

# ANNUAL REPORT

2011-12



सत्यमेव जयते

GOVERNMENT OF INDIA  
MINISTRY OF WATER RESOURCES  
NEW DELHI



## Abbreviations

ADB	Asian Development Bank	INCGW	Indian National Committee on Ground Water
AIBP	Accelerated Irrigation Benefits Programme	INCH	Indian National Committee on Hydraulic Research
AR	Artificial Recharge	INCID	Indian National Committee on Irrigation and Drainage
BB	Brahmaputra Board	INCOH	Indian National Committee on Hydrology
BCB	Bansagar Control Board	ISRO	Indian Space Research Organisation
BRB	Betwa river Board	ISRWD	Inter-State river Water Disputes
CADWM	Command Area Development & Water Management	JBIC	Japan Bank for International Cooperation
CCA	Culturable Command Area	JCWR	Joint Committee on Water Resources
CEA	Central Electricity Authority	JET	Joint Expert Team
CGWB	Central Ground Water Board	JGE	Joint Group of Experts
Ch	Chainage	JRC	Joint rivers Commission
CSMRS	Central Soil & Materials Research Station	Kfw	Kreditanstalt fur Wiederaufbau
cumec	cubic metre per sec	KWDT	Krishna Water Disputes Tribunal
cusec	cubic foot per sec	m	Metre
CWC	Central Water Commission	MI	Minor Irrigation
CWPRS	Central Water & Power Research Station	MoU	Memorandum of Understanding
CLA	Central Loan Assistance	M & M	Major and Medium
CRA	Cauvery river Authority	Mha	million hectares
CWDT	Cauvery Water Disputes Tribunal	MoWR	Ministry of Water Resources
DPR	Detailed Project report	NAPCC	National Action Plan on Climate Change
DSS	Decision Support System	NCA	Narmada Control Authority
DRIP	Dam Rehabilitation and Improvement Project	NEEPCO	North Eastern Electric Power Corporation Limited
EFC	Expenditure Finance Committee	NERIWALM	North Eastern Regional Institute of Water and Land Management
ERM	Extension, Renovation and Modernization	NCSDP	National Committee on Seismic Design Parameters
EW	Exploratory Well	NHDC	Narmada Hydro-electric Development Corporation
FPARP	Farmers' Participatory Action Research Programme	NLSC	National Level Steering Committee
FBP	Farakka Barrage Project	NLPMC	National Level Programme Monitoring Committee
FMP	Flood Management Programme	NPP	National Perspective Plan
FR	Feasibility Report	NWDT	Narmada Water Disputes Tribunal
FRL	Full Reservoir Level	NWM	National Water Mission
GFCC	Ganga Flood Control Committee	NPCC	National Projects Construction Corporation Ltd
GRA	Grievances Redressal Authority	NRSC	National Remote Sensing Centre
ha	Hectare	NWDA	National Water Development Authority
HE	Hydro-electric	NCMP	National Common Minimum Programme
HP	Hydrology Project	OFD	On Farm Development

IBRD	International Bank of Reconstruction and Development	OW	Observatory Well
IEC	Information, Education and Communication	PAC	Project Advisory Committee
IMD	India Meteorological Department	PAF	Project Affected Families
INCGECM	Indian National Committee on Geotechnical Engineering and Construction Materials	TAC	Technical Advisory Committee
PDS	Purpose Driven Studies	TAMC	Technical Assistance and Management Consultancy
PIM	Participatory Irrigation Management	Th.	Thousand
PSC	Permanent Standing Committee	TOR	Terms of Reference
PZ	Piezometer	TB	Tungbhadra Board
RFD	Results Framework Document	UYRB	Upper Yamuna River Board
RMIS	Rationalisation of Minor Irrigation Statistics	WALMI	Water and Land Management Institute
RRR	Repair, Renovation and Restoration	WAPCOS	Water and Power Consultancy Services (India) Ltd
R&R	Rehabilitation and Resettlement	WB	World Bank
RRSSC	Regional Remote Sensing Service Centre	WEGWIS	Web Enabled Ground Water Information System
SS	State Sector	WQAA	Water Quality Assessment Authority
SSCAC	Sardar Sarovar Construction Advisory Committee	WRIS	Water Resources Information System
SAC	Standing Advisory Committee	WUA	Water User Association
SCEC	Sub Committee on Embankment Construction		
SSP	Sardar Sarovar Project		

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# Chapter 1

## An Overview

Water is one of the most precious natural resources, without which it is impossible to sustain life. India has 4% of water resources of the world, while it has to support 16% of world population and 15% of livestock.

The annual precipitation including snowfall, which is the main source of water in the country, is estimated to be of the order of 4000 Billion Cubic Metres (BCM). The estimated precipitation during the monsoon season (June to September) is of the order of 3000 BCM. The effect of global warming on hydrological cycle could result in further intensification of temporal and spatial variations in precipitation, snowmelt and water availability. The resources potential of the country, which occurs as natural run off in the rivers is about 1869 BCM, considering both surface and ground water as one system.

Due to various constraints of topography and uneven distribution of resources over space and time, it has been estimated that presently only about 1123 BCM of the estimated average runoff of 1869 BCM is utilisable. With increasing population, the per capita water availability has reduced to about one third since independence. Another important challenge is related to over-exploitation of ground water in some areas. At present, about 15% of the assessment blocks are over-exploited and about 14% of the assessment blocks fall in the category of critical and semi-critical blocks. There is also gap between the irrigation potential

created and utilized and at present, 15% of the created irrigation potential remains unutilized. Further, irrigation infrastructure is not operating at desirable efficiency. Efficiency of surface water projects is about 35-40% and of ground water facilities is about 65%, which can, however, be increased to 60% and 75% respectively. There is also problem of water quality relating to geogenic, arsenic, fluoride, nitrate and iron contamination in ground water. Further, many areas of the country frequently suffer from floods, which cause substantial damages.

Ministry of Water Resources, Government of India is responsible for development, conservation and management of water as a national resource; overall national perspective of water planning and coordination in relation to diverse uses of water; general policy, technical assistance, research and development, training and matters relating to irrigation and multi-purpose projects, ground water management; conjunctive use of surface and ground water, command area development, flood management including drainage, flood-proofing, waterlogging, sea erosion and dam safety.

The Ministry has also been allocated the subject of regulation and development of inter-State rivers, implementation of awards of Tribunals, water quality assessment, bilateral and external assistance and co-operation programmes in the field of water resources and

matters relating to rivers common to India and neighbouring countries.

The above functions of the Ministry are carried out through its two attached offices (Central Water Commission and Central Soil and Materials Research Station), seven subordinate offices (Central Ground Water Board, Central Water and Power Research Station, Ganga Flood Control Commission, Farakka Barrage Project, Sardar Sarovar Construction Advisory Committee, Banasagar Control Board and Upper Yamuna River Board), seven statutory bodies (Brahmaputra Board, Narmada Control Authority, Betwa River Board, Tungabhadra Board, Ravi and Beas Water Tribunal, Cauvery Water Disputes Tribunal and Krishna Water Disputes Tribunal), two autonomous bodies (societies) (National Water Development Agency and National Institute of Hydrology) and two public sector enterprises (Water and Power Consultancy Services (India) Limited and National Projects Construction Corporation Limited).

The Ministry is headed by Hon'ble Shri Pawan Kumar Bansal as the Union Minister of Water Resources since 13<sup>th</sup> July 2011 with Hon'ble Shri Vincent H. Pala as the Minister of State for Water Resources. Shri Dhruv Vijai Singh is the Secretary in the Ministry with Shri G Mohan Kumar as the Additional Secretary. The organisational chart of the Ministry is at **Annexure- I**. The staff strength of the Ministry and its organizations is at **Annexure-II**. The list of head of organizations under the Ministry of Water Resources is at **Annexure-III**.

There are 12 Wings in the Ministry, namely, Administration, Coordination, Integrated Finance & Accounts, Policy & Planning, Projects, Brahmaputra & Barak, Ganga, Indus, Command Area Development &

Water Management, Ground Water, Minor Irrigation Statistics and External Assistance.

The Ministry is implementing and monitoring 4 State Sector and 15 Central Sector Schemes. The State Sector Schemes implemented and monitored by the Ministry during 2011-12 include Accelerated Irrigation Benefits Programme (AIBP), Repair, Renovation & Restoration (RRR) of Water Bodies, Command Area Development and Water Management (CADWM) and Flood Management Programme (FMP).

The Central Sector Schemes implemented by the Ministry during 2011-12 include River Management Activities in Border Areas, Ground Water Management and Regulation, Flood Forecasting, Development of Water Resources Information System, Hydrology Project, Infrastructure Development Scheme, Information, Education and Communication, Investigation of Water Resources Development, Research and Development, Dam Safety Studies and Planning and Farakka Barrage Project. In addition, works related to National Water Academy and Rajiv Gandhi Institute of Training and Research were also carried out. Consultations with the concerned State Governments were continued for implementing the schemes of River Basin Organisation for Mahanadi and Godavari River Basins and for expediting Pagladia Project.

The budget at a glance, indicating the plan and non- plan actuals and budget estimates of various schemes, is at **Annexure-IV**.

## Major Achievements

- **Under Accelerated Irrigation Benefits Programme (AIBP)**, the State Governments have been provided an amount of ₹ 51132.024



crore till 31.12.2011 and ₹ 54350.648 crore till 31.03.2012 as CLA/Grant since its inception in 1996 for 292 major/medium irrigation projects and 13098 surface minor irrigation schemes. Out of above, 134 major/medium and 9220 surface minor irrigation schemes have been completed upto December 2011 and October 2011 respectively. An additional irrigation potential of 5.486 million hectare has been created through major/medium irrigation projects and an irrigation potential of 0.454 million hectares has been created through surface minor irrigation schemes upto March, 2009. Irrigation potential of 9.82 lakh hectares has been created during 2009-10.

- A budget allocation of ₹ 9750 crore was made by the Ministry of Finance for AIBP for 2011-12, which includes ₹ 1450 crore for National Projects, against which, an amount of ₹ 5783.88 crore has been released to States as grant.
- Of the 65 major/medium projects initially included in the **Prime Minister's Relief Package for Agrarian Distress Districts** of Andhra Pradesh, Karnataka, Kerala and Maharashtra, 40 projects have been funded under AIBP till March 2012 and the grant released for these projects is ₹ 6267.86 crore.
- 14 projects have been identified as **National Projects** for which Central Assistance of 90% of cost of the project is provided. Out of these 14 projects, three projects, namely, Gosikhurd project of Maharashtra, Shahpur Kandi project of Punjab and Teesta Barrage project of West Bengal have been funded under the scheme. Gosikhurd project has been provided grant amounting to ₹ 2582.94 crore during 2008-09 to 2010-11. Shahpur kandi project has been provided grant

amounting to ₹ 26.036 crore during 2009-10 and 2010-11. Teesta Barrage project started receiving funding under the scheme of National Project during 2010-11 and grant amounting to ₹ 81.00 crore was provided to the project. During 2011-12, an amount of ₹ 97.20 crore has been released.

- Under **Bharat Nirman**, irrigation potential created during 2010-11 stood at 1.22 million hectare and during 2011-12 (till September 2011) stood at 0.079 million hectare.
- Under the scheme of **Repair, Renovation and Restoration (RRR) of Water Bodies** with domestic support, a sum of ₹ 146.16 crore was released during 2009-10 and ₹ 374.66 crore was released during 2010-11. During the year 2011-12, a sum of ₹ 288.09 crore has been released till December 2011. ₹ 34.68 crore has been released to Chhattisgarh, ₹ 10.61 crore to Gujarat, ₹ 6.79 crore to Haryana, ₹ 80.53 crore to Maharashtra, ₹ 70.33 crore to Odisha, ₹ 77.51 crore to Karnataka, ₹ 2.62 crore to MP (Bundelkhand) and ₹ 5.02 crore to Rajasthan. The number of Water Bodies covered stands at 3341 till 31<sup>st</sup> December 2011.

Besides, under EAP component of the scheme, a sum of ₹ 174.88 crore has been released till December, 2011.

- Under the State Sector Scheme of **Command Area Development and Water Management Programme (CAD&WM)**, as against an outlay of ₹ 584.00 crore during 2011-12, Central Assistance amounting to ₹ 150.55 crore (upto December 2011) and ₹ 247.05 crore (till February 2012) has been released to States. The construction of field channels covered an area of 0.227 million hectare during 2011-12 (upto December, 2011).

- Ministry of Water Resources introduced a component of **Reclamation of Waterlogged Areas** under the Centrally Sponsored Command Area Development Programme w.e.f. 1.4.1996. So far 727 schemes of 9 States, namely, Bihar, Gujarat, Madhya Pradesh, Jammu & Kashmir, Karnataka, Kerala, Maharashtra, Odisha and Uttar Pradesh have been approved for reclamation of 117.808 thousand hectare (th. ha.) waterlogged area. Out of this, an area of 54.196 th. ha. has been reported to be reclaimed by these States upto March, 2011.
  - **Participatory Irrigation Management:** 15 States viz. Andhra Pradesh, Assam, Bihar, Chhattisgarh, Goa, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Sikkim, Tamil Nadu and Uttar Pradesh have either enacted exclusive legislation or amended their Irrigation Acts for involvement of farmers in irrigation management. Other States are also taking steps in this direction. So far 63,167 Water Users' Associations have been formed in various States covering an area of 14.623 Mha. under various commands of irrigation projects.
  - Under **Flood Management Programme**, Central Assistance amounting to ₹ 3140.05 crore has been released to States (including ₹ 89.79 crore for spilled over works of X<sup>th</sup> Plan) during XI<sup>th</sup> Plan (as on 31.12.2011), out of which ₹ 472.40 crore has been released during the current financial year (upto 31.12.2011). A total of 230 works in twelve States are reported physically completed at site by the respective State Governments as on 30.11.2011, out of which 12 works have been completed during the current financial year (upto 30.11.2011). By completing 218 works, an area of 1.86 m ha has been restored/ protected against floods. It would provide safety to over 19.72 million people during high floods situation.
- The State Government of West Bengal utilized a total amount of ₹ 294.96 crore including State's share of ₹ 107.11 crore for reconstruction, remodeling and improvement of embankments in Sunderban and adjoining areas in the districts of North and South 24 Parganas, damaged by severe cyclone 'AILA', till December, 2011.
- **Flood Forecasting:** During the flood season 2011 (May to Oct.), 5991 flood forecasts (4848 level forecasts and 1143 inflow forecasts) were issued, out of which 5903 (98.53%) forecasts were found within accuracy limit of (+/-) 0.15 m for level forecast and (+/-) 20% for inflow forecast.
  - Central Ground Water Board (CGWB) under their **Ground Water Exploration Programme** constructed 495 wells (EW-267, OW-102, PZ-126) including 43 high yielding wells during the financial year 2011-12 (up to 31.12.2011) to assess the ground water potential in different hydrogeological set up. Priority was accorded to drought affected and tribal areas, hard rock areas and pollution affected areas. Out of 495 bore wells constructed, 86 wells and 107 wells were constructed for exploration in tribal and drought prone areas respectively.
  - **Geophysical Studies:** CGWB carried out 1161 vertical electrical soundings, 1.80 line kilometer resistivity profiling and geophysical logging of 35 bore holes in various parts of the country during 2011-12 (up to 31<sup>st</sup> December, 2011).
  - **Water Quality Analysis :** 14619 samples have been analyzed during the year 2011-12 (up to 31<sup>st</sup>

December, 2011), out of which 11532 samples were analysed for basic constituents, 2581 samples for heavy metals such as Cu, Zn, Fe, Mn, CO, Cd, Cr, Ni, Pb, etc. and 506 samples for organic and specific constituents.

- The scheme on **Artificial Recharge to Ground Water through Dug Wells** had an approved cost of ₹1798.71 crore for implementation during 2007-08. Total amount of subsidy of ₹ 260.53 crore has been released to 711488 beneficiaries. A total of 108671 dug well recharge structures have been constructed in the participating States till 31<sup>st</sup> December 2011. The total expenditure incurred under various component of the scheme as on 31<sup>st</sup> December 2011 is ₹ 280.40 crore.
- 83 **Projects** for construction of 1488 artificial recharge structures amounting to ₹ 8392.40 lakh have been approved in the XI Plan and ₹ 6469.88 lakh have been released to the 20 States as on 31<sup>st</sup> December 2011. 568 recharge structures have been completed till December, 2011 and the remaining are under progress. During the year 2011-12, 59 Projects for 413 artificial recharge structures in Odisha, Rajasthan, Himachal Pradesh, Jammu & Kashmir, Delhi, Bihar, Nagaland, Kerala, Andhra Pradesh, Karanataka, Uttar Pradesh and Punjab, amounting to ₹ 3529.372 lakh have been approved and ₹ 3122.59 lakh have been released till December 2011. This includes ₹ 651 lakh released as second / third installment. A total of 215 artificial recharge structures were completed in this year till December, 2011.
- Under **Infrastructure Development Scheme**, an amount of ₹ 28.40 crore was provided during the financial year 2011-12 and the expenditure incurred upto December, 2011 stood at ₹ 11.14 crore on Land & Building and ₹ 1.52 crore on Information Technology components of Central Water Commission/ Central Ground Water Board/ Ministry (Proper).
- The **“National Water Mission”** has been formulated by the Ministry of Water Resources with the main objective of “conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within States through integrated water resources development and management”. The Mission was approved by Hon’ble Prime Minister’s Council on 30-08-10 and by the Union Cabinet on 06-04-11.
- The **draft National Water Policy (2012)** has been put up on the website of Ministry of Water Resources <http://mowr.gov.in> and arrangement has been made to facilitate posting of online comments/suggestions. A separate email id [nwp2012-mowr@nic.in](mailto:nwp2012-mowr@nic.in) has also been created to receive comments. The draft National Water Policy (2012) has also been circulated amongst related Ministries and all States/UTs for soliciting their comments. After carrying necessary modifications, it would be placed before National Water Board and National Water Resources Council for finalization and adoption.
- Ministry of Water Resources participated in the **31<sup>st</sup> India International Trade Fair (IITF)** at Pragati Maidan, New Delhi during the period 14<sup>th</sup> to 27<sup>th</sup> November, 2011 on the theme “Save Water – Secure Future”. The central attraction of the pavilion was a large size working model of the proposed Pancheshwar Multipurpose Project, a joint venture of India-Nepal Mahakali Treaty. Models on the activities of CWC, CWPRS, NIH, CSMRS, CGWB and other organisations of the Ministry

were exhibited to depict wide variety of subjects concerning their activities to spread awareness amongst masses for water conservation and management.

