	**i)** 09/06/2023 ii) 15/02/2024	Ongoing
47	Bargi Diversion Ph -III	Maj.	**i) 21/09/2023** **ii) 16/02/2024**	Ongoing
48	Bargi Diversion Ph-IV	Maj.	i) **22/09/2023** ii) **17/02/2024**	Ongoing
49	PenchDiv-I	Maj.	---	Ongoing
50	Sagar(Sagad)	Med.	---	Completed
51	Singhpur	Med.		Completed
52	Sanjay Sagar (Bah)	Med.	---	Completed
53	Mahuar	Med.		Completed
	TOTAL=14 (including 21 phases)			
	MAHARASHTRA			
54	Gosikhurd [NP]	Maj.	(10-11)/11/2023	Ongoing
55	Waghur	Maj.	21/09/2023	Ongoing
56	Upper Pen Ganga	Maj.		Ongoing
57	Bawanthadi [IS]		23/05/2023	Completed

Sl. No	State/Project Name	Major/ Medium/ ERM	Date of Visit	Remarks
58	Lower Dudhna	Maj.	---	Completed
59	Tillari		(28-29)/12/2023	Ongoing
60	Warna	Maj.	---	Completed
61	Lower Wardha	Maj.	**i)** 19/05/2023 ii) 09/01/2024	Ongoing
62	Khadakpurna	Maj.	---	Completed
63	Dongargaon	Med.	---	Completed
64	Bembla	Maj.	11/01/2024	Ongoing
65	Sangola Branch Canal	Maj.	08/12/2023	Ongoing
66	Tarali	Maj.	**i)** 26/09/2023 ii) 10/01/2024	Ongoing
67	Dhom Balakwadi	Maj.	31/05/2023	Completed
68	Morna (Gureghar)	Med.		Ongoing
69	Arjuna	Med.	08/05/2023	Ongoing
70	Lower Pedhi	Maj.	**(i)** 26/05/2023 (ii) 10/01/2024	Ongoing
71	Upper Kundalika	Med	---	Completed
72	Wang Project	Med	24/04/2023	Completed
73	Lower Panzara	Med	---	Completed
74	Aruna	Med	i) 09/05/2023 ii) 15/02/2024	Ongoing
75	Krishna Koyana Lift	Maj.	**i.** (01-02)/06/2023 **ii.** (19-20)/12/2023	Completed
76	Naradave (Mahammadwadi)	Med	---	Ongoing
77	Gadnadi	Med	21/12/2023	Completed
78	Kudali	Med		Ongoing
79	NandurMadhmeshwarPh-II		(12-13)/12/2023	Completed
80	Jihe Kathapur LIS	Maj	(i) 27.09.2023 (ii) 13.03.2024	Ongoing
	TOTAL=27			
	MANIPUR			
81	Thoubal	Maj.	--	Ongoing

Sl. No	State/Project Name	Major/ Medium/ ERM	Date of Visit	Remarks
82	Dolaithabi Barrage	Med.	--	Completed
83	Loktak LIS	ERM	--	Ongoing
	TOTAL=03			
	ODISHA			
84	Upper Indravati(KBK)	Maj.	--	Completed
85	Subernarekha	Maj.	i) (29-30)/01/2024	Ongoing
86	Anandpur Barr./ Integrated Anandpur Barr.	ERM	i) 19/07/2023	Ongoing
87	Lower Indra(KBK)	Maj.		Completed
88	Telengiri(KBK)	Maj.		Completed
89	RET Irrigation(KBK)	Med.		Completed
90	Kanupur	Maj.	(02-03)/052023	Ongoing
91	Rukura-Tribal	Med	--	Completed
	TOTAL=08			
	PUNJAB			
92	Kandi Canal Extension (Ph.II)	ERM	--	Completed
93	Rehabilitation of Ist Patiala Feeder and Kotla Branch Project	ERM	--	Completed
	TOTAL=02			
	RAJASTHAN			
94	Narmada Canal	Maj.	--	Completed
95	Mod. of Gang Canal	ERM	--	Completed
96	Parwan Major Multipurpose Irrigation Project	Maj	(i) 08/08/2023 (ii) 03/03/2024	Ongoing
	TOTAL=03			
	TAMILNADU			
97	Kannadian Channel	Maj	12/11/2023	Ongoing
	TOTAL=01			
	TELANGANA			
98	Indiramma FFC of SRSP	ERM	i) 18/05/2023 ii) 27/03/2024	Ongoing
99	SRSP St.II	ERM	i) 29/09/2023 ii) 07/03/2024	Ongoing