- Ministry of Water Resources organized a three-tier painting competition on **water conservation** themes for the students of 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> standards in 29 States/UTs of the country. The objective of organising the painting competition was to engage the attention of children towards the need of water conservation and to inculcate in them the habit of judicious use of water right from their formative years. A total of 16.05 lakh students from 23,475 schools participated at the school level competition in 29 States/UTs.
- **Co-operation in Flood Forecasting:** India is providing the flood data of Farakka and Sahibganj for Ganga (from 15<sup>th</sup> June to 15<sup>th</sup> October) and the flood data of Pandu, Goalpara and Dhubri for Brahmaputra and of Silchar for Barak besides the data of rivers Teesta, Manu, Gumti, Jaladhaka and Torsa during monsoon period (from 15<sup>th</sup> May to 15<sup>th</sup> October) to 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. Flood data of above sites was communicated to Bangladesh on continuous basis during the Monsoon of the year 2011.
- During the 6<sup>th</sup> meeting of **India-Nepal Joint Committee on Water Resources** (JCWR) held on 24-25 November, 2011 at New Delhi, it agreed for initiating the process of establishment of Pancheshwar Development Authority (PDA) for the implementation of Pancheshwar Multipurpose Project.
- Two agreements have been signed between the Ministry of External Affairs, Government of India and WAPCOS Limited, a Public Sector Undertaking under the Ministry of Water Resources on 16<sup>th</sup> December, 2011 under which WAPCOS has been appointed as the Project Consultant for:
  1. Preparation of Strategy Paper on Integrated Water Resource Development and Management for Lake Chad Basin
  2. Preparation of Strategy Paper on Integrated Water Resource Development and Management for Save River Basin in Zimbabwe and Sankuru River Basin in D.R. Congo.
- Under **ITEC programme for African Nationals**, National Water Academy, Pune conducted training programme, namely, "Preparation of Detailed Project Report from 28<sup>th</sup> November to 9<sup>th</sup> December 2011 and trained 16 trainees from 12 African countries.
- A Memorandum of Understanding was signed between National Institute of Hydrology, Roorkee and University of Applied Sciences, Dresden (HTWD), Germany on 31<sup>st</sup> May, 2011 for establishment and operation of an "**Indo-German Competence Centre for Riverbank Filtration (IGCCRBF)**" at NIH, Roorkee. The main objective of IGCCRBF is to establish and promote national and international linkage for collaborative multi-disciplinary research on River Bank Filtration Systems in India.
- NIH has joined a consortium of 20 organizations from 8 countries to collaborate in the R & D project entitled, "**Saph Pani** -

**Enhancement of natural water systems and treatment methods for safe and sustainable water supply in India”,** under 7<sup>th</sup> Framework Programme (Theme–ENV.2011.3.1.1.2) of the European Commission. The project duration is 36 months starting from October 2011.

- **WAPCOS Limited**, a Government of India Enterprise under the aegis of the Ministry of Water Resources, achieved turnover of ₹ 35117.76 lakh in 2010-11 as against the previous year of ₹ 30124.07 lakh. The net profit of the company was ₹ 3618.42 lakh in 2010-11 compared to ₹ 3003.09 lakh in the previous year. A dividend of ₹ 760 lakh was paid for the year 2010-11.
- **National Projects Construction Corporation Limited**, a Government of India Enterprise under the aegis of the Ministry of Water Resources, achieved a turnover of ₹ 1061.90 crore in 2010-11 as compared to previous year's turnover of ₹ 991.11 crore. The Company also registered a net profit of ₹ 72.74 crore (including deferred tax of ₹ 40.65 crore) in 2010-11.
- **National Institute of Hydrology**, Roorkee published 178 papers in reputed international and national journals and proceedings of international and national conferences and symposia during the year 2011-12.
- **Central Water & Power Research Station** undertook more than 100 studies assignments on a no-loss, no-profit basis in the three major sectors of water resources, energy and water-borne transport during 2011-12 (till 31.12.2011).
- **National Water Academy** (NWA), Pune conducted 25 training programs consisting of total 28 weeks of training during the year 2011-12 (up to December 2011). **Rajiv Gandhi National Ground Water Training & Research Institute** (RGI) conducted 23 training programmes and trained 409 trainees during the year 2011-12 (upto 31.12.2011).
- **National Institute of Hydrology** organized a 2-day workshop on “Integrated Water Resources Management Strategy for Water Scarce Bundelkhand region in India” supported by the TIFAC (DST, GoI) under India-IIASA Program during Dec. 6-7, 2011.



## Chapter 2

# National Water Mission and Policy

### NATIONAL WATER MISSION

#### Goals and Strategies

The Government of India launched National Action Plan on Climate Change (NAPCC) on 30<sup>th</sup> June, 2008, which, inter-alia, envisages 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 Ecosystem, (f) National Mission for a Green India, (g) National Mission for Sustainable Agriculture, and (h) National Mission on Strategic Knowledge for Climate Change. Ministry of Water Resources is the nodal Ministry for National Water Mission with the main objective of "*conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within States through integrated water resources development and management*".

Water resources schemes and projects are multi-disciplinary in nature and are implemented by several departments and agencies of State Governments and various ministries/departments of Central Government. Therefore, Ministry of Water Resources (MoWR) constituted six Sub-Committees to examine all related aspects in the field of:

- (a) Policy and Institutional Framework;
- (b) Surface Water Management;
- (c) Ground Water Management;
- (d) Domestic and Industrial Water Management;
- (e) Efficient Use of Water for Various Purposes; and
- (f) Basin Level Planning and Management.

Based on the objectives of the National Water Mission, identified key areas to be addressed, and recommendations of these Sub-Committees, a Comprehensive Mission Document for National Water Mission was prepared, which was approved by the Union Cabinet on 6<sup>th</sup> April, 2011.

The Comprehensive Mission Document for National Water Mission identifies five goals as under:

1. Comprehensive water data base in public domain and assessment of the impact of climate change on water resources,
2. Promotion of citizen and State actions for water conservation, augmentation and preservation,
3. Focused attention to vulnerable areas including over-exploited areas,
4. Increasing water use efficiency by 20% and
5. Promotion of basin level integrated water resources management.

Following strategies have been identified to achieve the above goals:

## **Goal I - Comprehensive water data base in public domain and assessment of the impact of climate change on water resources**

### **Strategies**

- I.1 Review and establishment of network for collection of additional necessary data
- I.2 Development of water resources information system
- I.3 Development / implementation of modern technology for measurement of various data
- I.4 Developing inventory of wetland
- I.5 Research and studies on all aspects related to impact of climate change on water resources including quality aspects of water resources with active collaboration of all research organizations working in the area of climate change
- I.6 Reassessment of basin-wise water situation
- I.7 Projection of the impact of climate change on water resources

## **Goal II - Promotion of citizen and State action for water conservation, augmentation and preservation**

### **Strategies**

- II.1 Empowerment and involvement of Panchayati Raj Institutions, urban local bodies, Water Users' Associations and primary stakeholders in management of water resources with focus on water conservation, augmentation and preservation
- II.2 Promote participatory irrigation management
- II.3 Sensitization of elected representatives of over-exploited areas on dimensions of the problems and to orient investment under MNREGP towards water conservation
- II.4 Provide incentives for water neutral and water positive technologies in industry

- II.5 Encourage participation of NGOs in various activities related to water resources management, particularly in planning, capacity building and mass awareness
- II.6 Involve and encourage corporate sector / industries to take up support and promote water conservation, augmentation and preservation within the industry and part of corporate social responsibility

## **Goal III - Focused attention to vulnerable areas including over-exploited areas**

### **Strategies**

- III.1 Expeditious implementation of water resources projects, particularly the multipurpose projects with carry over storages benefitting drought prone and rain deficit areas
- III.2 Promotion of traditional system of water conservation
- III.3 Physical sustainability of groundwater resources
- III.4 Intensive programme for ground water recharge in over-exploited, critical and semi-critical areas
- III.5 Conservation and preservation of wetland
- III.6 Intensive programme for addressing the quality aspects of drinking water, particularly in rural area
- III.7 Promotion of water purification and desalination
- III.8 Systematic approach for coping with floods

## **Goal IV - Increasing water use efficiency by 20%**

### **Strategies**

- IV.1 Research in area of increasing water use efficiency and maintaining its quality in agriculture, industry and domestic sector

- IV.2 Incentivize recycling of water including wastewater
- IV.3 Development of Eco-friendly sanitation system
- IV.4 Improve efficiency of urban water supply system
- IV.5 Efficiency labeling of water appliances and fixtures
- IV.6 Promotion of water efficient techniques and technologies
- IV.7 Undertake pilot projects for improvement in water use efficiency in collaboration with States
- IV.8 Promote Water Regulatory Authorities for ensuring equitable water distribution and rational charges for water facilities
- IV.9 Promote mandatory water audit including those for drinking water purposes
- IV.10 Adequate provision for operation & maintenance of water resources projects
- IV.11 Incentive through award for water conservation & efficient use of water
- IV.12 Incentivize use of efficient irrigation practices and fully utilise the created facilities.

## **Goal V - Promotion of basin level integrated water resources management**

### **Strategies**

- V.1 Review of National Water Policy
- V.2 Review of State Water Policy
- V.3 Guidelines for different uses of water e.g., irrigation, drinking, industrial etc. particularly in context of basin wise situations
- V.4 Planning on the principle of integrated water resources development and management
- V.5 Inter-basin integration particularly for augmenting water by converting surplus flood water into utilizable water

- V.6 Ensuring convergence among various water resources programmes

### **National Water Mission Directorate**

In pursuance of the approval accorded by the Union Cabinet to the National Water Mission, a compact Mission Directorate has been established in the Ministry of Water Resources. The Mission Directorate is functioning with Additional Secretary (Water Resources) as Mission Director, Chief Engineer (P&D), CWC as Advisor (Technical) and Sr. Jt. Commissioner (PP) as Advisor (Coordination & Monitoring). Creation of various posts and finalization of their Recruitment Rules is in progress.

### **Advisory Board / Committees / Groups of National Water Mission**

Following eight Advisory Groups / Committees envisaged in the National Water Mission Document has also been constituted:

1. Advisory Board under the Chairmanship of Union Minister of Water Resources
2. High Level Steering Committee for National Water Mission under the Chairmanship of Secretary (Water Resources)
3. Inter-sectoral Advisory Group for Goal-I: Comprehensive Water Data Base in Public Domain and Assessment of Impact of Climate Change on Water Resources under the Chairmanship of Chairman, Central Water Commission
4. Inter-sectoral Advisory Group for Goal-II: Promotion of Citizen and State Action for Water Conservation, Augmentation and Preservation under the Chairmanship of Secretary (Water Resources)
5. Inter-sectoral Advisory Group for Goal-III: Focused Attention to Vulnerable Areas including Over-



exploited Areas under the Chairmanship of Chairman, Central Ground Water Board

6. Inter-sectoral Advisory Group for Goal-IV: Increasing Water use Efficiency by 20% under the Chairmanship of Secretary (Water Resources)
7. Inter-sectoral Advisory Group for Goal-V: Promotion of Basin Level and Integrated Water Resources Management under the Chairmanship of Secretary (Water Resources)
8. Technical Committee on Climate Change and Water Resources under the Chairmanship of Chairman, Central Water Commission

### Status of Implementation

The National Water Mission Document did not earmark any specific outlay for implementation of its strategies during the year 2011-12. It stipulated that the expenditure towards implementation of prioritized strategies during the XI Five Year Plan (2007-12) would be met out of present allocation of various schemes / programmes with appropriate re-allocations within the approved outlays for the schemes / programmes.

However, for the XII Five Year Plan, a specific plan scheme "Implementation of National Water Mission" has been prepared, for which the Working Group on Major & Medium Irrigation of the Planning Commission has recommended an outlay of ₹ 10900 crore.

Considering the importance of achieving the goals and strategies of National Water Mission, the Prime Minister's Office has identified it as the thrust area for the Ministry of Water Resources. The status of implementation of National Water Mission versus Mission Deliverables identified by Prime Minister's Office is at **Table-1**. A review of progress of

implementation of National Water Mission was also taken by the Advisor to the Prime Minister on 19<sup>th</sup> December, 2011.

### Initiatives taken under National Water Mission

#### Proposal for Setting up of National Bureau of Water Use Efficiency

The National Action Plan on Climate Change (NAPCC) launched by the Government of India, inter-alia, envisaged development of a framework to optimize water use by increasing water use efficiency by 20% through regulatory mechanisms. In pursuance, the National Water Mission (NWM) document envisages 'Increasing Water Use Efficiency by 20%' as one of its five key goals.

Ministry of Water Resources proposes to constitute a National Bureau of Water Use Efficiency (NBWUE) as an Authority under Section 3(3) of Environment (Protection) Act 1986 for the purpose of promotion, regulation and control of efficient use of water in irrigation, municipal and / or industrial uses. The proposed Bureau will have the overall responsibility of improving water use efficiency across various sectors, namely, irrigation, drinking water supply, power generation and industry in the whole country.

A draft note for Cabinet Committee on Economic Affairs has been prepared by the Ministry of Water Resources and circulated to the concerned Ministries / Departments of the Government of India for comments. An EFC Memorandum in this regard has been circulated. Thereafter, the proposal would be placed before the Cabinet Committee on Economic Affairs.

#### Guidelines for Grants-in-Aid to NGOs/VOs

The National Water Mission Goal – 2: *Promotion of citizen and State action for*

*water conservation, augmentation and preservation*, inter-alia, include the strategy to encourage participation of NGOs in various activities related to water resources management, particularly in planning, capacity building and mass awareness. Non Governmental Organizations (NGOs) / Voluntary Organizations (VOs) are found to be very effective in mobilizing communities at the grass root level and therefore, their involvement in the fields of preservation, conservation and efficient use of water throughout the country would go a long way in achieving the objectives of water security, food security and sustainable livelihood to the people. Ministry of Water Resources proposes to utilize the services of reputed, non-profit, secular NGOs with proven track record in identified fields of activity relating to the water resources sector. Hence, guidelines for registration and release of grants-in-aid to NGOs/VOs as per provisions of General Financial Rules have been prepared.

### Interaction with States for Implementation of Strategies of National Water Mission

Active co-operation of the States for implementation of various strategies of

National Water Mission, for example, preparation of State specific action plans for taking up the activities like creation of comprehensive water data base; sensitization, training and capacity building of local bodies through involvement of NGOs, taking up projects for improving water use efficiency; basin level integrated water resources management, etc., are essential. Hence, all States have been requested for setting up of Water Mission Cells to facilitate this.

In order to have the first hand interaction with related State Departments and prominent NGOs, interactive meetings with senior State Government Officers dealing with Irrigation/Water Resources, Ground Water, Command Area Development, Panchayati Raj, Chief Engineers of major/medium water resources projects and representatives of prominent NGOs were held on 17<sup>th</sup> January, 2012 at Chennai for the State of Tamil Nadu and on 9<sup>th</sup> February, 2012 at Bhopal for the State of Madhya Pradesh. Very encouraging responses were received from these two States and more such meetings are planned in future.

**Table-1: Status of Implementation of National Water Mission Versus Mission Deliverables Identified by the Prime Minister's Office**

Sl. No.	Goals	Mission Deliverables	Status
1.	Institutional Mechanism	(i) Setting up of Mission Secretariat  (ii) Constitution of Advisory Boards / Groups / Committees envisaged in National Water Mission Document.  (iii) Convening of meetings of Advisory Boards / Groups / Committees	Mission Secretariat set up vide Order dated 8 <sup>th</sup> July, 2011  Advisory Boards / Groups / Committees (8 in nos.) envisaged in National Water Mission Document constituted vide Orders dated 10-12 August, 2011.  The first set of meetings convened in December, 2011

2	<p><b>Goal 1 –</b></p> <p>Comprehensive water database in public domain and assessment of the impact of climate change on water resources</p>	<p>(i) The initial projections of the impact of climate change on water resources including the likely changes in the water availability in time and space.</p> <p>(ii) Downscaling of climate change models on river basin scale</p> <p>(iii) Placing the first set of water data (except data of classified and sensitive nature) in public domain</p>	<p>A "<i>Preliminary Consolidated Report on Effect of Climate Change on Water Resources</i>" already prepared and placed on CWC website. The initial projections of the impact of climate change on water resources including the likely changes in the water availability in time and space have been made as part of Second National Communication to United Nations Framework Convention on Climate Change (UNFCCC) by Ministry of Environment &amp; Forests.</p> <p>Studies for downscaling of climate change models on river basin scale for assessment of the impact of climate change on water resource are being initiated.</p> <p>First set of data are in the public domain with launching of first phase of "Water Resources Information System" on 7<sup>th</sup> December 2010. Further updation of "Water Resources Information System" (<a href="http://www.india-wris.nrsc.gov.in/webgis.php">http://www.india-wris.nrsc.gov.in/webgis.php</a>) is in progress in association with ISRO.</p>
3	<p><b>Goal 2 –</b></p> <p>Promotion of citizen and State action for water conservation, augmentation and preservation</p>	<p>Sensitization of all Panchayat Members and their functionaries in dark and grey blocks.</p>	<p>Central Ground Water Board is drawing up a calendar of activities in consultation with State Governments for sensitization of all Panchayat Members and their functionaries especially in dark and grey blocks.</p>

4	<b>Goal 3 –</b> Focused attention to vulnerable areas including over-exploited areas	(i) Comprehensive assessment of ground water resources through aquifer mapping.  (ii) The revised master plan for artificial recharge to ground water will be in public domain  (iii) All over-exploited areas to be covered by recharge of ground water	A pilot project for Micro Level Aquifer Mapping in six areas varying from 200 to 500 sq. km. in different hydro-geological environs of the country has been taken up under World Bank Aided Hydrology Project. Suitable provision has been made during 12 <sup>th</sup> Five Year Plan for upscaling this all over the country.  A revised master plan for artificial recharge to ground water has been prepared and is being placed in public domain.  A comprehensive plan proposal for artificial recharge of ground water especially in over-exploited areas has been proposed for XII <sup>th</sup> Five Year Plan.
5	<b>Goal 4 –</b> Increasing water use efficiency by 20%	The gap of about 15% between the irrigation potential created and the irrigation potential utilized to be reduced by half.	AIBP guidelines are being revised to conform to the benchmarks for water use efficiency and taking up command area development works pari-passu with the distribution works.
6	<b>Goal 5 –</b> Promotion of basin level and integrated water resources management	(i) Review of National Water Policy  (ii) Preparation of river Basin Master Plan for integrated water resources development & management.  (iii) Guidelines for different uses	Consultation for review of National Water Policy has been completed with Hon'ble Members of Parliament, Academia, Professional and Experts, Corporate Leaders, Non – Governmental Organizations, representatives of Panchayati Raj Institutions. Draft National Water policy has been placed on the website of the Ministry for soliciting on line comments and would be processed for adoption through National Water Board and National Water Resources Council.  Proposal for restructuring of CWC has been circulated amongst all States, concerned Ministries, Non Governmental Organizations, etc. in August, 2011. A consultant has been appointed to review the proposal in light of comments received. Thereafter, a Cabinet Note would be prepared for approval of the Cabinet for necessary implementation.  Preliminary draft on "Guidelines for

		of water	different uses of water” has been prepared in CWC, which has been circulated for comments.
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**NATIONAL WATER POLICY**

The first National Water Policy (NWP) was adopted by the National Water Resources Council under the Chairmanship of Hon’ble Prime Minister during its 2<sup>nd</sup> meeting held on 9<sup>th</sup> September 1987. This policy guided the formulation of policies and programmes for water resources development and its management. Thereafter, new challenges emerged in the water resources sector, which necessitated review of the National Water Policy. Accordingly, the revised National Water Policy-2002 was adopted by the National Water Resources Council in its 5<sup>th</sup> meeting held on 1<sup>st</sup> April 2002.