Sl. No	State/Project Name	Major/ Medium/ ERM	Date of Visit	Remarks
100	Ralivagu	Med.		Completed
101	Gollavagu	Med.		Completed
102	Mathadivagu	Med.		Completed
103	Peddavagu at Jagannathpur	Med.	i) 05/10/2023 ii) 28/02/2024	Ongoing
104	J. ChokkaRao LIS	Maj	i) 02/08/2023 ii) 21/03/2024	Ongoing
105	Neelwai (Peddavagu)	Med.	i) 04/10/2023 ii) 27/02/2024	Ongoing
106	Sri Komaram Bheem	Med.	i) 05/10/2023	Completed
107	Palemvagu	Med.	i) 25/10/2023 ii) 20/03/2024	Ongoing
108	Rajiv Bhima LIS	Maj	i) 02/06/2023 ii) 11/12/2023	Ongoing
	TOTAL=11			
	UTTAR PRADESH			
109	Saryu Nahar NP	Maj	15/09/2023	Completed
110	Bansagar Canal	Maj.	--	Completed
111	Madhya Ganga Canal Ph-II	Maj.	i) (28-29)/08/2023 ii) (27-28)/02/2024	Ongoing
112	Arjun Sahayak	Maj.	(22-23)/12/2023	Ongoing
	TOTAL=04			
	Grand Total=	**112 (105+7 Phases)**	87	**Completed- 58 Ongoing- 54**

Annexure - 8.2

State-Wise and Project-Wise List of Projects under Special Package Monitoring Visits during 2023-24

Sl. No	State/Project Name	Major/ Medium/ ERM	Date of Visit*	Remarks
1	Tembhu LIS Dist. Satara	Major	--	Completed
2	Urmodi Dist. Satara	Major	i) 26/04/2023 ii) 10/01/2024	Ongoing
3	SulwadeJamphalKanoli L.I. Scheme Dist. Dhule	Major	20/09/2023	Ongoing
4	Shelgaon Barrage Medium Project, Dist.Jalgaon	Medium	22/09/2023	Ongoing
5	Ghungshi Barrage LIS Akola	Medium	i) 08/05/2023 ii) 24/01/2024	Ongoing
6	Purna Barrage No.2 (Nerdhamana) Dist.Akola	Medium	09/05/2023	Ongoing
7	Jigaon Dist. Buldhana	Major	i) 10-12/05/2023 ii) 18-19/01/2024	Ongoing
8	WarkhedLondhe Dist. Jalgaon	Medium	19/09/2023	Ongoing
9	Relining of Rajasthan Feeder canal	Major	23/05/2023	Ongoing
10	Relining of Shirind Feeder canal	Major		Ongoing

Annexure - 8.3

Details of Completed Projects under AIBP

S. No.	State/Project Name	Year of Inclusion in AIBP	Year of Completion
	ANDHRA PRADESH		
1	Cheyyeru(Annamaya)	1996-97	2003-04
2	Somasila	1998-99	2006-07
3	Madduvalasa	1998-99	2005-06
4	Maddigedda	2001-02	2006-07
5	Vamsdhara St-II Ph I	2003-04	2008-09
6	Veligallu	2006-07	2008-09
7	Swarnamukhi	2005-06	2008-09
	ASSAM		
8	Pahumara	1996-97	2008-09
9	Hawaipur lift	1996-97	2006-07
10	Rupahi Lift	1996-97	2001-02
11	Boradikarai	1997-98	2004-05
12	Intg. Irr. Scheme in Kallong Basin	1997-98	2006-07
13	Kallonga @	1996-97	2006-07
14	Mod. ofJamunaIrr.	2001-02	2008-09
	BIHAR		
15	Upper Kiul	1996-97	2006-07
16	Orni Reservoir	1997-98	2006-07
17	Bilasi Reservoir	1997-98	2000-01
18	Sone Modernisation	1998-99	2008-09
19	Restoration of Kosi Barrage and its appurtenants for sustaining created irrigation Potential	2008-09	2010-11
	CHHATTISGARH		
20	HasdeoBango	1997-98	2006-07
21	Shivnath Diversion	1997-98	2002-03

S. No.	State/Project Name	Year of Inclusion in AIBP	Year of Completion
22	Jonk Diversion	1999-2000	2006-07
23	Kosarteda	2002-03	2013-14
24	Mahanadi Res. Pr.	2005-06	2010-11
25	Barnai	2002-03	2006-07
26	Minimata (HasdeoBango Ph. IV)	2007-08	2010-11
	GOA		
27	Salauli	1997-98	2006-07
	GUJARAT		
28	Jhuj	1996-97	1999-2000
29	Sipu	1996-97	1999-2000
30	Mukteshwar	1996-97	2006-07
31	Harnav - II	1996-97	1997-98
32	Umaria	1996-97	1996-97
33	Damanganga	1997-98	1999-2000
34	Karjan	1997-98	1999-2000
35	Sukhi	1997-98	1999-2000
36	Deo	1997-98	1997-98
37	Watrak	1997-98	1999-2000
38	Aji-IV	2000-01	2009-10
39	Ozat-II	2000-01	2009-10
40	Brahmini-II	2000-01	2008-09
41	Bhadar-II	2002-03	2010-11
	HARYANA		
42	Gurgaon Canal	1996-97	2003-04
43	WRCP	1996-97	2006-07
	HIMACHAL PRADESH		
44	Changer Lift Irr. Project	2000-01	2012-13
	JAMMU & KASHMIR		

S. No.	State/Project Name	Year of Inclusion in AIBP	Year of Completion
45	Marwal Lift*	1996-97	2006-07
46	Lethpora Lift*	1996-97	2006-07
47	Koil Lift*	1996-97	2006-07
48	Mod. of Kathua Canal	1999-2000	2006-07
49	IgopheyIrr. Pr.	2000-01	2006-07
50	Rafiabad High Lift Irr.	2001-02	2010-11
51	Mod. of Zaingir Canal	2001-02	2006-07
52	Mod. Of Martand Canal	2006-07	2010-11
53	Mod. Of MavKhul	2006-07	2010-11
54	Mod. of Babul Canal	2007-08	2011-12
	JHARKHAND		
55	Latratu	1997-98	2002-03
56	Kansjore	1997-98	2010-11
57	Tapkara Reservoir	1997-98	2002-03
	KARNATAKA		
58	Hirehalla	1996-97	2006-07
59	GhataprabhaSt.III	1997-98	2010-11
60	GandoriNala	2001-02	2009-10
61	Maskinallah	2002-03	2003-04
62	Votehole	2007-08	2008-09
	KERALA		
63	Kallada	1996-97	2004-05
	MADHYA PRADESH		
64	Bansagar Unit-I	1996-97	2010-11
65	Upper Wainganga	1996-97	2002-03
	Rajghat Dam	1998-99	2004-05
66	Sindh Phase I	1999-2000	2006-07
67	Urmil RBC	2000-01	2002-03

S. No.	State/Project Name	Year of Inclusion in AIBP	Year of Completion
68	Banjar	2000-01	2002-03
	MAHARASHTRA		
69	Surya	1996-97	2006-07
70	Bhima	1997-98	2006-07
71	Upper Tapi	1997-98	2004-05
72	Upper Wardha	1997-98	2008-09
73	Wan	1998-99	2005-06
74	Jayakwadi Stage-II	2000-01	2004-05
75	Vishnupuri	2000-01	2005-06
76	Bahula	2000-01	2006-07
77	Krishna	2002-03	2008-09
78	Kukadi	2002-03	2008-09
79	Hetwane	2002-03	2008-09
80	Chaskaman	2002-03	2008-09
81	Wan - II	2006-07	2008-09
82	PothraNalla	2006-07	2008-09
83	Utawali	2006-07	2008-09
84	Purna	2006-07	2008-09
85	NandurMadhmeshwar	2006-07	2008-09
86	Kar	2006-07	2008-09
87	LalNalla	2006-07	2008-09
88	Arunavati	2006-07	2008-09
89	Tajnapur LIS	2006-07	2008-09
90	Khadakwasla	2002-03	2004-05
91	Kadvi	2002-03	2004-05
92	Kasarsai	2002-03	2004-05
93	Jawalgaon	2002-03	2004-05
94	Kumbhi	2002-03	2006-07

S. No.	State/Project Name	Year of Inclusion in AIBP	Year of Completion
95	Kasari	2002-03	2004-05
96	Patgoan	2004-05	2006-07
97	Madan Tank	2005-06	2008-09
98	ShivnaTakli	2005-06	2008-09
99	Amravati	2005-06	2007-08
100	Chandarbhaga	2007-08	2009-10
101	Sapan	2007-08	2009-10
102	Pentakli	2007-08	2009-10
103	Prakasha Barrage	2007-08	2008-09
104	Sulwade Barrage	2007-08	2008-09
105	Sarangkheda	2007-08	2008-09
	ODISHA		
106	Upper Kolab(KBK)	1997-98	2004-05
107	Titlagarh St-II(KBK)	1998-99	2004-05
108	Potteru(KBK)	2001-02	2004-05
109	Naraj Barrage	2001-02	2005-06
110	Improvement to Sason Canal System	2002-03	2004-05
111	Salandi Left Main Canal-Ambahata	2002-03	2005-06
112	Improvement to Salki Irrigation	2003-04	2004-05
	PUNJAB		
113	RanjitSagar Dam	1996-97	2000-01
114	Remodelling of UBDC	2000-01	2006-07
115	Irr. to H.P. below Talwara (ShahneharIrr. Project)	2000-01	2005-06
	RAJASTHAN		
116	Jaisamand (Modernisation)	1996-97	2000-01
117	Chhapi	1996-97	2004-05
118	Panchana	1997-98	2004-05
119	Bisalpur	1998-99	2006-07