The National Water Policy - 2002 provides that “National Water Policy may be revised periodically as and when need

arises”. The National Water Board, which was constituted to review the progress achieved in implementation of the National Water Policy and to report the progress to the National Water Resources Council from time to time, in its 10<sup>th</sup> meeting held on 18<sup>th</sup> September 2009 recommended review of National Water Policy-2002. The National Action Plan on Climate Change (NAPCC) and the National Water Mission Documents also stipulate review of National Water Policy. Accordingly, the Ministry of Water Resources undertook review of National Water Policy 2002 to ensure sustainable and equitable development taking into consideration the likely impact due to climate change. A series of consultation meetings were held with different groups of stakeholders for review of National Water Policy as under:





Consultation (including through video-conferencing) with the representatives of Panchayati Raj Institutions for review of National Water Policy at NWA, Pune on 02.11.2011

1. With Hon'ble Members of Parliamentary Standing Committee on Water Resources, Consultative Committee for Ministry of Water Resources and Parliamentary Forum on Water Conservation and Management on 28<sup>th</sup> July, 2010 at New Delhi.
 

A Drafting Committee comprising of Dr. S.R. Hashim, former Member, Planning Commission and former Chairman, Union Public Service Commission; Prof. Subhash Chander, former Professor, IIT, Delhi; Shri A.D. Mohile, former Chairman, Central Water Commission; and Shri S.C. Jain, an expert from an NGO was constituted for drafting of the National Water Policy. This Committee was supported by a team of officers from Ministry of Water Resources, Central Water Commission, Central Ground Water Board, National Rainfed Area Authority; National Institute of Hydrology and Planning Commission.
  2. With Academia, Experts and Professionals on 26<sup>th</sup> October, 2010 at New Delhi.
  3. With Non-Governmental Organizations held on 11<sup>th</sup> & 12<sup>th</sup> January, 2011 at New Delhi.
  4. With Corporate Sector held on 21<sup>st</sup> March, 2011 at New Delhi.
  5. With representatives of Panchayati Raj Institutions on 16<sup>th</sup> June, 2011 at Hyderabad, on 30<sup>th</sup> June, 2011 at Shillong, on 14<sup>th</sup> July, 2011 at Jaipur and on 2<sup>nd</sup> November, 2011 at Pune.
- Considering the recommendations and feedback received during various consultation meetings, the Drafting Committee identified basic concerns in water resources sector and adopted basic principles which should be followed to address those concerns, and accordingly, evolved draft policy recommendations. The salient features of Draft National

Water Policy (NWP, 2012) are at **Annexure-V**.

The draft National Water Policy (2012) has been put up on the website of Ministry of Water Resources <http://mowr.gov.in> and arrangement has been made to facilitate posting of online comments/suggestions. A separate email id [nwp2012-mowr@nic.in](mailto:nwp2012-mowr@nic.in) has also been

created to receive comments. The draft National Water Policy (2012) has also been circulated amongst related Ministries and all States/UTs for their comments. After carrying necessary modifications, it would be placed before National Water Board and National Water Resources Council for finalization and adoption.

# Chapter 3

## Major Programmes

### MAJOR PROGRAMMES (STATE SECTOR)

#### ACCELERATED IRRIGATION BENEFITS PROGRAMME

The Accelerated Irrigation Benefits Programme (AIBP) was launched during 1996-97 to provide loan assistance to the States to help them complete some of the incomplete major/medium irrigation projects which were in an advanced stage of completion and thereby create additional irrigation potential in the country. The surface minor irrigation schemes of North-Eastern States, Hilly States of Sikkim, Uttaranchal, Jammu and Kashmir, Himachal Pradesh and Koraput, Bolangir and Kalahandi districts of Odisha have also been provided Central Loan Assistance (CLA) under this programme since 1999-2000. Grant component has been introduced in the programme from April, 2004 like other Central Sector Schemes. As per the existing AIBP criteria effective from December, 2006, grant amounting to 25% of the project cost for major and medium irrigation projects in non-Special Category States and 90% grant of the project cost for major/medium/minor irrigation projects in Special Category States (including undivided Koraput, Bolangir and Kalahandi districts of Odisha) are provided to the selected projects. The minor irrigation schemes in non-Special Category States falling in drought prone/tribal areas are treated at par with Special Category States and are released 90% grant of the project cost. Major and medium projects providing irrigation benefit to drought prone/tribal area and flood prone area are also eligible for 90% grant of the project cost. The State

Governments have been provided an amount of Rs. 51132.02 crore upto 31.12.2011 and ₹ 54350.648 crore till March 2012 as CLA/Grant under AIBP since inception of this programme for 292 major/medium irrigation projects and 13098 surface minor irrigation schemes. State-wise details of Central Assistance released under AIBP till December 2011 are given in **Table-2**. After commencement of this Programme, 134 major/medium irrigation schemes have been completed upto 31.12.2011 and 9220 surface minor irrigation schemes have been completed upto October 2011. An additional irrigation potential of 5.486 million hectare has been created through major/medium irrigation projects and an irrigation potential of 0.454 million hectares has been created through surface minor irrigation schemes upto March, 2009. Irrigation potential of 9.82 lakh hectares has been created during 2009-10.

As per the prevailing AIBP guidelines, projects benefiting drought prone/tribal area, projects included in the Prime Minister's relief package for agrarian distress districts of Maharashtra, Karnataka, Andhra Pradesh and Kerala and projects in the States having irrigation development below national average could be included in AIBP in relaxation to one to one criteria of inclusion of new project under AIBP. Of the 65 major/medium projects initially included in the Prime Minister's relief package for agrarian distress districts of Andhra Pradesh, Karnataka, Kerala and Maharashtra, so far 40 projects have been funded under AIBP. The grant released upto March 2012 for these projects is ₹ 6267.86 crore.



**Table-2: CENTRAL ASSISTANCE RELEASED UNDER THE AIBP DURING 1996-97 TO 2011-12 (uptoDec 2011)**

Sl. No.	State	( ₹ crore)									
		1996-97 to 2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12 (upto Dec. 2011)	Grand Total (upto Dec. 2011)
(1)	(2)		(11)	(12)	(13)	(14)	(15)	(16)			(17)
1	Andhra Pradesh	869.33	87.55	311.38	843.42	987.77	855.18	1300.73	22.79	113.40	5391.55
2	Arunachal Pradesh	51.50	10.00	18.00	27.00	47.18	33.96	30.78	48.63	30.41	297.46
3	Assam	120.19	16.93	34.93	30.27	77.34	405.95	589.97	406.40	225.30	1998.29
4	Bihar	428.85	37.22	16.24	3.23	62.24	109.70	77.91	55.75	0.00	794.48
5	Chhattisgarh	265.28	2.93	7.66	10.71	96.96	193.04	60.89	174.81	201.47	983.13
6	Goa	130.40	0.65		1.91	32.48	39.23	20.25	20.00	0.00	244.92
7	Gujarat	3622.42	530.50	339.60	121.89	585.72	258.61	6.08	361.42	0.00	5826.24
8	Haryana	70.24	11.14	6.00	3.17	0.00	0.00	0.00		0.00	90.54
9	H P	66.65	3.69	30.08	3.93	114.05	119.32	90.68	43.52	0.00	502.62
10	J & K	84.05	12.74	36.69	37.77	199.23	393.07	171.73	156.03	156.01	1367.15
11	Jharkhand	62.91	21.29	5.04	1.29	9.22	3.72	0.00	242.89	66.83	413.19
12	Karnataka	1954.22	396.30	140.78	160.37	349.90	442.42	823.83	567.76	134.51	4970.07
13	Kerala	89.09	49.44	9.36	16.65	0.00	0.90	3.81	10.02	0.00	179.27
14	Madhya Pradesh	1505.20	516.70	168.10	48.31	500.35	473.78	758.75	658.69	240.27	4870.15
15	Maharashtra	603.38	529.29	167.38	465.52	972.25	2257.83	1395.39	2069.06	352.56	8812.66
16	Manipur	108.75	13.00	75.70	156.30	103.99	221.67	42.54	250.00	0.00	970.46
17	Meghalaya	15.26	1.74	1.58	0.75	1.16	24.80	22.50	110.19	0.00	174.74
18	Mizoram	14.92	5.00	9.32	14.24	34.34	50.72	36.45	51.09	37.90	253.97
19	Nagaland	23.39	4.00	8.00	10.60	40.51	48.60	57.29	70.00	65.39	322.77
20	Orissa	898.25	24.22	151.37	133.88	624.36	724.44	871.57	591.68	313.38	4301.44
21	Punjab	415.47		26.32		13.50	9.54	22.05	140.48	0.00	627.35
22	Rajasthan	1140.39	352.90	90.30	11.60	156.53	178.62	157.58	41.92	0.00	2129.84
23	Sikkim	5.26	0.75	0.91	3.32	3.24	0.00	2.60	14.36	33.71	61.77
24	Tripura	109.22	11.00	32.00	22.51	8.10	43.18	36.21	48.00	0.00	310.21
25	Tamil Nadu	20.00				0.00	0.00	0.00		0.00	20.00
26	Uttar Pradesh	1788.38	175.92	133.13	81.90	150.69	315.47	238.08	432.54	190.97	3507.07
27	Uttarakhand	50.72	38.99	80.44	84.73	265.65	371.66	127.01	160.06	232.75	1412.00
28	West Bengal	156.71	13.46	0.03	6.70	8.95	22.81	0.91	89.10	0.00	298.67
	<b>Total</b>	14670.43	2867.34	1900.31	2301.97	5445.71	7598.22	6945.59	6837.20	2394.85	51132.02

A budget allocation of ₹ 9750 crore was made by the Ministry of Finance for AIBP for 2010-11 which includes ₹ 1450 crore for National Projects, against which, an amount of ₹ 5783.88 crore has been released as grant under AIBP.

**PRIME MINISTER'S PACKAGE FOR AGRARIAN DISTRESSED DISTRICTS**

During 2006-07, a large number of cases of suicide of farmers were reported from several districts of Andhra Pradesh, Karnataka, Kerala and Maharashtra. Prime Minister announced a relief package for these districts which also

included financial assistance to 65 selected major/medium projects under AIBP.

Central Assistance amounting to ₹ 6267.86 crore has been provided for 40 major/medium projects of the PM package under AIBP till March 2012.

## NATIONAL PROJECTS

The Union Cabinet in its meeting held on 7<sup>th</sup> February 2008 gave its consent to the proposal of the Ministry of Water Resources on implementation of National Projects with Central Assistance of 90% of the cost of the project as grant falling in the following selection criteria:

- (i) International projects where usage of water in India is required by a Treaty or where planning and early completion of the project is necessary in the interest of the country.
- (ii) Inter-State projects which are dragging on due to non-resolution of inter-State issues relating to sharing of costs, rehabilitation, aspects of power production etc., including river inter-linking projects.
- (iii) Intra-State projects with additional potential of more than 2 lakh ha. and with no dispute regarding sharing of water and where hydrology is established

Ministry of Water Resources has finalized modalities of funding and guidelines for implementation of scheme of National Projects in consultation with Planning Commission and Ministry of Finance and has sent the same to all the States and Union Territories. So far, three projects, namely, Gosikhurd project of Maharashtra, Shahpur Kandi project of Punjab and Teesta Barrage project of West Bengal have been funded under the scheme of National Projects. Gosikhurd project has been provided grant amounting to ₹ 2582.94 crore during 2008-09 to 2010-11. Shahpur kandi project has been provided grant amounting to

₹ 26.036 crore during 2009-10 and 2010-11. Teesta Barrage project started receiving funding under the scheme of National Project during 2010-11 and grant amounting to ₹ 81.00 crore has been provided for the project. During 2011-12, an amount of ₹ 97.20 crore has been released.

## BHARAT NIRMAN: IRRIGATION SECTOR

Irrigation is one of the six components for development of rural infrastructure under Bharat Nirman. The irrigation component of Bharat Nirman aimed at creation of irrigation potential of 10 million hectare (Mha) during four years from 2005-06 to 2008-09.

The targets of irrigation potential and its creation from 2005-06 to 2011-12 are given in **Table- 3**.

**Table- 3**

(Million hectare)

Year	Target	Irrigation Potential Created
2005-06	1.90	1.69
2006-07	2.40	1.96
2007-08	2.85	1.73
2008-09	2.85	1.93
2009-10	1.75	1.85
2010-11	1.75	1.22
2011-12	-	0.079 ( upto September, 2011)

## REPAIR, RENOVATION AND RESTORATION (RRR) OF WATER BODIES

Government of India has approved two schemes on Repair, Renovation and Restoration of water bodies (i) with external assistance with an outlay of ₹ 1500 crore and (ii) with domestic support with an outlay of ₹ 1250 crore for implementation during XI Plan Period.

Under the scheme covered by external assistance, the Government of India provides assistance to the extent of 25% and borrows necessary funds as loan from World Bank, 75% State share is to be borrowed from the World Bank by concerned State. Under the scheme with domestic support, funding is also in the ratio of 25:75 (Centre: State) for non-Special Category States and in the ratio of 90:10 for Special Category States (North-Eastern States including Sikkim, HP, Uttarakhand, J&K and undivided Koraput, Bolangir and Kalahandi (KBK) districts of Odisha), drought prone/naxal affected/ tribal areas. These schemes were approved during the end of financial year 2008-09. Public water bodies are covered under the scheme.

The scheme of RRR of water bodies with domestic support envisages convergence with the Mahatma Gandhi National Rural Employment Guarantee Act of Ministry of Rural Development for which joint guidelines have

been issued. The scheme of RRR of water bodies includes the comprehensive improvement of water bodies, catchment area treatment, command area development and capacity building of stakeholders, increased availability of drinking water.

The guidelines for the scheme of RRR of water bodies with domestic support/ external assistance have already been circulated to the State Governments. A sum of ₹ 146.16 crore and ₹ 374.66 crore were released under the scheme with domestic support during the year 2009-10 and 2010-11 respectively. During the year 2011-12 (till 31<sup>st</sup> December 2011), a sum of ₹ 288.09 crore has been released. Besides, a sum of ₹ 174.88 crore has been released till December, 2011 under EAP component. The details of funds released under the scheme with domestic support till 31.12.2011 is given in **Table-4**.

**Table-4: Status of Fund Released under the Scheme of RRR of Water Bodies (Domestic Support): 2009-10, 2010-11 & 2011-12**

S. No.	Name of State	Number of water bodies	Fund released during 2009-10	Fund released during 2010-11	Fund released till 31.12.2011
1.	Odisha	1321	72.12	75.00	70.33
2.	Karnataka	427	74.04	47.47	77.51
3.	Andhra Pradesh	1029		189.00	
4.	Bihar	15		25.00	
5.	U.P. (Bundelkhand)	28		29.08	
6.	M.P. (Bundelkhand)	78		7.33	2.62
7.	Meghalaya Umiam Lake	1		1.78	
8.	Chhattisgarh	131			34.68
9.	Gujarat	34			10.61
10.	Haryana	3			6.79
11.	Maharashtra	258			80.53
12.	Rajasthan	16			5.02
	<b>Total</b>	<b>3341</b>	<b>146.16</b>	<b>374.66</b>	<b>288.09</b>

Under the scheme of RRR of water bodies with external assistance, World Bank Loan Agreement has been signed with Tamil Nadu for ₹ 2182 crore to restore 5763 water bodies having a CCA of 4 lakh hectares, with Andhra Pradesh for ₹ 835 crore for restoration of 3000 water bodies with CCA of 2.5 lakh hectares, with Karnataka for ₹ 268.78 crore for restoration of 1224 water bodies with CCA of 0.52 lakh and with Odisha for ₹ 448 crore for restoration of 900 water bodies having CCA of 1.2 lakh hectares.

### **FARMERS' PARTICIPATORY ACTION RESEARCH PROGRAMME (FPARP)**

The Ministry of Water Resources, Government of India is implementing Farmers Participatory Action research Programme (FPARP) throughout the country with the help of Agricultural Universities, ICAR Research Institutes, ICRISAT, WALMIs, and NGOs for demonstrating possibility of increase in yield and income per drop of water through combination of water, crop variety and agronomic practices. The 1<sup>st</sup> Phase of the programme was started in Rabi season of 2007-08 for the total cost of the programme at Rs. 24.47 crore.

Considering the overall benefit of the programme in terms of water saving, increase in yield leading to more crop per drop of water, MoWR has decided to extend the programme during the remaining period of XI<sup>th</sup> Five Year Plan i.e. year 2010-11 & 2011-12 and sanctioned funds amounting to Rs 14.43 crores (2010-11, 2011-12) to 31 institutes for carrying out 2,921 demonstrations in 2<sup>nd</sup> phase of FPARP. The 2<sup>nd</sup> phase of programme is being monitored by the Regional Offices of CWC and CGWB.

### **COMMAND AREA DEVELOPMENT AND WATER MANAGEMENT (CADWM)**

#### **Objective**

The Centrally Sponsored Command Area Development (CAD) programme was

launched in 1974-75 for development of adequate delivery system of irrigation water up to farmers' field with an objective to enhance water use efficiency and production and productivity of crops per unit of land and water for improving socio-economic condition of farmers. The programme envisages integration of all activities relating to irrigated agriculture in a coordinated manner with multi-disciplinary team under a Command Area Development Authority.