S. No.	State/Project Name	Year of Inclusion in AIBP	Year of Completion
120	Gambhiri (Modernisation)	1998-99	2000-01
121	Chauli	1998-99	2006-07
122	Mahi Bajaj Sagar	1999-2000	2006-07
123	WRCP	1996-97	2006-07
	TELANGANA		
124	SriramsagarSt.I	1996-97	2005-06
125	PriyadarshiniJurala	1997-98	2006-07
126	Nagarjunsagar	1998-99	2005-06
127	Gundalavagu	2001-02	2006-07
128	Alisagar LIS	2006-07	2008-09
129	Guthpa LIS	2006-07	2008-09
	UTTAR PRADESH		
130	Upper Ganga including Madhya Ganga Canal	1996-97	2003-04
131	SardaSahayak	1996-97	2000-01
132	Providing Kharif Channel in H.K. Doab	1996-97	2004-05
133	Rajghat Dam	1996-97	1996-97
134	GuntaNala Dam	1996-97	1999-2000
135	Gyanpur Pump Canal	1999-2000	2001-02
136	Eastern Ganga Canal	1999-2000	2010-11
137	Rajghat Canal	2000-01	2008-09
138	Mod. Agra Canal	2002-03	2008-09
139	Jarauli Pump Canal	2003-04	2006-07
	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 - 8.4

Details of Projects Reported completed under PMKSY-AIBP as on 31.3.2024

Sl. No.	State/Project Name	Year of Inclusion in AIBP	Year of Completion
	ANDHRA PRADESH		
1	Maddigedda	2001-02	2017-18
	ASSAM		
2	Champamati	1996-97	2019-20
3	Dhansiri	1996-97	2022-23
	CHHATISGARH		
4	Maniyari Tank (ERM)	2011-12	2017-18
5	Kharung(ERM)	2010-11	2018-19
	GOA		
6	Tillari	2000-01	2022-23
	UT of JAMMU & KASHMIR		
7	Rajpora Lift	2000-01	2018-19
8	Restoration & Mod. of Main Ravi Canal	2011-12	2021-22
9	Tral Lift Irrigation Project	2000-01	2021-22
	KARNATAKA		
10	Sri Rameswar Irrigation	2014-15	2017-18
11	Bhima LIS	2009-10	2018-19
12	Karanja	1997-98	2020-21
13	Narayanpur LBC Project	2014-15	2023-24
	MADHYA PRADESH		
14	Sagar(Sagad)	2011-12	2017-18
15	Singhpur	2011-12	2017-18
16	Mahuar	2013-14	2017-18
17	Sindh Phase II	1998-99	2018-19
18	Bariarpur LBC	2000-2001	2018-19

Sl. No.	State/Project Name	Year of Inclusion in AIBP	Year of Completion
19	Bansagar Unit-II	2003-04	2018-19
20	Sanjay Sagar (Bah)	2011-12	2018-19
21	Indira Sagar Unit II (Ph I & II)	1996-97	2018-19
22	Indira Sagar Unit V	2014-15	2018-19
23	Omkareshwar, Ph.-IV	2014-15	2018-19
24	Bargi Diversion Ph - I	2001-02	2018-19
25	Mahi	2000-01	2020-21
26	Mahan	2003-04	2020-21
27	Indira Sagar Project Canal Phase -III	2007-08	2022-23
28	Indira Sagar Project Canal Phase -IV	2008-09	2022-23
29	Omkareshwar Project Canal Phase-II	2007-08	2022-23
30	Omkareshwar Project Canal Phase-III	2007-08	2022-23
	MAHARASHTRA		
31	Bawanthadi [IS]	2004-05	2017-18
32	Lower Panzara	2009-10	2017-18
33	Dongargaon	2005-06	2017-18
34	Warna	2005-06	2017-18
35	NandurMadhmeshwar	2006-07	2018-19
36	Upper Kundalika	2008-09	2018-19
37	Lower Dudhna	2005-06	2019-20
38	DhomBalaakwadi	2007-08	2019-20
39	Khadakpurna	2006-07	2019-20
40	Wang	2008-09	2022-23
41	Krishna Koyna LIS	2009-10	2023-24
42	Gdnadi	2009-10	2023-24
	MANIPUR		
43	Dolaithabi	2002-03	2020-21

Sl. No.	State/Project Name	Year of Inclusion in AIBP	Year of Completion
	ODISHA		
44	Upper Indravati(KBK)	1996-97	2017-18
45	Rukura-Tribal	2009-10	2017-18
46	RET Irrigation(KBK)	2003-04	2018-19
47	Upper IndravatiExtn (KBK)	1996-97	2019-20
48	Telengiri	2003-04	2019-20
	PUNJAB		
49	Kandi Canal Extension (Ph.II)	2002-03	2017-18
50	Rehabilitation of Ist Patiala Feeder and Kotla Branch Project	2007-08	2017-18
	RAJASTHAN		
51	Narmada Canal	1998-99	2018-19
52	Mod. of Gang Canal	2000-2001	2018-19
	TELANGANA		
53	Gollavagu	2006-07	2017-18
54	Ralivagu	2006-07	2017-18
55	Mathadivagu	2006-07	2017-18
56	Sri Komaram Bheem	2006-07	2023-24
	UTTAR PRADESH		
57	Bansagar Canal	1997-98	2018-19
58	Saryu Nahar	1996-97	2023-24