#### **Coverage**

Initially, 60 major and medium irrigation projects were taken up under the CAD programme, covering a Culturable Command Area (CCA) of about 15 million hectare. After inclusion of new projects, deletion of completed projects and clubbing of some projects, there are now 149 projects under implementation. The programme was restructured and re-named as Command Area Development and Water Management (CADWM) programme w.e.f. 1.4.2004. Now, the scheme is being implemented as a State Sector Scheme during the XI Five Year Plan (2008-09 to 2011-12).

#### **Programme Components**

The components of the CADWM programme are as follows:

- a) Survey, planning and designing of On Farm Development (OFD) works;
- b) On Farm Development (OFD) works comprising construction of field channels and also land levelling and shaping and realignment of field boundaries, with a minimum beneficiary contribution of 10%.
- c) Construction of field, intermediate and link drains for letting out surplus water;
- d) Correction of system deficiencies above the outlet up to distributaries of 4.25 cumec ( 150 cusec) capacity;

- e) Reclamation of waterlogged area with a minimum beneficiary contribution of 10%, including use of location specific bio-drainage techniques to supplement conventional techniques for reclamation of waterlogged area;
- f) Warabandi [with requisite funds for hardware activities under item(c) and software activities under item (g)]
- g) Trainings/ adaptive trials/ demonstrations through Water and Land Management Institutes (WALMI) and other Central/State institutions and monitoring & evaluation of the programme with 75% funding from Government of India;
- h) One time functional grants to Water Users' Associations; and
- i) Establishment cost - 20% of the total Central Assistance on items (b), (c), (d) and (e).

**The following broad provisions have been made in the programme during XI Five Year Plan:**

- (i) To promote water use efficiency in irrigation, financial assistance is provided to the States for development of infrastructure to facilitate use of sprinkler / drip irrigation as an alternative to construction of field channels. The assistance under this item is not admissible for sprinkler and drip irrigation systems (assistance for drip and sprinkler irrigation systems is available under the schemes of Ministry of Agriculture) but limited to construction of stilling tank, pump house and laying conveyance pipes up to farmer's fields. The cost norms as applicable for On-Farm Development (OFD) works will also be applicable for such works.
- ii) Any new project under the programme is included only in lieu of completion/ deletion of an on-going project in a particular State except for the projects included in the Prime Minister's package

for agrarian distress districts, projects benefiting the drought prone areas, tribal areas, projects in the States having irrigation development below the national average and projects located in Special Category States/areas, namely, NE States, Utrakhand, Himachal Pradesh, Jammu and Kashmir and Kalahandi-Bolangir-Koraput (KBK) districts of Odisha.

Under the programme, there is a thrust on Participatory Irrigation Management (PIM) and, therefore, following features have been made mandatory for its implementation:

- i) Central Assistance to States has been linked to enactment of PIM legislation. Till this is done, alternative arrangements have to be in place for formation and empowerment of Water Users' Associations (WUAs);
- ii) WUAs have to be in position before Project Components are taken up so that beneficiaries are involved in the implementation of programme activities, since inception;
- iii) A minimum of 10% beneficiary contribution is mandatory in the construction of On-Farm Development (OFD) works and reclamation of waterlogged areas to ensure increased beneficiary participation and thereby improve the quality of works; and
- iv) Central Assistance for correction of system deficiencies upto distributaries of 4.25 cumec (150 cusec) capacity has been linked to formation of Distributaries Committees and handing over of the distributaries to such Committees for maintenance in future.

**Programme Implementation**

The Command Area Development and Water Management wing of the Ministry of Water Resources co-ordinates and monitors the implementation of the Command Area Development programme at the national

level. Proposals received from the States for inclusion of new projects under the programme are examined and, if found techno-economically feasible, are included under the programme. Progress of the projects is monitored through physical and financial progress reports of the programme received from the States and six monthly monitoring by field units of Central Water Commission. The quality of works is ensured through monitoring, including field visits. Technical guidelines and manuals have been circulated to the States in this regard. Functionaries are trained on specific subjects from time to time, besides holding various meetings, workshops and seminars on different technical and managerial aspects.

### Financing Pattern

The funding pattern for all the programme components is on 50:50 sharing basis between Centre and State/farmers for all the components except for State sponsored software components such as training of farmers and field functionaries and officials, adaptive trials and demonstrations, seminars/conferences/ workshops, monitoring & evaluation of the programme etc. for which the funding pattern is 75:25 basis between the Centre and States. A minimum of 10% contribution by the beneficiary farmers is mandatory for execution of on-farm development works and reclamation of waterlogged areas. There is also a provision of one time functional grants at the rate of ₹ 1000/- per ha (450:450:100 as Centre: State: Farmers) to the registered Water Users' Associations. The interest accrued from this fund is utilized to upgrade the irrigation system and infrastructure developed under this programme.

### Progress under Command Area Development and Water Management

The approved outlay for the Command Area Development and Water Management programme during the XI Five Year Plan (2008-09 to 2011-12) is ₹ 1600 crore and the physical

target is 1.32 Mha. The details of targets/achievements for the XI Plan period are indicated hereunder.

### Financial Achievements

Central Assistance of ₹ 4722.49 crore has been released to States under this programme since its inception in 1974-75 upto March, 2011. The continuation of CADWM scheme has been approved as State Sector Scheme since the year 2008-09. The details of Central Assistance released under State Sector Scheme are as in **Table-5**.

**Table-5: Central Assistance Released in XI Plan**

(₹ crore)

Period	Outlay by Planning Commission	BE Allocation	Release	% Releases w.r.t. BE Allocation
2008-09	350	350	324.29	92.7
2009-10	400	400	413.70	103.4
2010-11	499	499	456.40	91.5
2011-12	584	584	247.05*	-
Total	1833	1833	1441.44	

\*29<sup>th</sup> February 2012

### Physical Achievements

The core components of physical works are construction of field channels. Since its inception in 1974-75 upto March, 2011, 19.69 Mha has been covered. The progress of works on this component under State Sector Scheme is given in **Table-6**.

**Table-6: Physical Progress for Construction of Field Channels in XI Plan**

(Million hectare)

Duration	Targets	Achievements
2008-09	0.27	0.430
2009-10	0.35	0.384
2010-11	0.35	0.413
2011-12	0.35	0.227*
Total	1.32	1.454

\*Progress upto December, 2011.



## Reclamation of Waterlogged Areas

Although development of irrigation has increased agriculture production, it has also caused adverse effect in the form of waterlogging and associated problem of soil salinity/alkalinity in many irrigation commands. The problem of waterlogging can be mitigated to a large extent by efficient water management and by adopting suitable preventive measures. However, in spite of best efforts, the problem of waterlogging has surfaced in many irrigation commands and thus it is essential to reclaim such areas so as to have optimum agricultural production from them. The Ministry of Water Resources introduced a component of Reclamation of Waterlogged Areas under the Centrally Sponsored Command Area Development Programme w.e.f. 1.4.1996. So far 727 schemes of 9 States, namely, Bihar, Gujarat, Madhya Pradesh, Jammu & Kashmir, Karnataka, Kerala, Maharashtra, Odisha and Uttar Pradesh have been approved for reclamation of 117.808 thousand hectare (th. ha) waterlogged area. Out of this, an area of 54.196 th. ha has been reported to be reclaimed by these States upto March, 2011.

## Participatory Irrigation Management (PIM)

National Water Policy 2002 stresses participatory approach in water resources management. It has been recognised that participation of beneficiaries will help greatly in the optimal upkeep of irrigation system and effective utilisation of irrigation water. The participation of farmers in the management of irrigation would include transfer responsibility for operation & maintenance and also collection of water charges to the Water Users' Association in their respective jurisdiction with effect from 2008-09. One time functional grant @ ₹.1000/- per ha. to be shared by the Centre, State and Farmers in the ratio of 450 : 450 : 100 respectively is being paid to outlet level Water Users Associations' as incentive, the

interest from which is to be used for maintenance.

15 States viz. Andhra Pradesh, Assam, Bihar, Chhattisgarh, Goa, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, Sikkim, Tamil Nadu and Uttar Pradesh have either enacted exclusive legislation or amended their Irrigation Acts for involvement of farmers in irrigation management. Other States are also taking steps in this direction. So far 63,167 Water Users' Associations have been formed in various States covering an area of 14.623 Mha. under various commands of irrigation projects.

Under the restructured "Command Area Development & Water Management" (CADWM) programme, more emphasis is being given to participatory approach. Under this programme, payment of Central Assistance to State is linked with the formation of Water Users' Associations. Apart from this, farmers will have to contribute 10% cost of the works in the form of cash/labour in the construction of OFD works and reclamation of waterlogged areas.

## Salient Features of XII Plan Proposals under CADWM Programme

The main thrust of the Command Area Development and Water Management (CADWM) programme in XII Plan will be to implement this programme pari-passu with AIBP in order:

- (i) to bridge the gap between irrigation potential created and utilized; and
- (ii) to enhance water use efficiency.

Keeping this in view, Working Group constituted by the Planning Commission for XII Plan has recommended that an area of 10 million hectare (Mha) is to be covered under CADWM programme for which an outlay of ₹ 20,000 crore as central share has been recommended. The pace of implementation

of CADWM programme is to be upscaled considerably from the present pace of an average coverage of 0.35 Mha/year to 2 Mha/year during XII Plan. Capacity building of farmers and field functionaries and monitoring of CADWM programme are to be considerably strengthened.

### **FLOOD MANAGEMENT PROGRAMME**

A re-structured scheme, namely, "Flood Management Programme" amounting to ₹ 8,000 crore has been 'in principle' approved by the Cabinet, under the State Sector in XI<sup>th</sup> Plan by amalgamating the following four on-going schemes of X<sup>th</sup> Plan.

1. Critical anti-erosion works in Ganga basin States – a Centrally Sponsored Scheme (CSS)
2. Flood control works in Brahmaputra Valley States – a State Sector Scheme (SS)
3. Critical anti-erosion works in coastal and other than Ganga basin States – a State Sector Scheme (SS)
4. Improvement of drainage in the critical areas of the country – a State Sector Scheme (SS).

The re-structured scheme would cover all on-going and new works related to river management, flood control, anti-erosion, drainage development, flood proofing including flood prone area development programme to be implemented by the State Governments in their respective States with Central Assistance. Central Assistance to the State Governments has also been proposed for the first time for restoration of damaged flood management works, based upon the recommendations of Task Force on Flood Management/Erosion Control-2004.

Based on the approval of the Cabinet, detailed revised guidelines for providing Central Assistance to the State Governments were issued by the Ministry of Water Resources on 5.8.2009. Further, as directed by Cabinet, an Empowered Committee under the Chairmanship of Secretary (Expenditure), Ministry of Finance has been constituted for examining and approving of the proposals submitted by the State Governments to ensure cost effective solutions.

Eight meetings of the Empowered Committee have been held upto 31.12.2011 and a total of 418 flood management works of critical nature from 24 States with a total cost of ₹ 7708.79 crore have been included under FMP for providing Central Assistance to States. Out of these 418 works, 73 works amounting to ₹ 1040.71 crore have been approved under FMP during the current financial year (upto 31.12.2011). During XI<sup>th</sup> Plan, Central Assistance amounting to ₹ 3140.05 crore has been released to States (including ₹ 89.79 crore for spilled over works of X<sup>th</sup> Plan) as on 31.12.2011. Out of which, ₹ 472.40 crore has been released during the current financial year (upto 31.12.2011). A total of 230 works in twelve States are reported physically completed at site by the respective State Governments as on 30.11.2011. Out of which, 12 works have been completed during the current financial year (upto 30.11.2011). By completing 218 works, an area of 1.86 m ha has been restored/ protected against floods. It would provide safety to over 19.72 million people during high floods situation. The State-wise summary of schemes included under FMP and funds released during XI Plan are given in **Table-7**. The physical achievements reported by the States are given in **Table-8**.



**Table-7: Summary of State-wise Schemes included under the State Sector Scheme "Flood Management Programme" and Funds Released during XI Plan (upto 31.12.2011)**

(₹ crore)

Sl. No.	State	Schemes Included under FMP			Released up to 31.3.2011	2011-12 (upto 31.12.11)	Total Amount (upto 31.12.11)
		Nos.	Total Cost	Central Share			
1	Arunachal Pradesh	21	107.33	96.55	57.85	17.74	75.59
2	Assam	100	996.14	896.49	508.92	108.28	617.20
3	Bihar	43	1370.41	1027.79	502.00	125.00	627.00
4	Chattisgarh	3	31.13	23.34	0.00	15.57	15.57
5	Goa	2	22.73	17.05	9.98		9.98
6	Gujarat	2	19.79	14.84	2.00		2.00
7	Haryana	1	173.75	130.31	46.91		46.91
8	Himachal Pradesh	3	225.32	202.78	117.45	44.67	162.12
9	Jammu & Kashmir	23	331.23	298.10	136.05	33.10	169.15
10	Jharkhand	3	39.30	29.47	10.53	6.54	17.07
11	Karnataka	3	59.46	44.59	0.00		0.00
12	Kerala	3	249.74	187.30	22.43		22.43
13	Manipur	22	109.34	98.41	52.65		52.65
14	Mizoram	2	9.13	8.22	2.06		2.06
15	Nagaland	11	49.35	44.38	11.21	17.72	28.93
16	Odisha	66	155.41	116.56	94.74		94.74
17	Puducherry	1	139.67	104.75	7.50		7.50
18	Punjab	5	153.40	115.04	34.59		34.59
19	Sikkim	24	86.21	77.59	63.57		63.57
20	Tamilnadu	5	635.54	476.66	59.82		59.82
21	Tripura	11	26.57	23.92	16.22		16.22
22	Uttar Pradesh	25	659.81	494.85	203.68	80.10	283.79
23	Uttrankhand	10	101.93	88.61	26.64	7.93	34.57
24	West Bengal	17	1822.08	1366.57	591.08	15.75	606.82
	<b>Total</b>	<b>406</b>	<b>7574.77</b>	<b>5984.17</b>	<b>2577.86</b>	<b>472.40</b>	<b>3050.26</b>
	<b>Spilled over works of X<sup>th</sup> Plan</b>				<b>89.79</b>		<b>89.79</b>
	<b>Grand Total</b>			<b>5984.17</b>	<b>2667.65</b>	<b>472.40</b>	<b>3140.05</b>

**Table-8: State-wise Flood Management Works/ Schemes Completed and Area Protected during XI Plan under "Flood Management Programme"**

Sl. No	State	Total Schemes Completed (As on 31 <sup>st</sup> March ,2011)				Population benefited in lakh
		Area protected in lakh ha *			Total	
		Nos.	Old Area restored	New Area Protected		
1	Arunachal Pradesh	11	0.000	0.566	0.566	0.697
2	Assam	65	3.864	1.007	4.871	97.848
3	Bihar	26	10.237	0.285	10.522	70.920
4	Goa	1	0.002	0.000	0.002	0.150
5	Manipur	12	0.000	0.280	0.280	1.582
6	Nagaland	5	0.000	0.004	0.004	0.600
7	Odisha	59	1.474	0.082	1.556	7.202
8	Sikkim	22	0.000	0.201	0.201	2.397
9	Uttar Pradesh	5	0.442	0.096	0.538	4.005
10	Uttrakhand	3	0.000	0.001	0.001	0.053
11	West Bengal	7	0.087	0.063	0.150	11.810
12	Tripura	2	0.000	0.002	0.002	0.013
	<b>Total</b>	<b>218</b>	<b>16.106</b>	<b>2.587</b>	<b>18.693</b>	<b>197.277</b>

\*The figure of NE States as per FMP's submitted by State Governments.

### Flood Management Works



(Assam)



### (Jammu & Kashmir)

The FMP schemes completed during 2011-12 (upto 30.11.2011) stood at 12 ( Assam: 9, Bihar: 1 and Uttar Pradesh: 2). Thus, the total FMP schemes completed as on 30.11.2011 stands at 230.

### Restoration of Sunderbans Embankments Damaged by Cyclone AILA

The scheme, namely, "Project for Reconstruction, Remodeling and Improvement of Embankments in Sunderban and adjoining areas in the districts of North and South 24 Parganas of West Bengal, damaged by severe cyclone 'AILA' was cleared at an estimated cost of ` 5032 crore by the Advisory Committee of MoWR in its 102<sup>nd</sup> meeting held on 28.01.2010. The Planning Commission accorded Investment Clearance to the scheme for ` 1339.50 crore only vide its letter dated 12.03.2010, based upon concurrence of the State Finance Department, for the works to be completed up to 31<sup>st</sup> March, 2011.

On receipt of the Investment Clearance from the Planning Commission, an advance of ` 187.50 crore was released to the State Government of West Bengal vide Ministry of

Finance order dated 12.03.2010 for taking up the aforesaid works. The scheme has been formally considered by the Empowered Committee on Flood Management (EC-FM) in its 6<sup>th</sup> meeting held on 12.07.2010 and approved for providing Central Assistance under FMP at a total cost of ` 1339.50 crore (Central Assistance: ` 1004.62 crore). The State Government has utilized a total amount of ` 294.96 crore including its share of ` 107.11 crore till December, 2011.

1<sup>st</sup> phase works of the scheme involves acquisition of 5996 acres of land. The works have not been awarded/ commenced as the possession of land has not yet been received by the I & WD, Government of West Bengal.

### MAJOR PROGRAMMES (CENTRAL SECTOR)

#### RIVER MANAGEMENT ACTIVITIES AND WORKS RELATED TO BORDER AREAS

A Central Sector Scheme has been formulated to cover 10 on-going works/ schemes of X<sup>th</sup> Plan (with 100% Central Assistance) alongwith some new works detailed as under:

1	Survey & Investigations of Kosi High Dam
2	Pancheshwar Multipurpose Project
3	Maintenance of Flood protection works of Kosi & Gandak Project
4	Extension of Embankments on Lalbakeya, Kamla, Bagmati & Khando rivers
5	Hydrological Observations of rivers originating from Bhutan
6	Joint Observations on rivers common to Bangladesh and neighbouring countries
7	Flood Forecasting on rivers common to India and Nepal
8	Ganga Flood Control Commission
9	Grant in aid to Brahmaputra Board
10	New Scheme for Majul iland in Assam, Dibang Project

In addition to above works, new works on common/ border rivers comprising of river management, flood control and minor irrigation schemes/ works, especially with Bangladesh are proposed under the scheme. It will also include any new works proposed on common/border rivers on the western sector i.e. Indus river system in XI Plan. Such works are proposed to be funded with 100% Central Assistance.