Annexure –8.5

Details of newly included project under PMKSY-AIBP during 2023-24

S.N.	Name of Project	CCA	Estimated Balance cost at the time of inclusion with central share	Target date	Benefitted districts
01	Jamrani Dam Multipurpose Project , **Uttrakhand**	UIP 57,065 Ha	Balance Cost of works:Rs. 1,730.21 crore Central Share: Rs. 1,557.18 crore	March 2028	Nainital & Udham Singh Nagar districts of Uttarakhand, and Rampur & Bareily districts in U.P.
02	Bodwad Parisar Sinchan Pariyojana (Stage-I),	27997 Ha	Balance Cost of works:Rs. 694.87 crore Central Share: Rs. 278.62 crore	June 2025	Jalgaon and Buldhana districts of Maharashtra

Annexure - 8.6

Central Assistance to MMI Projects included under Special Package for Maharashtra

S. No	Project Name	Districts Benefitted	Central Assistance (CA) released status							Ultimate Irrigation Potential in Ha	Potential created in Ha from 2018 to 2024 as on 31.03.2024
			CA released during 2018-19	CA released during 2019-20	CA released during 2020-21	CA released during 2021-22	CA released during 2022-23	CA released during 2023-24	Total CA released		
1	Tembhu LIS Dist. Satara	Satara, Sangli, Solapur	25.00	69.79	77.56	108.01	10.77	6.03	297.16	111856	96319
2	Warkhed Londhe Dist. Jalgaon	Jalgaon	10.41	19.345	26.03	23.68	2.78	5.801	88.04	7919	0
3	Sulwade Jamphal Kanoli L.I. Scheme Dist. Dhule	Dhule	0.23	0.00	95.97	108.55	103.47	126.915	435.135	52720	0
4	Shelgaon Barrage Medium Project, Dist.Jalgaon	Jalgaon	15.22	13.99	47.15	43.59	15.32	0	135.27	11318	80
5	Ghungshi Barrage LIS Akola	Akola (V)	3.27	2.55	3.84	10.43	2.71	5.3325	28.1325	6660	5102
6	Purna Barrage No.2 (Nerdhamana) Dist.Akola		0.00	0.00	12.43	0.74	1.35	0.1375	14.6575	6954	0
7	Jigaon Dist. Buldhana	Buldhana, Akola (V)	262.02	17.01	39.53	336.42	33.66	487.405	1176.045	101088	0
8	Urmodi Dist. Satara	Satara	13.27	10.63	0.00	14.35	0.00	0	38.25	32000	17979
	Total MMI		**329.43**	**133.31**	**302.52**	**645.77**	**170.05**	**631.6213**	**2212.696**	**330515**	**119480**

Annexure – 8.7

Central Assistance to MMI Projects included under Special Package for Punjab

S. No	Project Name	Districts Benefitted	Central Assistance Released			
			CA released till March 2016 under AIBP	CA released during 2016-2024 under PMKSY	Total CA released	Additional Irrigation Potential Stabilization Target (in Ha)
1	Relining of Rajasthan Feeder RD 179000 to 496000	Mukatsar & Faridkot	105.84	294.64	559.524	98739
2	Relining of Sirhind Feeder RD119700 to RD 447927	Mukatsar & Faridkot	50.00	153.65	203.651	69096
	Total		**155.84**	**448.29**	**763.175**	**167835**

Annexure - 15.1

Training Activities Organized / Coordinated by Training Directorate, CWC during 2023-24

Sl.	Topic of Programme	FY 2023-24	Venue	CWC Participants
1.	1st Senior Talk	25 April 2023	New Library Building,	Open to all
2.	2-week "Induction Training Programme of MTS	15-26 May 2023	New Library Building,	31
3.	Hindi Workshop	15 June 2023	CWC CWC (HQ)	75
4.	"SCA-Himalayas Project-Glacial hydrological Modelling for the Indian Himalayan Region"	3-7 July 2023	New Library Building,	19
5.	Hindi Workshop	25 Sept 2023	CWC (HQ)	70
6.	Meeting of newly recruited Central Water Engineering (Group-A) Service (CWES) with the Hon'ble President of India	21 August 2023	Rashtrapati Bhavan, New Delhi	60
7.	2nd Senior Talk	31 August 2023	New Library Building,	Open to all
8.	3rd Senior Talk	27 September 2023	New Library Building,	Open to all
9.	4th Senior Talk	29 September 2023	New Library Building,	Open to all
10.	5th Senior Talk	30 Oct 2023	New Library Building,	Open to all
11.	"Training program on MS office for non-technical staff and posted in CWC (HQ)"	30-31 Oct 2023	New Library Building,	20
12.	Hindi Workshop	13 December 2023	CWC (HQ)	75
13.	Mentorship Program for newly joined Assistant Directors	25 Sept-24 Dec 2024	CWC (HQ)	09
14.	Vigilance Event	03 November	CWC (HQ)	Open to all