The work of de-silting of river Ichhamati in West Bengal along international border with Bangladesh has been completed. Ten bank protection/ flood control works in West Bengal and two bank protection/ flood control works in Tripura along international border with Bangladesh are at various stages of completion. 100% Central Assistance is being provided by the Ministry of Water Resources for the above works. In addition, Central Assistance of ₹ 14.52 crore has been released during 2011-12 to the State Government of Tripura for undertaking three more bank protection works along international border with Bangladesh.

## **GROUND WATER MANAGEMENT & REGULATION**

Central Ground Water Authority has been constituted under Section 3 (3) of the Environment (Protection) Act, 1986 to regulate and control development and management of ground water resources in the country.

### **Powers & Functions**

The Authority has been conferred with the following powers:

- (i) Exercise of powers under section 5 of the Environment (Protection) Act, 1986 for issuing directions and taking such measures in respect of all the matters referred to in sub-section (2) of section 3 of the said Act.
- (ii) To resort to penal provisions contained in sections 15 to 21 of the said Act.
- (iii) To regulate and control, management and development of ground water in the country and to issue necessary regulatory directions for the purpose.
- (iv) Exercise of powers under section 4 of the Environment (Protection) Act, 1986 for the appointment of officers.

### **Regulatory Measures**

- The Central Ground Water Authority is regulating withdrawal of ground water by industries/ projects in 839 Over-exploited and 226 Critical Assessment Units. List of these critical areas has been circulated to the State Pollution Control Boards and Ministry of Environment & Forests which refer the new industries/ projects to CGWA for obtaining permission.
- CGWA has notified 43 critical/ over-exploited areas in parts of NCT Delhi, Haryana, Punjab, Andhra Pradesh, Rajasthan, MP, Gujarat, West Bengal, Uttar Pradesh and Diu for control and regulation of development of ground

water resources. For enforcement of the regulatory measures in these areas, concerned Deputy Commissioners/ District Magistrates have been directed under Section 5 of Environment (Protection) Act, 1986 to regulate ground water development in these notified areas.

### **Ground Water Legislation**

To enable the States to enact Ground Water Legislation, a Model Bill to Regulate and Control Development of Ground Water has been circulated by the Ministry of Water Resources to all the States/UTs. So far the States of Andhra Pradesh, Goa, Tamil Nadu, Kerala, West Bengal, Himachal Pradesh, Bihar and Union Territories of Lakshadweep, Chandigarh, Dadra & Nagar Haveli and Puducherry have enacted and implemented ground water legislation. 18 States/UTs are at various stages of enactment of legislation.

### **Budget**

The budget estimates for Ground Water Management and Regulation for 2011-12 is ₹ 119.40 crore and the revised estimates is at ₹ 131.40 crore. The expenditure till February 2012 stood at ₹ 97.75 crore.

### **FLOOD FORECASTING**

During XI<sup>th</sup> Plan, a Central Sector Scheme, namely, 'Flood Forecasting' was prepared by amalgamating two on-going schemes of X<sup>th</sup> Plan, namely, 'Establishment and Modernization of Flood Forecasting Network in India including Inflow Forecast' and 'Strengthening and Modernization of Flood Forecasting and Hydrological Observation Network in the Brahmaputra and Barak Basin'. Under the combined scheme, it is proposed (i) to modernize the flood forecasting network by installing automatic water level and rainfall sensors at all the observation sites and satellite based transmission system for getting real time

flood data expeditiously and (ii) to develop appropriate software/models for flood/ inflow forecasting to reduce the time for analysis of data. It is also proposed to extend the flood forecasting network in uncovered areas and integrate with the network of State Governments/ Projects Authorities/ National Disaster Management Authorities (MHA).

In the year 2011, a total of 5662 forecasts with an accuracy of 98.66 % were issued by CWC to the State Governments/ local administration. These forecasts have been proved to be very useful in saving life and public properties as a result of timely action by the authorities.

### **RATIONALISATION OF MINOR IRRIGATION STATISTICS (RMIS) SCHEME**

A Centrally Sponsored Plan Scheme, "Rationalisation of Minor Irrigation Statistics (RMIS)" was launched in 1987-88 in the Ministry of Water Resources with 100% assistance to the States/UTs. The main objective of the RMIS scheme is to build up a comprehensive and reliable database in the Minor Irrigation (MI) sector for effective planning and policy making.

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



surveys /studies to know the status of minor irrigation schemes between the two MI censuses.

In the MI census, detailed information on five types of minor irrigation schemes, namely, Dugwell, Shallow Tubewell, Deep Tubewell, Surface Flow and Surface Lift schemes is collected. Besides this, information on their performance in terms of irrigation potential created and utilized, their ownership, the social class and holding size of the owner, number of electrical/diesel devices used for lifting water is also collected. Information in respect of adoption of water and energy conserving devices such as sprinkler and drip irrigation, use of non-conventional energy sources such as solar pumps, water mills is also collected in the MI census. The National Informatics Centre unit in the MoWR is associated for processing of data and generation of tables. At present, "Rationalisation of Minor Irrigation Statistics (RMIS)" is a Central Sector Scheme and is a part of the major plan scheme called "Development of Water Resources Information System (DWRIS)" of Ministry of Water Resources. It is a continuing scheme since 7<sup>th</sup> Five Year Plan. Detailed data base on minor irrigation works in the country has been generated through four censuses carried out under the scheme so far with reference years 1986-87, 1993-94, 2000-2001 & 2006-07 respectively. The census reports have been published and have also been placed on the website ([www.mowr.gov.in](http://www.mowr.gov.in)) of the Ministry (only 2<sup>nd</sup> and 3<sup>rd</sup> M. I. census reports are on website) except for the 4<sup>th</sup> census (Ref. year 2006-07) which is not yet finalized.

## **HYDROLOGY PROJECT PHASE II (HP-II)**

Hydrology Project -II (HP-II) is being implemented with the assistance of World Bank in 13 States viz. Andhra Pradesh, Chhattisgarh, Gujarat, Goa, Himachal Pradesh, Karnataka, Kerala, Madhya

Pradesh, Maharashtra, Odisha, Tamil Nadu, Puducherry and Punjab and 8 Central Agencies viz. Central Water Commission (CWC), Central Ground Water Board (CGWB), National Institute of Hydrology (NIH), Central Water & Power Research Station (CWPRS), Central Pollution Control Board (CPCB), Bhakra Beas Management Board (BBMB), India Meteorological Department (IMD) and Ministry of Water Resources (MoWR). The estimated cost of the project is ₹ 631.83 crore. The World Bank funding is in the form of loan of US \$104.98 Million from International Bank for Reconstruction and Development (IBRD). The Loan Agreement was signed on January 19, 2006. The project was started in April, 2006 and stipulated date of completion is June, 2012.

## **Objective**

The objective of the Project is to extend and promote the sustained and effective use of Hydrological Information System (HIS) by all the potential users concerned with Water Resources Planning and Management, both in public and private, thereby contributing to improve productivity and cost effectiveness of water related investments.

The project is being implemented with the help of following consultancies:-

- (i) Technical and Management Consultants (TAMC)
- (ii) Decision Support System (Planning)
- (iii) Decision Support System (Real Time)
- (iv) Hydrological Design Aids (Surface Water)

The project is monitored by National Level Steering Committee (NLSC) headed by the Secretary, Ministry of Water Resources with State Secretaries/Principal Secretaries of the concerned Departments as Members.

21 Purpose Driven Studies related to surface water domain and 20 related to ground water domain have been approved for implementation by the participating agencies.

**The physical achievements during the current financial year (from 1<sup>st</sup> April, 2011 to 31<sup>st</sup> December, 2011) are as follows:**

1. Under Decision Support System-Planning (DSS-P), Generic Model has been developed and its customization has been completed in 6 States (Chhattisgarh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra and Odisha) out of 9 HP-I States (Andhra Pradesh, Chhattisgarh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha and Tamil Nadu) as per their needs.
2. Under Hydrological Design Aid-Surface Water (HDA-SW), state-of-the art report and inception reports of all 3 Modules have been completed and development of software for 3 modules is under progress and is likely to be completed by May 2012.
3. For development and establishment of Real Time Stream Flow and Reservoir Operation System in Bhima and Upper Krishna rivers in Maharashtra, consultant has been engaged w.e.f. October 2011 for development of software and contract awarded for procurement and installation of Real Time Data Acquisition System (RTDAS).
4. For development of Web based GIS Portal, Request for Proposal (RFP) document has been issued to the shortlisted firms by CPCB.
5. World Bank has issued 'No Objection' for engaging NGRI as consultant by CGWB for Micro Level Aquifer Mapping Pilot Project.
6. Construction of Piezometers has been completed by Himachal Pradesh, Goa and CGWB, and is in progress in Gujarat, Punjab and Puducherry.
7. Real Time Data Acquisition System has been partly completed in

Karnataka. The other participating States are in the process of procurement of RTDAS equipment for collecting data pertaining to hydro-meteorology and water quality.

8. Construction of State Data Centre and Water Quality Labs in new States i.e. Himachal Pradesh, Goa and Puducherry have been completed.
9. 41 Purpose-Driven Studies (PDS) are under various stages of completion.

## **INFRASTRUCTURE DEVELOPMENT SCHEME**

Infrastructure Development Scheme (IDS) has been approved by merging of four continuing schemes viz (i) Land & Building & Information Technology Plan of Central Ground Water Board, (ii) Land & Building of Central Water Commission, (iii) Information Technology Development Plan of Ministry of Water Resources, and (iv) Up-gradation and modernization of computerization and information system of Central Water Commission for implementation during XI Five Year Plan. With the merger of these four schemes, the implementation and monitoring of the schemes have been streamlined and strengthened.

The total outlay for IDS is ₹ 115 crores during the XIth Plan (2007-12). Out of this, ₹ 99 crore is meant for purchase of land and construction/ modernization of buildings/ offices and ₹ 16 crores is meant for development of information technology in the Ministry and its attached/ subordinate offices.

The scheme aims at providing better working environment in the offices, creation of assets and savings on payment of monthly rent. To achieve this, construction of offices at various locations, provision of hutments for field workers, provision for construction of staff quarters as well as modernization of existing offices of the Ministry (Proper), Central Water Commission and Central Ground Water Board

have been included under the ambit of the scheme. It also aims at integrating and streamlining existing scattered information systems into uni-directional dynamic E-governance mode.

During the financial year 2011-12, an amount of ₹ 28.40 crores has been provided under the scheme and the expenditure incurred upto December, 2011, is ₹ 11.14 crore on Land & Building and ₹ 1.52 crore on Information Technology components of Central Water Commission/ Central Ground Water Board/ Ministry (Proper). The construction of buildings and offices of Central Water Commission at Asansol and Jammu have almost been completed. The construction of buildings and office at Guwahati, Bhubneshwar/Burla and modernization of CWC HQ, Sewa Bhawan are under progress. The construction of Hutments for site staff at various sites under CWC is under progress.

The construction of building for Divisional/Workshop office at Guwahati and boundary wall at Bhubaneshwar & Ambala of Central Ground Water Board has been completed. Acquisition of land from JDA, Jodhpur and State Govt. of Tamil Nadu at Chennai has been taken over. The construction of Regional Office Workshop & Store Building at Guwahati, Bangalore, Ambala and Divisional Office Workshop & Store Building at Bhopal are in progress. Acquisition of land for construction of building for Regional Office at Ranchi, Dehradun, Ahmedabad and Dharamshala is under process.

The Ministry took initiatives for providing updated information on its schemes/programmes on the website i.e. [www.mowr.gov.in](http://www.mowr.gov.in). During the period,

various IT applications like File Tracking System, CADWM Programme Monitoring System (Physical & Financial Monitoring of on-going projects under CADWM) and Hydrological Observation Information System for Indus Basin were put to use. This Ministry was also identified as one of the Central Ministries for launching of e-office by the Department of Administrative Reforms and Public Grievances under the National e-governance Plan (NeGP) of the Government. Besides, training programmes were organized for capacity building of the staff and officers of the Ministry. Hardwares, softwares as well as network equipments were made available on regular basis for strengthening of the e-Governance agenda of the Government.

## **INFORMATION, EDUCATION AND COMMUNICATION (IEC)**

### **Participation in Fairs/Exhibitions**

The Ministry of Water Resources participated in the 31<sup>st</sup> India International Trade Fair (IITF) at Pragati Maidan, New Delhi during the period 14<sup>th</sup> to 27<sup>th</sup> November, 2011 on the theme "Save Water – Secure Future". The central attraction of the pavilion was a large size working model of the proposed Pancheshwar Multipurpose Project, a joint venture of India-Nepal Mahakali Treaty. Models on the activities of CWC, CWPRS, NIH, CSMRS, CGWB and other organisations of the Ministry were exhibited to depict wide variety of subjects concerning their activities to spread awareness amongst masses for water conservation and management. The interactive quiz shows and pantomime shows were also arranged for the visitors, specially children to generate water literacy among them.





**Shri Pawan Kumar Bansal, Hon'ble Minister for Water Resources & Parliamentary Affairs lighting the Invocation Lamp at the inauguration of the pavilion of MoWR at IITF 2011**



**Shri Pawan Kumar Bansal, Hon'ble Minister for Water Resources & Parliamentary Affairs viewing the working model of the proposed Pancheshwar Multipurpose Project at the pavilion of MoWR at IITF 2011**

## Participation in other Events

The Ministry participated in International Conclave on “Climate Change” 2011 held at Hyderabad from 12-14 October 2011.

The Ministry also participated in the 99<sup>th</sup> Indian Science Congress at Bhubaneshwar from 3<sup>rd</sup> to 7<sup>th</sup> January 2012.

## Painting Competition

A three-tier painting competition on water conservation themes was organised by the Ministry for the students of 4<sup>th</sup>, 5<sup>th</sup> and 6<sup>th</sup> standards in 29 States/UTs of the country. The objective of organising the painting competition was to engage the attention of children towards the need of water conservation and to inculcate in them the habit of judicious use of water right from their formative years. A total of 16.05 lakh students from 23,475 schools participated at the school level competition in 29 States/UTs.

The State level competition was held on 14<sup>th</sup> November 2011 in the State/UT Capitals, amongst the 50 best entries received in the State/UT which were selected by the jury for competing at the State level. Out of 50 students in each State/UT, the jury selected 13 students for the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> prize and 10 consolation prizes. The topic of State level painting competition this year was **“CONSERVE WATER FOR THE FUTURE”**. The first, second and third prize winners were given cash prizes of ₹ 10,000/-, ₹ 8,000/- and ₹ 5,000/- respectively and certificates. Ten consolation prize winners were given cash prizes of ₹ 1,000/- each and certificates.

The first three winners of the State Level Painting Competition were invited for on the spot National Level Painting Competition on 21<sup>st</sup> January 2012 at NASC Complex, Pusa, New Delhi. The winners were awarded a cash prize of ₹ 1 lakh (1<sup>st</sup> prize), four second prizes of ₹ 50,000/- each, eight third prizes of ₹ 25,000/- each and seventy four consolation prizes of ₹ 5,000 each, along with certificates.



Hon'ble Minister of State for Water Resources, Shri Vincent H. Pala presenting the First Prize of 2<sup>nd</sup> National Painting Competition, New Delhi (21-01-2012) to Ms. Disha Roy Chowdhury, Siliguri, West Bengal

## **Electronic Media Campaign**

An electronic media campaign was launched on National and DD news channels and 13 regional channels and Delhi LPT of Doordarshan for a period of 60 days w.e.f. 20.06.2011 to 18.08.2011 to telecast video spots on water conservation. After expiry of the paid campaign, the electronic media campaign with free bonus airtime was run on various channels of Doordarshan for a period of 69 days w.e.f. 1.10.2011 to 08.12.2011.

The campaign had also been launched on National News, Primary channel/LRS(188 stations), Vivid Bharti National (37 stations), 22 FM Radio channels and 31 Stations of Regional News of All India Radio w.e.f. 20.06.2011 to 01.08.2011 for 43 days to broadcast audio spots on water conservation.

A campaign in the cinema halls across the country was also launched through Digital Cinema for a period of 14 days from 11.11.2011 to 24.11.2011.

On the Lok Sabha TV, campaign comprising of video spots of 30 seconds on water conservation for 130 days and a documentary film on FPARP of 22 minutes and 8 seconds, once a week for 16 weeks have been launched w. e. f. 15.12.2011 to 22.04.2012.

## **Workshops/Seminars/Conferences**

The Ministry provided Grant-in-aid to an NGO, named, "Non- Violent Alternatives" for organizing a conference on "river Waters" from 18<sup>th</sup> to 20<sup>th</sup> November, 2011 at Delhi which was also supported by the Ministry of External Affairs.

## **Campaign in Tribal Areas**

A mass awareness campaign has been launched by the Ministry through CGWB and CWC for implementing the Tribal Sub-plan for IEC activities in tribal areas.

## Chapter 4

### Initiatives in North-East

North-East India with its geographical area of 26.52 million hectare is endowed with enormous water resources. The combined annual water resources potential of Brahmaputra and Barak rivers is 586 BCM, which is the highest among all rivers basins in the country. Ministry of Water Resources has taken significant initiatives through its organizations for the development of North-Eastern region, which are detailed below.

#### BRAHMAPUTRA BOARD

The important activities of Brahmaputra Board in North-Eastern region are as follows:

**Master Plans:** Brahmaputra Board carried out the detailed planning and documentation of the water resources of North-East region and prepared the Master Plans. It has completed preparation of 49 Master Plans out of 57.

**Protection of Majuli Island, Assam:** Majuli is a chronically flood and erosion effected island in river Brahmaputra. The protection works of the island were taken up by the Brahmaputra Board, as under:

The Brahmaputra Board took up anti-erosion works at Majuli Island in 2003-04, as immediate measures, at an estimated cost of ₹ 5.92 crore and were completed in 2004-05. These works were followed by regular protection works under Phase-I and works are nearly complete with estimated cost of ₹ 56.07 crore. The Brahmaputra Board also

executed emergent works (₹ 4.99 crore) for protection of Majuli Island on the recommendations of Standing Committee of Experts in 2008. The Board is presently executing the Phase-II and Phase-III works (₹ 115.49 crore) combined together.

**Anti-Erosion work at Dhola-Hatighuli:** In order to bring the Lohit and Dibang rivers to their original courses, the works were taken up by Brahmaputra Board in phases in 2003-04. These phases of works viz. Phase-I (₹ 10.47 crore), Phase-II (₹ 4.95 crore) and Phase-III (₹ 8.47 crore) were completed by 2007-08. The Phase-IV works (₹ 23.09 crore) are under progress.