		2023		
15.	6th Senior Talk	28 December 2023	New Library Building,	Open to all
16.	7th Senior Talk	29 February 2023	New Library Building,	Open to all
17.	Post Retirement prospect & Avenues for	23-24 Feb 2024	CWC (HQ)	14
18.	Celebration of International Women's Day	7-8 March 2024	CWC (HQ)	Open to all
19.	हिंदी राजभाषा संगोष्टी	18 March 2024	New Library Building,	150
20.	Hindi Workshop	20 March 2024	CWC (HQ)	75

Participation of in Training/Workshop/Webinar/Talks Organized by other Institutions during 2023-24

Sl.	Topic of Programme	FY 2022-23	Venue	CWC Participants	Organized by
21.	33rd Induction Training Programme (ITP)	24 April- 08 December 2023	National Water Academy, , Pune	10	NWA Pune
22.	Training Program on "Second Training under CMIS Project at National Institute of Oceanography	25-26 April 2023	Goa	20	CMIS project
23.	Workshop on "South Asia Innovative Flood and Drought Governance"	28 April 2023	New Delhi	07	India Water Partnership (IWP) with World Bank
24.	One-day workshop on "Parameters and Feasible technologies required to be installed for Online Continuous Effluent Monitoring system in different categories of STPs across the Ganga Basin"	2 May 2023	IIC Lodhi Estate, New Delhi	03	NMCG
25.	Workshop for 8 th Edition of "International Conference on Nanotechnology for Better Living"	5-29 May 2023	Srinagar	04	NIT Srinagar (J&K)
26.	"Introduction to GEE & its Applications in WRM"	12-16 June 2024	NWA Pune	09	NWA Pune
27.	National Workshop on – "Integrated Management of Sediments in River Basins and Reservoirs for Sustainable Development"	19 June 2023	India International Centre (IIC), New Delhi	78	DSR
28.	4th National Water Awards	17 June 2023	Plenary Hall, Vigyan Bhawan, New Delhi	250	MoWR
29.	e-bill training program	20-22 June 2024	INGAF, New Delhi	85	INGAF

30.	"Workshop to strengthen national capacity for reporting on water use efficiency and water stress indicators and compile the necessary data"	19 - 20 June 2022	India Islamic Cultural Centre, Lodhi Road, New Delhi	05	FAO with MoJS
31.	Webinar on the Bayesian method BaRatin for the analysis of stage-discharge rating curves and the related uncertainties in stream flow data	27 June 2022	Online Mode	77	RDC-II
32.	"Training Needs Assessment (TNA) for Water Resources Development & Management (WRD&M)"	07 July 2023	Scope Convention Centre, New Delhi	22	NWA Pune
33.	Level-3 Mandatory Cadre Training Programme of JAG .	04 Sept -15 Sept 2024 20 Nov-02 Dec 2023	IIM, Calcutta and NWA, Pune	50	NWA Pune
34.	Batch – III of Level-1 Mandatory Cadre Training Programm of JTS	27 Nov-22 Dec 2023	IIT-Roorkee, IIM-Ahmedabad and NWA, Pune	25	NWA, Pune
35.	"Interactive and hands-on Training on SWAT Hydrological Modelling"	21- 26 Aug 2023	NWA, Pune	16	NWA, Pune
36.	Workshop on "Methodology Adopted for Fixation of Water Rates and Physical & Financial Aspects of Major & Medium Irrigation Projects in India"	24 August 2023	Main Auditorium, Scope Convention Centre, Lodhi Road, New Delhi	15	WP&P Coordination
37.	"Overview of Water Resources Sector of India" for Non-Technical	28 Aug - 01 Sept 2023	National Water Academy, Pune	10	National Water Academy, Pune
38.	Training/Capacity Building of officials on Coastal Management Information System (CMIS)	04-08 Sept 2023	CWPRS, Pune	16	NWA, Pune
39.	Refresher training on RBM Cycle to be organized by	04–06 Sept 2023	Nainital, Uttarakhand	04	Indo-German 'Support to Ganga Rejuvenation'