#### Drainage Development Schemes (DDS)

- (i) **Preparation of DPRs:** The Board has completed the DPRs of 24 Drainage Development schemes out of 41 identified Drainage Development Schemes (DDS).
- (ii) **Execution of Drainage Development Scheme:** The Brahmaputra Board has taken up the execution of 4 Drainage Development Schemes (DDS) viz. Barbhag (₹ 7.23 crore), Amjur (₹ 18.84 crore), Jengrai (₹ 1.49 crore) and Jakaichuk (₹ 2.96 crore). The works are under progress.

**Survey, Investigation & Preparation of DPR for Multipurpose Project:** The Board has completed 5 DPR for multipurpose project (Siang Single Stage, Subansiri Single



Stage in Arunachal Pradesh, Tipaimukh in Manipur and Mizoram, Pagladiya in Assam and Bairabi in Mizoram).

Preparation of DPR for 5 projects, namely, Noa-Dehing, Jiadhal, Kulsi, Kiling and Simsang are in various stages of investigation / DPR preparation.

**The North-Eastern Hydraulic & Allied Research Institute (NEHARI):** The Institute was established near Guwahati with facilities of Hydraulic Modeling, Soil Testing, Concrete and Rock Mechanics Laboratory in association with CSMRS, CWPRS. The Board has successfully carried out sample testing as requested by various organizations like NEEPCO, CWC, NEC, NHPC, and State Government of Assam, Manipur, Meghalaya and Mizoram for their on-going projects. So far, NEHARI has completed physical model studies of (i) Jiadhal river (ii) river Brahmaputra from Porvita to South Salmara (iii) Majuli Island and (iv) Kameng river (Jia Bharali in Assam).

**Pagladiya Dam Project:** The project meant for flood moderation to benefit an area of 40,000 ha., irrigation to 54,160 ha. and incidental power generation of 3 MW was proposed across Pagladiya River at Thalkuchi in Baska district which falls under Bodoland Territorial Autonomous Districts (BTAD) in Assam. The project envisaged construction of 25 m high and 21 km long earth dam with a concrete spillway. The Government of India sanctioned the project in January, 2001 at an estimated cost of ₹ 542.90 crore for construction by Brahmaputra Board.

The works carried out since 2001 are as follows:

- Pre-construction survey, investigation, studies, design, drawings, etc.
- Taking possession of land (956 ha) for Resettlement & Rehabilitation (R&R) purpose

- Construction of project roads, offices, etc.
- Preparation of technical specifications & tender document
- Pre-qualification of contractors for main works

The work is held up due to (i) Zirat Survey (property assessment) of the Project Affected Families (PAF) for finalizing the Resettlement and Rehabilitation (R&R) Plan and (ii) land allotment/ acquisition for R&R and project construction.

## CENTRAL WATER COMMISSION

CWC has two regional Chief Engineer Offices i.e. the Chief Engineer, Brahmaputra & Barak Basin Organisation at Shillong looking after the 7 North-Eastern States and Chief Engineer, Teesta Basin Organisation at Siliguri looking after the States of Sikkim and West Bengal in addition to survey & investigation works in Bhutan.

CWC is involved with the following activities of water resources development in North-Eastern region

### Design Consultancy for Water Resources Development Projects

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

At present, there are following 11 projects at construction stage for which design consultancy is being provided by D&R wing of CWC.

### Assam

1. Barbhag Drainage Development Scheme- Sluice Regulator
2. Amjur Drainage Development Scheme
3. Pagaladiya HE Project

### Manipur

1. Thoubal M.P. Project
2. Dhoithabi Barrage Project
3. Khuga Multipurpose Project

### Meghalaya

1. Ganol HE project
2. New Umtru HE Project

### Tripura

1. Kalasi Barrage
2. Champaichera Dam Project
3. Howrah Dam Project

### Preparation of Detailed Project Reports for Water Resources Development Projects

The work of preparation of DPR of the following projects in North-Eastern region is under progress:

1. Kundil Irrigation Project
2. Mat-Sekawi H.E. Project
3. Rukai Irrigation Project
4. Sonai Irrigation Project
5. Myntdu H.E. Project, Stage II
6. Suntaley H.E. Project ( East Sikkim)

### Hydrological Observation and Flood Forecasting Services

CWC has a large network of hydrological observation sites for collection of hydrological data and for issue of flood forecasts in North-East region. At present, CWC has 143 hydrological observation sites in the North-East region and issues flood forecasts for 32 sites in the NE region including Sikkim.

To make the flood forecasts more accurate, effective and timely, the modernization activities are being taken up on a continuous basis. As part of modernisation of flood forecasting activities, 21 telemetry stations have been installed in the region to improve lead time accuracy and presentation. 14 more telemetry stations are likely to be installed in the 11<sup>th</sup> Plan. telemetry stations involve installing sensor based instrumentation and acquisition of data i.e. water level, rainfall and other meteorological data through satellite based communication system.

### Farmers Participatory Action Research Programme (FPARP)

The Ministry of Water Resources, Government of India is implementing Farmers Participatory Action Research Programme (FPARP) throughout the country for demonstrating that it is now possible to increase the yield and income per drop of water through combination of water, variety and agronomic practices. Three institutes, namely, Assam Agriculture University, Jorhat; WM Division, ICAR Research Station for NEH region, Umroi road, Umiam, Meghalaya and NERIWALM, Tezpur were awarded the work in phase-I beginning from Rabi season 2007. The monitoring of this scheme is being carried out by CWC and CGWB. The demonstrations as approved by MoWR have been completed by the institutes.

In the 2<sup>nd</sup> phase of the proposals received from Assam Agricultural University, Jorhat, and ICAR Research Station NEH region, Umroi (Meghalaya) have been accepted and MoWR has awarded the work to both the institutes. Both the institutes are implementing the second phase of FPARP. The details of technologies proposed to be demonstrated to farmers by these institutes are given **Table-9**.

**CENTRAL GROUND WATER BOARD (CGWB)**

The Central Ground Water Board is conducting scientific and technical studies for

ground water assessment, development and management in the North-Eastern region. Major achievements of the North-Eastern region in the year 2011-12 up to 31st December 2011 are given in **Table-10**.

**Table-9.**

Sl. No.	Name of Institute	Description of Technologies to be Demonstrated
1.	Assam Agriculture University, Jorhat, Assam	<ul style="list-style-type: none"> <li>• Integration of rain water harvesting and micro irrigation for increasing productivity of high water crop</li> <li>• SRI</li> <li>• Application of treadle pump for irrigation</li> <li>• Multiple use of water</li> <li>• Improvement of traditional rain water harvesting structure</li> <li>• Soil moisture conservation</li> </ul>
2.	WM Division, ICAR Research Station for NEH region, Umroi road, Umiam, Meghalaya	<ul style="list-style-type: none"> <li>• Conservation agriculture in Maize/Rice based cropping system</li> <li>• Rooftop water harvesting</li> <li>• Multiple use of water</li> <li>• SRI</li> <li>• Raised and sunken bed</li> </ul>

**Table-10**

Sl.	Activities	Achievements
1.	Ground Water Management Studies	12, 567 Sq. km. (Pre-monsoon) 7500 Sq.km. (Post-monsoon)
2.	Ground Water Exploration through department	15 wells drilled in North-Eastern region
3.	Water Quality Analysis	150 samples analyzed for basic constituents and 132 samples have been analyzed for heavy metals such as Cu, Zn, Fe, Mn, CO, Cd, Cr, Ni, Pb etc.
4.	Ground Water Regime Monitoring	Pre-monsoon, Monsoon & Post-monsoon water level monitoring completed in 310 observation wells
5.	Short Term Water Supply Investigation	68 nos.
6.	Chemical Quality Studies in Urban Clusters	Chemical analysis of water samples under progress in Guwahati.
7.	Artificial Recharge and Rainwater Harvesting (AR&RWH) Studies	Demonstrative project on AR&RWH are being implemented in Arunachal Pradesh and Nagaland for 94 artificial recharge structures in 4 schemes amounting to ₹ 508.39 lakh were approved and fund to the tune of ₹ 433.77 lakh released. 26 artificial recharge structures have been constructed.
8.	Ground Water Year Books	Ground Water Year Book of NE State issued
9.	Ground Water Resources Assessment	Dynamic Ground Water Resources 2008-09 reports of North-East States issued
10.	Study of Aquifer Mapping	Preparations of maps of Assam, Mizoram Arunachal Pradesh, Nagaland, Manipur, Tripura and Meghalaya have been completed.



## **CENTRAL SOIL AND MATERIALS RESEARCH STATION (CSMRS)**

Kopili H E Project, Assam

Located on the river Kopili in the North Cachar Hills district of Assam, the Kopili Hydroelectric Project was the maiden venture of NEEPCO when it came into existence in 1976.

Investigations were taken up for this project in order to study the effect of acidic reservoir water having pH values varying from 2.76 to 5.98 at various components of the dam. The following investigations were done:

- Nondestructive tests to evaluate the general condition of the concrete
- Extracation of cores for determining its comprehensive strength and mechanical properties
- Corrosion studies

## **CENTRAL WATER AND POWER RESEARCH STATION (CWPRS)**

The following studies, pertaining to the North-Eastern regions, are in progress:

Hydraulic Model Studies for:

- Power House tailrace joining works with river & Spillway Aerator, Subansiri Lower HE Project, Arunachal Pradesh
- Diversion channel; Teesta Low Dam Project Stage IV, Sikkim
- Original Design of Umtra Dam Spillway, Meghalaya
- Pare Dam Spillway, Arunachal Pradesh

## **NATIONAL PROJECTS CONSTRUCTION CORPORATION LTD (NPCC)**

The presence of NPCC in NE region dates back to almost 33 years in the entire eight

States of NE region. The major works taken up are in the fields of Irrigation, Building, Hydro- power, Tourism, Roads & Bridges, etc. NPCC executes project worth ₹ 150 crore every year for Assam Rifles. NPCC is executing more than ₹ 3200 crore of works for Indo-Bangla Border Fencing, Road Works & Flood Lighting in the States of Tripura, Mizoram, Meghalaya and Assam.

# Chapter 5

## Inter-State River Issues

### INTER-STATE RIVER WATER DISPUTES ACT, 1956

Inter-State river Water Disputes (ISRWD) Act, 1956 was originally enacted by the Parliament in 1956 for adjudication of disputes relating to water of inter-State rivers and river valleys. In view of the Sarkaria Commission recommendations, the said act has been amended and came into force from 6<sup>th</sup> August 2002. The amendments include time frame for constitution of the Inter-State Water Disputes Tribunals and prescribes time limit for the Tribunals to give their awards. As per the amendment, Central Government will have to constitute a Tribunal within a period of one year from the date of receipt of a request from any State Government. Also, the award of the Tribunal shall have the same force as an order or decree of Supreme Court.

### INTER-STATE WATER DISPUTES TRIBUNALS

#### CAUVERY WATER DISPUTES TRIBUNAL (CWDT)

The Cauvery Water Disputes Tribunal (CWDT) was constituted by the Government of India on 2<sup>nd</sup> June 1990 to adjudicate the water dispute regarding inter-State river Cauvery and the river valley thereof. The term of CWDT has been extended by the

Government upto 02.11.12 as per provisions of ISRWD Act, 1956.

### Progress in Adjudication of the Dispute before CWDT

The Cauvery Water Dispute Tribunal submitted its reports and decision under section 5 (2) of Inter-State river Water Dispute Act, 1956 to Government on 5<sup>th</sup> February, 2007. Under Section 5(3) of the said Act, the Central Government as well as party States sought further clarification/guidance in this regard.

The Tribunal took up the petitions of the party States for consideration on 10<sup>th</sup> July, 2007. In its order, the Tribunal, inter-alia, observed as under:-

"It appears that the State of Karnataka, the State of Tamil Nadu and the State of Kerala filed Special Leave Petitions against the aforesaid decision of this Tribunal dated 5<sup>th</sup> February, 2007 before the Supreme Court. The Supreme Court has granted Special Leave. The appeals are pending. According to us, in this background, these applications under Section 5(3) of the said Act should be listed for orders after disposal of the appeals by the Supreme Court".

Civil Appeal No.2453 of 2007 of the State of Karnataka versus State of Tamil Nadu and

other alongwith Civil Appeal No.2454 of 2007 and Civil Appeal No.2456 of 2007 of the State of Kerala and State of Tamil Nadu respectively came up for preliminary hearing before the Hon'ble Supreme Court of India on 28.07.2008, 12.05.2009, 06.05.2010 but decision could not be arrived at. The matter was again listed before the three judge's bench on 22<sup>nd</sup> September, 2011 wherein it was ordered to list along with civil appeal in the third week of October, 2011. The appeal which was listed on 18<sup>th</sup> October, 2011, the Hon'ble Court mentioned that the Learned Sr. Counsel appearing for the parties submit that oral arguments in these appeals are likely to take more than six regular hearing days. In view of the submission, subject to orders of the Hon'ble Chief Justice of India, let the appeal be listed for final disposal before the appropriate bench in the month of February, 2012. The said matter has not been listed as yet. However, Counsel for the State of Tamil Nadu has filed Civil Miscellaneous Petition on 16<sup>th</sup> March 2012 before the Cauvery Water Disputes Tribunal for hearing/ disposal of the pending application under section 5(3) of the Inter State River Water Disputes Act 1956. The said Civil Miscellaneous Petition is listed before the Tribunal for disposal on 17<sup>th</sup> April 2012.

### Monitoring of the Implementation of Interim Order of CWDT

Under the provisions of Section 6 A of the ISRWD Act, 1956, the Central Government has notified a scheme called Cauvery Water (implementation of the Order of 1991 and all subsequent Related Orders of the Tribunal) Scheme, 1998, consisting of Cauvery River Authority (CRA) and Monitoring Committee (CMC). The Cauvery River Authority consists of the Prime Minister as Chairperson and Chief Ministers of the basin States as Members. The Monitoring Committee consists of Secretary, MoWR as Chairperson, Chief Secretaries, Chief Engineers of the basin States and Chairman, Central Water

Commission as Members. The Authority is required to give effect to the implementation of the Interim Order dated 25<sup>th</sup> June 1991 of the Tribunal and its related subsequent orders. The CRA has held 6 meetings till 31<sup>st</sup> March, 2012. Last meeting of CRA was held on 10.2.03. The CMC has held 26 meetings till 31<sup>st</sup> March, 2012 and its last meeting was held on 12<sup>th</sup> August, 2011. During the Water Year 2011-12, starting from June, 2011, as per the Interim Order, an inflow of 193.59 TMC was required at Mettur up to 31<sup>st</sup> December, 2011. Against this, an inflow of 188.38 TMC has been received at Mettur up to 31<sup>st</sup> December, 2011.

The financial expenditure of the Tribunal for the year 2011-12 is given in **Table-11**.

**Table-11**

Sl. No.	Specification	(₹ lakh)
1.	Budget Allocation for 2010-11	192.92
2.	Expenditure incurred by the Tribunal during 2010-11	224.44
3.	Cumulative Expenditure up to 3/11	1770.17
4.	Expenditure from 04/11 to 12/11	150.59
5.	Cumulative Expenditure upto December, 2011	1920.76

### KRISHNA WATER DISPUTES TRIBUNAL

The Krishna Water Disputes Tribunal (KWDT) was constituted on 2<sup>nd</sup> April, 2004 for adjudication of the dispute relating to sharing of waters of Inter-State river Krishna and river valleys thereof. In the Writ Petition No. 408 of 2008, Hon'ble Supreme Court has ordered that the effective date of constitution of the Tribunal will be 01.02.06. Consequently, the term of the Tribunal was extended up to 31.12.2010 as per provisions of ISRWD Act, 1956. The report and the decision by the Tribunal under Section 5(2) of

the Act were forwarded to the Ministry of Water Resources on 30<sup>th</sup> December, 2010.

In terms of Section 5(3) of the Inter-State River Water Disputes Act, the time allowed for preferring the reference is three months from the date of the decision. The Central Government and the party States viz State of Andhra Pradesh, Karnataka and Maharashtra have filed references, last one by the State of Maharashtra and Central Government on 29.3.2011. The hearing on references is going on before the Tribunal for further consideration. The Tribunal may forward to the Central Government a further report within one year of filing of the reference, which is extendable, if necessary.

The financial expenditure of the Tribunal for the year 2011-12 is given in **Table-12**.

**Table-12**

Sl. No.	Specification	(₹ lakh)
1.	Budget Allocation for 2011-12	178
2.	Expenditure incurred by the Tribunal during 2011-12 (upto December, 2011)	123
3.	Cumulative Expenditure up to December, 2011	954

### **VANSADHARA WATER DISPUTES TRIBUNAL**

The Hon'ble Supreme Court has directed Central Government to constitute the Vansadhara Tribunal before February 2010. The Tribunal has been notified on 24.2.2010 under the Chairmanship of Mr. Justice B.N. Agrawal with Justice Nirmal Singh and Justice B.N. Chaturvedi as its Members. However, Hon'ble Mr. Justice B.N. Agrawal resigned from the post of Chairman on 9<sup>th</sup> December, 2010. Thereafter, the Central Government nominated Hon'ble Dr. Justice Mukundakam Sharma as Chairman of the Tribunal and he took over charge of the post on 17.09.2011.

Further, the Ministry of Water Resources vide letter No 1 (1) /87-GA dated 31.10.2011 has allotted the office space for VWDT at 5<sup>th</sup> floor, Mohan Singh Place, New Delhi.

The financial expenditure of the Tribunal for the year 2011-12 is given in **Table-13**.

**Table-13**

Sl. No.	Specification	(₹ lakh)
1.	Budget allocation for 2011-12	417.00
2.	Expenditure incurred by the Tribunal during 2011-12 ( upto December, 2011)	105.18
3.	Cumulative Expenditure upto December, 2011	164.23

### **MAHADAYI/MANDOVI RIVER WATER DISPUTES**

The Central Government issued a Notification No. S.O.2786 (E) dated 16<sup>th</sup> November, 2010 constituting a Tribunal called as "the Mahadayi Water Disputes Tribunal" for the adjudication of water disputes relating to the inter-State river Mahadayi and the river valley thereof, consisting of (1) Hon'ble Mr. Justice J.M.Panchal, Judge, Supreme Court of India as Chairman, (2) Hon'ble Mr. Justice Viney Mittal, Judge, High Court of Madhya Pradesh as Member and (3) Hon'ble Mr. Justice P.S.Narayana, Former Judge, High Court of Andhra Pradesh as Member. They took over the charge of the post on 1<sup>st</sup> November, 2011, 1<sup>st</sup> December, 2010 and 16<sup>th</sup> November, 2010 respectively.