					Project (GIZ-SGR)
40.	2-week training program on 'Water Use Quantification and Efficiency Estimation in Irrigated Command Areas using Satellite Data'	04- 15 Sep 2023	NRSC, Hyderabad	04	POMIO
41.	"International Conference on Dam Safety, 2023"	14-15 Sept. 2023	Jaipur	115	MoWR
42.	"Pre-IOWave23 Workshop on Tsunami Standard Operating Procedure (SOP)"	13-14 Sept 2023	Indian National Centre for Ocean Information Services (INCOIS), Hyderabad	03	INCOIS
43.	"Management Development Program" for Non-Technical	25-29 Sept 2023	National Water Academy, Pune	16	National Water Academy, Pune
44.	Training on River Basin Modelling using (RIBASIM)	09-19 October 2023	NWA Pune	11	NWA Pune
45.	One-Day workshop on "Flood Modelling: Real time Forecasting, Warning and Dissemination"	12 October, 2023	CSRD, JNU, New Delhi	07	DHI India with CSRD,JNU
46.	Batch-V Level-1 MCTP for Junior Engineer (Civil & Mechanical)	16 Oct 2023 to 10 Nov 2023	NWA Pune	50	NWA Pune
47.	"Physical Based Mathematical Modelling for Estimation of Sediment Rate and Sediment Transport in Seven River Basins"	17 Oct 2023	3rd Floor Conference Room, Sewa Bhawan, R.K. Puram	41	Hydrology(Central)
48.	25th Congress INCID	02-04 Nov 2023	Radisson Blu Resort, Vishakhapatnam	04	INCID
49.	Batch-III Level-2 MCTP of STS	04 Dec to 22 Dec, 2023	NWA, Pune, IISc-Bangalore and IIM-Bangalore	25	NWA, Pune
50.	25th Congress INCID , 74th International Executive Council (IEC) meeting of INCID	5-8 Nov 2023	Radisson Blu Resort, Vishakhapatnam	06	INCID
51.	5-day Hands-On Training of ICP-MS and GC-MS (Batch-1)	11-15 December 2023	NIH Roorkee	20	RDC-II

52.	25th Congress INCID	2-4 Nov 2023	Radisson Blu Resort, Vishakhapatnam	18	INCID
53.	Batch-IV Level-2 MCTP for Assistant Director-II/SDE	27 Nov 2023 to 22 Dec 2023	NWA, Pune	65	NWA, Pune
54.	Phase-II of Support to Ganga Rejuvenation and India EU Water Partnership Action	20 Nov 2023	Lalit, New Delhi	13	GIZ
55.	RBM toolbox and E-Flows training	21-23 November 2023	BPMO Modelling Center, 5th Floor (S), , Sewa Bhawan	07	BPMO
56.	Training on numerical modelling by Delf3D software related to Coastal Management Information System (CMIS),	22-24 November 2023	NWA, Pune	23	NWA, Pune
57.	Jal Itihas Utasav	1st December 2023	Jahaz Mahal, Mehrauli	41	National Water Mission, Ministry of Jal Shakti
58.	3-Day Training Workshop on ‘‘Modernization of Irrigation Systems using RAP-MASSCOTE Approach’’	06-08 December 2023	NWA, Pune	12	NWA, Pune
59.	One day National Workshop on "Hydro-informatics Products & Services"	15 Dec 2023	Hotel Sangri-La, New Delhi	05	NRSC
60.	National Workshop on "Risk Informed Dam Safety Management"	21-22 Dec. 2023	THDC-TAKSHASHILA Trainign Centre, Rishikesh	02	INCOLD With CBIP
61.	02 Day Training Workshop on “Water as Leverage”	20-21 December, 2023	Prayagraj	01	Indo-Dutch Collaboration
62.	(Batch-II) for 5-day Hands-On Training of ICP-MS and GCMS	08-12 January 2024	NIH Roorkee	17	NIH Roorkee
63.	SAG of CWES Group ‘A’ batch-4 Level-4 Mandatory Cadre Training Programme (MCTP) on “Management in Government”	8-12 January 2024	Indian Institute of Management, Ahmedabad	10	Indian Institute of Management, Ahmedabad

64.	Training Program on "Pumped Storage Hydroelectric Projects"	08-12 January 2024	NWA Pune	04	NWA Pune
65.	Batch-VI Level-1 MCTP for JEs	09 January 2024 to 02 February2024	NWA, Pune	51	NWA, Pune
66.	Workshop on State Water Informatics Centre (SWIC)	9 January 2024	The Imperial, Janpath, New Delhi	01	NWIC
67.	Workshop on "Morpho1ogical Studies of Yamuna, Baghmati and Kosi Rivers of India"	15 January 202	Auditorium in Research & Innovation Park, lIT Delhi	21	Morpho & CC, with IIT delhi
68.	International Conference on Future of Water resources	18-20 January 2024	IIT Roorkee	17	IWRS & IIT Roorkee
69.	Training on Personal Safety and Social Responsibilities under ''Safety at Sea''	14-16 February 2024	Kochi	09	IMU,Kochi
70.	"Online lecture for two days on the topic of IMD data product - Significant & Utilization "	22-23 January 2024	Online	Open to all	IMD
71.	Training program on "Water Laws and River Valley Disputes"	05-09 February 2024	NWA, Pune	03	NWA, Pune
72.	Workshop on "Slope Stabilization Challenges in Infrastructure Projects	01-02 February	Chanakyapuri, New Delhi	02	ISRM with CBIP
73	5-day Hands - On Training of ICP-MS and GC-MS	19 -23 February 2024	NIH Roorkee	17+4(Reserve List)	NIH Roorkee
74	Training program on "SWAT Modelling using Hydrologic Unit Model for India (HUMID)	12-23 February 2024	NRSC, Hyderabad	02	NRSC
75	Training Course on "Planning and Development of Earth Core Rockfill Dam For Hydropower/ Irrigation Projects"	15-16 Feb 2024	CSMRS, New Delhi	06	CSMRS
76	Training program on ''Hydro-meteorological Observations''	19-24 February 2024	NWA, Pune	06	NWA, Pune
77	Training program on ''Use of Advanced Software in Design of Water Resources Structures''	26 February – 01 March 2024	NWA, Pune	03	NWA, Pune

79	Training Programme for Junior computers & Senior computers	11- 18 March 2024	NWA, Pune	11	NWA, Pune
80	Workshop (Offline) on "Litigation Management (LTM-03)"	26-27 March 2024	ISTM Campus, New Delhi	01	ISTM
81	Mandatory Cadre Training Programme for Scientific Assistants	12 - 19 March 2024	NWA, Pune	15	NWA, Pune
82	Campaign: "Jal Shakti Abhiyan: Catch The Rain – 2024,	09 March 2024	Sansad Marg, New Delhi	10	DoWR
83	Training program on ''Hydrological Applications of Microwave Remote Sensing'	18-22 March 2024	NWA, Pune	01	NWA, Pune

Annexure - 15.2

Details of Training Programs undertaken by National Water Academy, Pune during 2023-24

Sl. No.	Name of Training Programme	Dates	Competency skills as per CBC	No of Trainee per course	Duration of Program (Weeks / Months)	Man weeks	Training Days	Mandays	Mode of Delivery
1	Conventional Flood Forecasting Method	03-17 April 2023	Domain	214	1.8	385.2	9	1926	DL
2	Mandatory Cadre Training for Junior Engineers of Central Water Commission	10 April - 04 May 2023	Domain, Functional, Behavioural	39	4	156	20	780	Residential
3	Induction Training Program for Assistant Engineers / Junior Engineers of NWDA	17-28 April 2023	Domain, Functional, Behavioural	22	2	44	10	220	Residential
4	Induction Training Program (ITP) for the officers of Central Water Engineering (Group A) Services	24 April - 08 December 2023	Domain, Functional, Behavioural	9	34	306	170	1530	Residential
5	Distance Learning Program on Water Resources Sector of India	17-18 April 2023	Domain	221	0.4	88.4	2	442	DL
6	Distance Learning	19-20 April	Domain	219	0.4	87.6	2	438	DL

	Program on Water Resources Sector of India	2023							
7	Distance Learning Program on Water Resources Sector of India	24-25 April 2023	Domain	184	0.4	73.6	2	368	DL
8	Distance Learning Program on Water Resources Sector of India	26-27 April 2023	Domain	330	0.4	132	2	660	DL
9	Training Program on Dam Safety Aspects - An Overview	17 -26 May 2023	Domain	25	1.8	45	9	225	Residential
10	Training Workshop on "Introduction to Google Earth Engine" or APSW at Vijayawada	24-26 May 2023	Domain	40	0.6	24	3	120	Residential
11	Familiarization with DPR Preparation of SMI, FMP, AIBP, RRR Projects for officers from Administration of Union Territory of Ladakh at Leh	05-09 June 2023	Domian	55	1	55	5	275	Residential
12	Application of Google Earth Engine for WRM under NHP	12-16 June 2023	Domain	36	1	36	5	180	Residential
13	Overview of Surface Water Resources for Newly	26.June.23 to 30.June.23	Domain	11	1	11	5	55	Residential

	Recruited Officers of NERIWALM at NWA, Pune								
14	Survey, Investigation and Preparation of Detailed Project Report for River Valley Projects - Only for North Eastern Region at CWC Campus, Adabari, Guwahati	26.June.23 to 30.June.23	Domain	20	1	20	5	100	Residential
15	TNA workshop for assessment of training needs in water resources sector under the aegis of DoWR, RD & GR	07-Jul-23	Domain	176	0.2	35.2	1	176	Residential
16	Workshop on Pension Related Matters	20 July 2023	Functional	14	0.2	2.8	1	14	Residential
17	Workshop on Pension Related Matters	21 July 2023	Functional	15	0.2	3	1	15	Residential
18	Webinar on legal and institutional Framework of Dam Safety in India	25-26 July 2023	Domain, Functional	950	0.4	380	2	1900	DL
19	Induction Training Program Newly appointed MTS of CWC	31 July - 11 Aug 2023	Domain, Functional, Behavioural	59	2	118	10	590	Residential

20	Constitutional Provisions pertaining to Water Resources in India	10 August 2023	Domain	269	0.1	26.9	0.5	134.5	DL
21	Existing Central Laws & Enactment relating to Interstate River Water Disputes in India and Role of Central Water Commission (CWC)	17 August 2023	Domain	173	0.1	17.3	0.5	86.5	DL

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