The office accommodation for MWDT has been allotted at 5<sup>th</sup> floor, A-wing, Janpath Bhawan, New Delhi.

The financial expenditure of the Tribunal for the year 2011-12 is given in **Table-14**.

**Table-14**

<b>SL</b>	<b>Specification</b>	<b>(₹ lakh)</b>
1.	Budget allocation for 2011-12	353.00
2.	Expenditure incurred by the Tribunal during 2011-12 (upto December, 2011)	32.09
3.	Cumulative Expenditure upto December 2011	40.53

### **RAVI & BEAS WATERS TRIBUNAL**

The Ravi & Beas Tribunal which was constituted on 2<sup>nd</sup> April, 1986 had submitted its report on 30<sup>th</sup> January, 1987. The report was circulated in May, 1987. A reference was made to the Tribunal in August, 1987 comprising reference from the Central Government and references received from Governments of Punjab, Haryana and Rajasthan, seeking explanation/guidance on certain points in the report.

The period for forwarding of further report by the Tribunal has been extended upto 5<sup>th</sup> February, 2012. The Tribunal's hearings have become dependant on the outcome of a Presidential reference related to Punjab Termination of Agreement Act, 2004. Following the demise of the Chairman of the Tribunal, the post has fallen vacant. Further, as one of the two Members tendered his resignation which was accepted, this post has also fallen vacant.

## Chapter 6

### Co-operation with Neighbouring Countries

The three major river systems of India, namely, Ganga, Brahmaputra and Indus cross international borders. This Ministry 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 international treaties relating to water.

#### INDIA-BANGLADESH CO-OPERATION

##### Indo-Bangladesh Joint River Commission

An Indo-Bangladesh Joint Rivers Commission (JRC) has been functioning since 1972 with a view to maintain liaison in order to ensure

the most effective joint efforts in maximizing the benefits from common river systems. It is headed by Ministers of Water Resources of both the countries. So far, 37 meetings have been held. The last meeting was held in March, 2010. Next meeting is due to be held at Dhaka.

##### Treaty on Sharing of Ganga/ Ganges Waters at Farakka

A Treaty was signed by the Prime Ministers of India and Bangladesh on 12<sup>th</sup> December 1996 for the sharing of Ganga/Ganges waters at Farakka during the lean season. As per the Treaty, the Ganga/ Ganges waters is being shared at Farakka (which is the last



Exchange of the Records of Discussions of 47<sup>th</sup> Meeting of Joint Committee by Members, JRC



control point on river Ganga in India) during lean period, from 1<sup>st</sup> January to 31<sup>st</sup> May every year, on 10-daily basis as per the formula provided in the Treaty. The validity of Treaty is 30 years.

The sharing of water as per the Treaty is being monitored by a Joint Committee headed by Members, JRC from both sides. Three meetings of the Joint Committee were held in the year 2011. The Treaty is being implemented to the satisfaction of both the countries since 1997.

### Cooperation in Flood Forecasting

India is providing the flood data of Farakka and Sahibganj for Ganga (from 15<sup>th</sup> June to 15<sup>th</sup> October) and the flood data of Pandu, Goalpara and Dhubri for Brahmaputra and of Silchar for Barak besides the data of river Teesta, Manu, Gumti, Jaladhaka and Torsa during monsoon period (from 15<sup>th</sup> May to 15<sup>th</sup> October) to 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. Flood data of above sites was communicated to Bangladesh on continuous basis during the Monsoon of the year 2011.

### INDIA-BHUTAN CO-OPERATION

A scheme titled "Comprehensive Scheme for Establishment of Hydro-meteorological and Flood Forecasting Network on rivers Common to India and Bhutan" is in operation. The network consists of 32 Hydro-meteorological/meteorological stations located in Bhutan and being maintained by the Royal Government of Bhutan with funding from India. The data received from these stations are utilized in

India by the Central Water Commission for formulating flood forecasts.

A Joint Group of Expert (JGE) on Flood Management has been constituted between India and Bhutan to discuss and assess the probable causes and effects of the recurring floods and erosion in the southern foothills of Bhutan and adjoining plains in India and recommend to both the Governments about appropriate and mutually acceptable remedial measures. The first meeting of JGE was held in Bhutan from 1<sup>st</sup> to 5<sup>th</sup> November, 2004, the second meeting was held on February 26-27, 2008 at New Delhi and the last (third) meeting was held on February 6-10, 2011 at Thimphu, Bhutan.

In accordance with the decision taken during the first meeting of JGE, a Joint Technical Team (JTT) on Flood Management between the two Countries was constituted. JGE reconstituted JTT with Chief Engineer, CWC, Shillong as its team leader (Indian Side). The 1<sup>st</sup> meeting of reconstituted JTT was held in Bhutan on 13 -16 September, 2010.

The recommendation made by JTT for the issues addressed were considered in the 3<sup>rd</sup> meeting of JGE held on 6<sup>th</sup> -10<sup>th</sup> February, 2011 at Thimphu, Bhutan. Thereafter, the 2<sup>nd</sup> meeting of JTT was held in India on 22-23 December, 2011. The recommendations made by JTT in its last meeting (2<sup>nd</sup>) will be discussed and accepted jointly by India – Bhutan JGE for its implementation. The 4<sup>th</sup> meeting of JGE is scheduled to be held in February, 2012 in India.

### INDIA –CHINA CO-OPERATION

In 2002, the Government of India entered into a MoU with China for provision of hydrological information on Yaluzangbu/Brahmaputra river in flood season by China to India. In accordance with the provisions contained in the MoU, the

Chinese side provided hydrological information (Water Level, Discharge and Rainfall) in respect of three stations, namely, Nugesha, Yangcun and Nuxia located on river Yaluzangbu/ Brahmaputra from 1<sup>st</sup> June to 15<sup>th</sup> October every year, which was utilized in the formulation of flood forecasts by the Central Water Commission. This MoU expired in 2007.

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 Joint Secretary level officers. Five meetings of ELM have been held. The last meeting was held in April 2011.

The first meeting of the Joint Expert Level Mechanism was held on 19-21 September 2007 at Beijing, wherein the issues related to bilateral co-operation on exchange of hydrological information between the two countries were discussed. The 2<sup>nd</sup> meeting of Expert Level Mechanism (ELM) on Trans-Border rivers was held from 10-12 April 2008 at New Delhi. During the meeting, work regulations of the Expert Level Mechanism were agreed and signed by the two sides. It has been agreed that the Expert Level Mechanism shall meet once every year, alternatively in China and India. The 3<sup>rd</sup> meeting of the Expert Level Mechanism (ELM) was held from 21<sup>st</sup> to 25<sup>th</sup> April 2009 at Beijing, which helped in understanding of each other's position for smooth transmission of flood season hydrological data. The 4<sup>th</sup> meeting of ELM was held from 26-29 April, 2010 at New Delhi. The 5<sup>th</sup> meeting of ELM was held from 19-22 April, 2011 wherein the Implementation Plan in respect of MoU on Sutlej was signed between the two countries.

The 6<sup>th</sup> meeting of ELM is scheduled to be held in April, 2012 in India.

### MoU on River Brahmaputra

During the visit of Hon'ble External Affairs Minister of India to Beijing from June 4-7, 2008, a new Memorandum of Understanding (MoU) upon provision of hydrological information of the Brahmaputra/Yaluzangbu river in flood season by China to India with a validity of five year was signed with China on 05.06.08. The Implementation Plan between the Bureau of Hydrology & Water Resources, Tibet autonomous region, the People's Republic of China and the Central Water Commission, Ministry of Water Resources, the Republic of India upon provision of hydrological information of the Yaluzangbu/ Brahmaputra river in flood season by China to India was signed during the 4<sup>th</sup> meeting of Expert Level Mechanism on Trans-Border rivers held from 26<sup>th</sup> to 29<sup>th</sup> April, 2010 in New Delhi. The hydrological information during the flood season every year is received in terms of the signed Implementation Plan.

### MoU on River Sutlej

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

details of provision of hydrological information, data transmission method and cost settlement in respect of the MoU on Sutlej was signed between the two countries during the 5<sup>th</sup> ELM held in April, 2011 at Beijing, China. The hydrological information during the flood season, 2012 was received in terms of the signed Implementation Plan.

## **INDIA – NEPAL CO-OPERATION**

### **Pancheshwar Multipurpose Project (5600 MW)**

Pancheshwar Multipurpose Project is the Central piece of Mahakali (Sarda) Treaty of 1996 between India and Nepal. Required field investigations for the Pancheshwar Multipurpose Project having an installed capacity of 5600 MW at Pancheshwar with irrigation and incidental flood control benefits and a re-regulating structure to primarily meet irrigation requirements downstream in Uttar Pradesh have been completed. During the 3<sup>rd</sup> meeting of India- Nepal Joint Committee on Water Resources (JCWR) held from 29.09.08 to 01.10.08 at Kathmandu (Nepal), it was decided to set up Pancheshwar Development Authority (PDA) for the development, execution and operation of Pancheshwar Multipurpose Project. During the 5<sup>th</sup> meeting of JCWR held on 20-22, November, 2009 at Pokhara (Nepal), JCWR finalized the Terms of Reference (TOR) of PDA. However, substantive issues such as sharing of cost and benefits, location of re-regulating structure, stage based implementation, etc. have not been finalized. During its 6<sup>th</sup> meeting held on 24-25 November, 2011 at New Delhi, JCWR agreed for initiating the process of establishment of Pancheshwar Development Authority (PDA) for implementation of Pancheshwar Multipurpose Project.

### **Sapta Kosi High Dam Multipurpose Project & Sunkosi-cum-Diversion Scheme (3300 MW)**

In order to undertake the joint investigations of Sapta Kosi High Dam Multipurpose Project and Sun Kosi Storage-cum-Diversion Scheme, a Joint Project Office (JPO-SKSKI) was set up in Nepal in August, 2004 to take up field investigations and preparation of Joint DPR. It was to complete the works by February, 2007. However, due to political instability and frequent strikes / bandhs in Nepal, the field investigations got delayed. The tenure of JPO-SKSKI has been extended to February, 2013. During the 6<sup>th</sup> meeting of JCWR, the measures for expediting the field investigations were agreed.

### **India-Nepal Joint Committee on Water Resources (JCWR)**

6<sup>th</sup> meeting of India- Nepal Joint Committee on Water Resources (JCWR) was held on 24-25 November, 2011 at New Delhi. During the meeting, all issues related to co-operation in water resources including Mahakali Treaty were discussed. Pancheshwar Multipurpose project is a part of the Mahakali Treaty. JCWR agreed for initiating the process of establishment of Pancheshwar Development Authority (PDA) for implementation of Pancheshwar Multipurpose Project. Progress of investigation of Sapta Kosi High Dam Project and Sun Kosi Storage-cum-diversion Scheme were also reviewed and measures for expediting were agreed. All other issues concerning floods and irrigation on common border areas were discussed and it was agreed to resolve them mutually.

### **India-Nepal Joint Standing Technical Committee (JSTC)**

3<sup>rd</sup> meeting of India- Nepal Joint Standing Technical Committee (JSTC) was held on 13-14 September, 2011 at New Delhi in which all outstanding technical issues between the two countries were discussed.



Signing of Minutes of 6<sup>th</sup> Meeting of India- Nepal Joint Committee on Water Resources (JCWR)

### India-Nepal Joint Team of Experts (JTE)

10<sup>th</sup> meeting of Joint Team of Experts (JTE) was held on 22-23 August, 2011 at New Delhi. During the meeting, various measures for expediting the field investigations were agreed.

### INDO-PAKISTAN CO-OPERATION

Under the Indus Waters Treaty 1960, India and Pakistan each have created a permanent post of Commissioner for Indus Waters. Each Commissioner is the representative of his Government for all matters arising out of the Treaty and is to serve as the regular channel of communication on all matters relating to implementation of the Treaty. The two Commissioners together form the Permanent Indus Commission.

The Commission has undertaken 114 tours of inspection and held 107 meetings till 31<sup>st</sup> March 2012, in both the countries as a whole.

In fulfillment of the requirements of Indus Waters Treaty, the daily gauge discharge data of hydrological sites of six basins, The Indus, The Jhelum, The Chenab, The Ravi, The Beas and The Sutlej of Indus system is sent to

Pakistan every month and also received from Pakistan.

Irrigated cropped area statistics for Indus, Jhelum & Chenab basins for the crop year 2010-11 were also sent to Pakistan in November 2011.

Flood flow data for agreed sites on the rivers Ravi, Sutlej, Tawi, and Chenab was also communicated by India to Pakistan for their benefit through telephone during the period from 1<sup>st</sup> July to 10<sup>th</sup> October, 2011, to undertake advance flood relief measures.

Initiated by Pakistan, a seven Member Court of Arbitration on Kishenganga HEP was set up in 2010 and it had its first meeting in January, 2011, a site visit to the project and also Neelum Valley in June, 2011, a hearing in August, 2011 and later, a second site visit to Neelum valley in February 2012. This arbitral matter is ongoing and is expected to be over by early 2013.

Secretary level talks on Tulbul Navigation Project (J&K) were also held in May 2011 at Islamabad and on March 2012 in New Delhi.

## Chapter 7

### External Assistance in Water Resources Sector

The Ministry of Water Resources assists the State Governments in availing external assistance from different funding agencies to fill up the resource gap and State of the art technology for water resources development and management of the country.

The World Bank continues to be the primary source of external assistance in the water resources sector. Assistance is also being availed from multilateral/bilateral agencies and countries.

There are 19 on-going externally aided projects in various States with the assistance from different funding agencies, viz. World Bank (11), Asian Development Bank (3) and other bilateral agencies, namely, Japan Bank for International Cooperation (JBIC) (4) and Kreditanstalt für Wiederaufbau (Kfw), Germany (1).

Out of 11 on-going externally aided projects assisted by World Bank, 3 relates to water sector restructuring in the States of Madhya Pradesh, Rajasthan and Uttar Pradesh; 3 relates to community based tank management in the States of Andhra Pradesh, Karnataka (Phase I & Phase II) and Odisha; 2 relates to water sector improvement in the States of Maharashtra and Andhra Pradesh; 1 relate to irrigated agriculture modernization and water bodies restoration and management of Tamil Nadu; 1 relates to Hydrology Project (Phase II) which covers 13

States & 8 Central Agencies and 1 relates to accelerated development of minor irrigation in West Bengal. A brief status of World Bank assisted ongoing external aided projects is given in **Table-15**.

A brief status of Asian Development Bank, JICA and KFW (Germany) assisted ongoing external aided projects are given in **Table-16**, **Table- 17** and **Table-18** respectively.

#### Projects under Pipeline - World Bank

Out of 2 externally aided projects under pipeline assisted by World Bank, 1 relates to Dam Rehabilitation and Improvement Project in 4 States and another relates to Water Sector Improvement in the State of Odisha. The brief features are given below:

#### Dam Rehabilitation and Improvement Project (DRIP)

Dam Rehabilitation and Improvement Project (DRIP) with the assistance of World Bank aims at rehabilitation and improvement of about 223 large dams in four States, viz. Madhya Pradesh, Odisha, Kerala and Tamil Nadu. DRIP would be a six-year project. Apart from structural and non-structural measures for rehabilitation and improvement of identified dams, the scope of project includes the development of appropriate



**Table -15: World Bank Assisted On-going Projects**

S. No	State	Name of Projects	Date of Agreement/ Completion	Amount of Assistance (IBRD/IDA) US \$ million	Cumulative Disbursement upto 31.12.2011 (US \$ million)	% of Cumulative Disbursement w.r.t Date of Agreement/ Completion as on 31.12.2011
1	Madhya Pradesh	Madhya Pradesh Water Sector Restructuring Project 4750-IN	30.11.2004/ 31.03.2012	387.40(IBRD)	182.79	47.18%: 7 Yrs 1 month 53.82%: 0 Yrs 3 month
2	Rajasthan	Rajasthan Water Sector Restructuring Project 3603-IN	15.3.2002/ 31.3.2013	93.45(IDA) XDR	76.39	81.74%: 9Yrs 9 months 18.26%: 1Yrs 3 months
		Additional Financing Rajasthan Water Sector Restructuring Project 4709-IN	21.5.2010/ 31.03.2013	12.40(IDA) XDR	0.97	7.84% 1Yrs 7 months 92.16% 1Yrs 3 months
3	Uttar Pradesh	UP Water Sector Restructuring Project 3602-IN	08.03.2002/ 31.10.2011	87.27(IDA) XDR	84.24	96.53%: 9Yrs 10 months 3.47%: 0Yrs 0 months
4	Maharashtra	Maharashtra Water Sector Improvement Project 4796-IN	19.08.2005/ 31.03.2012	325.00(IBRD)	215.54	66.32%: 6Yrs 4 months 33.68%: 0Yrs 3 months
5	Karnataka	Karnataka Community Based Tank Management Project.4872-IN	2.11.2007/ 31.01.2012	32.00(IBRD)	12.30	38.43%: 4Yrs 2 months 61.47%: 0Yrs 1 months
		Karnataka Community Based Tank Management Project 3635-1-IN	02.11.2007/ 31.01.2012	21.00(IDA) XDR	8.32	39.63%: 4Yrs 2 months 60.37%:0Yrs 1months
		Karnataka Community Based Tank Management Project.3635-IN	04.06.2002/ 31.01.2012	63.42(IDA) XDR	40.32	63.58%: 9Yrs 7 months 36.42%:0Yrs 1 months
6	Andhra Pradesh	Andhra Pradesh Community Based Tank Management Project 4857-IN	08.06.2007/ 31.12.2012	94.50(IBRD)	32.91	34.82%: 4Yrs 7 months 65.18%:1Yrs 0 months
		Andhra Pradesh Community Based Tank Management Project 4291-IN	08.06.2007/ 31.12.2012	63.00(IDA) XDR	21.06	33.43%:4Yrs 7 months 66.57%: 1yrs 0 months
7	Andhra Pradesh	Andhra Pradesh Water Sector Improvement Project 7897-IN	<u>14.08.2010/</u> <u>31.07.2016</u>	450.60(IBRD)	48.11	10.68%: 1Yrs 5 months 89.32%: 4Yrs 7 months
8	Odisha	Odisha Community Tanks Management Project 7576-IN	<u>27.01.2009/</u> <u>31.12.2014</u>	38.47(IBRD)	3.56	9.24%: 2Yrs 11 months 90.76%:3Yrs 0 months
		Odisha Community Tanks Management Project 4499-IN	<u>27.01.2009/</u> <u>31.08.2014</u>	23.46(IDA) XDR	2.20	9.38%: 2Yrs 11 months 90.62%:2Yrs 8 months
9	Tamil Nadu	Tamil Nadu Irrigated	<u>12.2.2007/</u>	335.00(IBRD)	56.02	16.72%:4Yrs 11 months



		Agriculture Modernization and Water Bodies Restoration and Management Project 4846-IN (IBRD)	<u>31.3.2013</u>			83.28%:1Yrs 3 months
		Tamil Nadu Irrigated Agriculture Modernization and Water Bodies Restoration and Management Project. 4255-IN (IDA)	<u>12.2.2007/</u> <u>31.3.2013</u>	99.80(IDA) XDR	98.78	98.97%:4Yrs 11 months 1.03%:1Yr 3 months
10	Multi-State*	Hydrology Project (Phase-II) 4749-IN	<u>19.1.2006/</u> <u>30.6.2012</u>	104.98(IBRD)	46.72	44.50%: 5 Yrs 11months 55.50%: 0 Yrs 6 months
11	West Bengal	West Bengal Accelerated Development of Minor Irrigation Project. Q6120	19.05.2008/ 31.12.2011	2.94(IDA)	0.54	18.32% 3 Yrs 7 months 81.68% 0 Yrs 0 months

\*Andhra Pradesh, Chhattisgarh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Odisha, Tamil Nadu, Goa, Punjab, Puducherry and Himachal Pradesh.

Note: Figures in second row of last column indicate the balance % of loan amount and the remaining period of its utilization.

**Table -16: Asian Development Bank Assisted On-going Projects**

S. N	State	Name of Projects	Date of Agreement/ Completion	Amount of Assistance (US \$ million)	Cumulative Disbursement upto 31.12.2011 ( US \$ million)	% of Cumulative Disbursement w.r.t Date of Agreement/ Completion as on 31.12.2011
1	Chhattisgarh	2159-IND Chhattisgarh Irrigation Development Project	20.03.2006/ 31.03.2013	46.11	28.43	61.67%: 5Yrs 9 months 38.33%: 1Yrs 3 months
2	Odisha	2444-IND Odisha Integrated Irrigated Agriculture and Water Management Investment Project	25.02.2009/ 30.09.2013	16.50	5.29	32.06%: 2Yrs 10 months 67.94%: 1Yrs 9 months
3	Maharashtra and Karnataka	2679-IND Sustainable Coastal Protection and Management Investment Program Project	17.08.2011 31.12.2014	51.56	0.56	1.08% 0Yrs 4 months 98.92% 3Yrs 0 months

**Table -17: JICA Assisted On-Going Projects**

S No	State	Name of Projects	Date of Agreement/ Completion	Amount of Assistance (JPY million)	Cumulative Disbursement upto 31.12.2011 ( JPY million)	% of Cumulative Disbursement w.r.t Date of Agreement/Completion as on 31.12.2011
1	Andhra Pradesh	IDP-155 Kurnool-Cuddapah Canal Modernization Project-II	31.03.2004/ 18.06.2012	4773	3273.87	68.59%: 7Yrs 9 months  31.41%: 0Yrs 6 months
2	Andhra Pradesh	IDP-181 Andhra Pradesh Irrigation & Livelihood Improvement Project	30.03.2007/ 11.07.2016	23974	4621.31	19.28%: 4Yrs 9 months  80.72%: 4Yrs 6 months
3	Odisha	Rengali Irrigation Project (IDP-210, IDP-210A)	31.03.2010/ 24.11.2015	3072	2166.92	71.00% 1Yrs 9 months 29.00% 3Yrs 11 months
		Rengali Irrigation Project (IDP-154)	31.03.2004/ 31.05.2011	6273.57	6273.57	100.00%: 7Yrs 9 months
4	Rajasthan	IDP-161 Rajasthan Minor Irrigation Improvement Project	31.03.2005/ 28.07.2015	11555	587.10	5.08%: 6Yrs 9 months  94.92%: 4Yrs 7 months

**Table -18: Kreditanstalt fur Wiederaufbau (KfW), Germany**

S No	State	Name of Project	Date of Agreement/ Completion	Amount of Assistance Donor Currency (Million)	Cumulative Disbursement upto 31.12.2011 (Million)	% of Cumulative Disbursement w.r.t Date of Agreement/Completion as on 31.12.2011
1	Maharashtra	Minor Irrigation Project	01.06.2000 31.12.2011	EURO 17.01	EURO 14.75	86.73%: 11Yrs 7 months  13.27%: 0Yrs 0 months

institutional mechanisms for the safe operation and maintenance of all large dams in participating States. In addition, strengthening of the institutional setup for national level dam safety surveillance and guidance would be taken up in Central Water Commission (CWC).

The total estimated cost of DRIP is ₹ 2100.00 crore (US\$ 437.50 million). Out of the total project cost, ₹ 1487.23 crore (US\$ 309.84 million) is for four States and ₹ 132.00 crore (US\$ 27.50 million) is for Central Water

Commission (Central component). In addition, a provision of ₹ 480.24 crore (US\$ 100.05 million) has been included in the total project cost as unallocated resources that can be used during implementation for similar works in additional States which may join the project at a later date. Out of the total project cost, 80% (i.e. ₹ 1680.00 crore) will be funded by the World Bank credit, while 20% (i.e. ₹ 420.00 crore) will be borne by respective State Governments and Government of India.

The negotiations for the project with the World Bank were held from 31<sup>st</sup> May to 1<sup>st</sup> June, 2010. The approval of the Expenditure Finance Committee (EFC) under the Chairpersonship of Secretary (Expenditure), Ministry of Finance, was obtained in May, 2011. The approval of Cabinet Committee on Economic Affairs (CCEA) was received on 23<sup>rd</sup> November, 2011. The signing of agreement with the World Bank for DRIP was held on 21<sup>st</sup> December, 2011. After the legal vetting of the project agreement by all the DRIP States, the project will become effective by 20<sup>th</sup> March, 2012

### **Odisha Water Sector Improvement Project (OWSIP)**

The total estimated cost of the project is US \$ 350 million, out of which loan amount will be US \$ 300 million. The balance amount of US \$ 50 million will be provided by the State Government. The main components of the project are (i) Institutional Modernization & Capacity Building; (ii) Improving the sustainable productivity of existing assets and (iii) Preparation of future water investments. The State Government of Odisha has been working out details of the sub-projects, keeping in the view the funds available under different schemes of Government of India, viz. A.I.B.P., FMP, NABARD etc. The revised proposal indicates cost of the project at ₹ 1503 crore.

### **Projects under Pipeline – ADB**

A brief status of North- Eastern Integrated Flood and river Bank Erosion Management Project, which is under pipeline with the assistance of Asian Development Bank is given below:

#### **North- Eastern Integrated Flood and river Bank Erosion Management Project (Assam) (AIFRERMIP)**

The total cost of AIFRERMIP over the period of 2010-17 is about US \$ 150 Million. The

financing pattern for AIFRERMIP is 80:20 between ADB and the Government. The Multi-Tranche Financing Facility (MFF) loan of this project of \$ 120 million was approved on 19<sup>th</sup> October, 2010 and its project-I for \$ 56.9 million was approved on 25<sup>th</sup> October, 2010. The loan and project agreements for project -1 was signed on 10<sup>th</sup> May 2011 and became effective on 4<sup>th</sup> August 2011. The MFF aims to improve the reliability of flood and riverbank erosion risk management systems in flood prone areas in Assam, focusing on three selected sub-projects having existing flood embankments that are deteriorated and threatened by river bank erosion.

#### **Bilateral Cooperation/ Signing of MoUs**

– Memorandum of Understanding (MoUs) with the Kingdom of Cambodia on co-operation in the field of Water Resources Management was signed on 8<sup>th</sup> December 2007 and shall remain in force for a period of five years.

The Memorandum of Understanding between the Government of India and the Government of Australia on Cooperation in the field of Water Resources Management was signed on 10<sup>th</sup> November 2009, which will be effective for a period of 5 years. Pursuant to signing of this Memorandum of Understanding, a Joint Working Group (JWG) having equal Members from each side was formed in 2010 and its first meeting was held during 15-19 November, 2010 in New Delhi wherein an Action Plan charting out various activities for co-operation on Water Resources Management between India and Australia was signed on 19.11.2010.

Draft MoUs between the Government of Republic of India and each with Royal Government of Bhutan, the Government of the Kingdom of Morocco and Republic of Fiji in the Water Resources Sector are under consideration.

Memorandum of Understandings (MoUs) were signed by WAPCOS, a Public Sector

Enterprise under the aegis of the Ministry of Water Resources with the Government of Lao PDR and the Royal Govt. of Cambodia in the field of Water Resources Management on 09.06.2010 and 10.06.2010 respectively.

**Bilateral Cooperation with African Countries** - The first India-Africa Forum Summit (IAFS) was held in April, 2008 and the Union Cabinet approved the following with regard to Ministry of Water Resources:

- (a) Preparation of Strategy Paper on Integrated Water Resources Development and Management by WAPCOS, initially for 5 countries and to be extended to other countries later on; and
- (b) Conducting 7 specialized training courses.

Funds for these activities will be provided by Ministry of External Affairs under its ITEC programme.

On (a) above, two agreements have been signed between the Ministry of External Affairs, Government of India and WAPCOS Limited on 16<sup>th</sup> December, 2011 under which WAPCOS have been appointed as the Project Consultant for:

1. Preparation of Strategy Paper on integrated Water Resource

Development and Management for Lake Chad Basin

2. Preparation of Strategy Paper on integrated Water Resource Development and Management for Save river Basin in Zimbabwe and Sankuru river Basin in D.R. Congo

Regarding (b), seven training courses on seven different specialized modules relating to water resources management for African engineers were prepared by seven Institutes, namely, National Water Academy, Pune; National Institute of Hydrology, Roorkee; Central Ground Water Board; Central Water and Power Research Station; Central Soil and Materials Research Station; Deptt. of Water Resources, IIT, Roorkee and Deptt. of Hydrology, IIT, Roorkee.

Under ITEC programme for African nationals, National Water Academy, Pune conducted training programme, namely, "Preparation of Detailed Project Report for River Valley Projects" from 14-25 February, 2011, Rajiv Gandhi National Ground Water Training and Research Institute, Faridabad conducted "Training Course on Ground Water Management and Modelling" from 03-07 March, 2011 and National Water Academy, Pune conducted training programme, namely, "Preparation of Detailed Project Report" from 28<sup>th</sup> November to 9<sup>th</sup> December 2011 and trained 16 trainees from 12 African countries.

## Chapter 8

### Research and Development

The Ministry of Water Resources (MoWR) has three organizations viz; Central Water and Power Research Station (CWPRS), Central Soil and Materials Research Station (CSMRS) and National Institute of Hydrology (NIH) which are fully devoted to research & development in water sector. CWPRS is the premier national institute for research in the area of hydraulics of water resources structure related to irrigation, hydro-power, navigation, coastal works and related instrumentation. CSMRS is involved in the research related to construction materials, concrete technology, geophysics, rock mechanics, soil mechanics and rockfill testing technology. NIH is devoted to systematic and scientific studies in all aspects of hydrology with the objective of improving the present practices in planning, design and operation of water resources projects.

#### Promotion of Research in Water Sector

The Ministry of Water Resources provides financial assistance to promote research work in the field of water resources sector. The assistance is provided by way of grants to academicians / experts in the Universities, IITs, recognised R&D Laboratories / Institutes, Water Resources / Irrigation Departments of the Central and State Governments in the country and NGOs for carrying out research and studies related to water resources sector. Research proposals of applied nature as well as basic research are considered for financial assistance.

The coordination of the Programme for providing financial assistance for research and development is done by Research & Development Division under the Policy &

Planning wing of the Ministry. Considering wide range of topics covered under water resources engineering, five Indian National Committees (INCs), namely, INCH (Hydraulics), INCOH (Hydrology), INCID (Irrigation & Drainage), INCGE (Geo-Technical Engineering) and INCCMS (Construction Materials & Structures) had been constituted to provide necessary technical and advisory support for the implementation of R&D programme. In September 2008, these INCs have been reconstituted. The INCGE and INCCMS have been merged into a single INC, namely, Indian National Committee on Geo-Technical Engineering and Construction Materials (INCGECM) and a new Indian National Committee on Ground Water (INCGW) have been constituted. Thus, the total number of INCs remains five. The Members of these Committees are drawn from various Central and State Government agencies as well as experts from academic and research organisations.

#### Indian National Committee on Hydraulic Research (INCH)

The Indian National Committee on Hydraulic Research (INCH) was constituted in 1990, the apex body in Hydraulics with the responsibility of coordinating various research activities in the field of management of floods, hydraulic structures, river and estuarine hydraulics, river morphology, ground water hydraulics, instrumentation for seismic and geophysical measurements, open channel flow, pipe flow, hydraulic machinery, city water supply and ports and harbours. The secretariat of INCH, earlier located at

CWC, New Delhi has now been shifted to CWPRS, Pune with effect from September 2008.

As on 31<sup>st</sup> December 2011, 19 research schemes were under implementation.

### **Indian National Committee on Hydrology (INCOH)**

The Indian National Committee on Hydrology (INCOH) was constituted in 1982, the apex body in Hydrology, with the responsibility of coordinating various research activities in the field of meteorology, surface water hydrology, evaporation control, instrumentation, real time systems, application of GIS and remote sensing. The secretariat of INCOH is located at National Institute of Hydrology, Roorkee.

In pursuance of its objectives, the Committee has brought out 29 State-of-art Reports in hydrology in the country. The Committee has also provided financial support for organising seminars, conferences etc. for dissemination of knowledge and promoting education and training in hydrology.

The Committee is participating in the activities of International Hydrological Programme (IHP) of United Nation's Educational, Scientific and Cultural Organisation (UNESCO) by organizing regional courses and workshops.

As on 31<sup>st</sup> December 2011, 19 research schemes were under implementation.

### **Indian National Committee on Irrigation and Drainage (INCID)**

The Indian National Committee on Irrigation & Drainage (INCID) was constituted in 1990, the apex body in Irrigation and Drainage with the responsibility of coordinating various research activities in the field of irrigation, drainage, agronomy, water management, environmental impact and socio-economic

aspect of water resources projects, plasticulture development, geo-textiles. This is working as National Committee for India for the International Commission on Irrigation & Drainage (ICID). INCID contributes to various ICID meetings/workshops/ conferences and to other international conferences. INCID is also involved in bringing out technical publications in the form of manuals, reports, bulletins and seminar proceedings etc.

As on 31<sup>st</sup> December 2011, 41 research schemes were under implementation.

### **Indian National Committee on Geotechnical Engineering and Construction Materials (INCCEM)**

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

As on 31<sup>st</sup> December 2011, 16 research schemes were under implementation.

### **Indian National Committee on Ground Water (INCGW)**

Considering the importance of various issues related to ground water, a new committee viz; Indian National Committee on Ground Water (INCGW) with responsibility of coordinating various research activities in the relevant field has been constituted in



September 2008. So far the activities pertaining to research in ground water were being coordinated by INCOH through its Research Committee on Ground Water. The secretariat of INCGW is located at CGWB, Faridabad. The research scheme pertaining to ground water which so far were being dealt by INCOH, have been brought under INCGW.

As on 31<sup>st</sup> December 2011, 15 research schemes were under implementation.

### **18<sup>th</sup> Meeting of the Standing Advisory Committee (SAC)**

The 18<sup>th</sup> meeting of the Standing Advisory Committee (SAC) of MoWR for Research & Development was held on 5<sup>th</sup> January 2012. A total of 35 research proposals including 6 deferred proposals were considered by the Committee. 23 research proposals were approved for funding under the R&D

Programme. 12 research proposals were not accepted for funding. These approved schemes are not part of details mentioned under various INCs.

### **New Activities taken up during XI Plan**

With a view to address the research problems in proper perspective, the State Government institutions such as engineering / irrigation research institutions, Water and Land Management Institutes are being actively involved in (a) efficiency studies for completed major and medium irrigation projects; (b) effect of climate change on water resources and studies in respect of vulnerability assessment and adaptation; (c) reservoir sedimentation studies; (d) post-facto evaluation and management plan for optimal benefit from the resources; and (e) initiation of benchmarking of irrigation projects for performance improvement.

# Chapter 9

## Organizations and Institutions

### ATTACHED OFFICES

#### CENTRAL WATER COMMISSION

##### Introduction

Central Water Commission with its Headquarters at New Delhi is a premier Technical Organisation in the country in the field of Water Resources since 1945. The Commission is entrusted with the general responsibility of initiating, coordinating and furthering, in consultation with the State Governments concerned, schemes for control, conservation and utilization of water resources throughout the country for the purpose of Flood Control, Irrigation, Drinking Water Supply and Water Power Development.

Central Water Commission is headed by a Chairman with status of an Ex-Officio Secretary to the Government of India. The Commission has three Technical Wings, namely:

- Designs and Research wing
- Water Planning and Projects wing
- River Management wing

Each wing is headed by a Member with the status of an Ex-Officio Additional Secretary to the Government of India. The activities of the wings are carried out by 18 functional units at the Headquarters, each headed by a Chief Engineer. The National Water Academy, Pune headed by a Chief Engineer is also a part of the Commission. Besides this, the Commission also has 13 Regional Organisations, each headed by a Chief Engineer.

##### Activities

The activities of CWC may be summarized as follows:

- Flood Forecasting and Assistance to State Governments in Flood Management
- Collection and Analysis of Hydrological Data
- Techno-Economic Appraisal of Projects
- Monitoring of Projects and Projects receiving Central Assistance
- Design of Projects
- Surveys, Investigations and Preparation of DPRs
- Studies on Environmental and Socio-Economic Issues
- Studies Related to Irrigation Planning and Water Management
- Basin Planning and Management
- National Water Resources Assessment
- Assistance in Resolution of Inter-State Water Disputes
- Construction Equipment Planning
- Studies on Dam Safety
- Research and Development
- Standardization of Engineering Practices
- Operation of Reservoirs
- Training and Capacity Building
- International Co-operation in Water Sector

##### Major Activities

##### Hydrological Observations

Central Water Commission is having a wide network of hydrological stations spread over all river basins of India. River water level, discharge, sediment and other meteorological

parameters on 878 stations are observed on different rivers in India. The data observed is validated and published in the form of Water Year Books annually by the regional field offices of CWC. The hydrological observation stations are being modernised through introduction of modern equipments and sensor based observations.

## Hydrology Project- Phase II

The Hydrology Project Phase-II envisages establishment of Hydrological Information System on the pattern of HP-I in 4 new States, namely, Punjab, Himachal Pradesh, Goa and Puducherry and vertical extension in existing 9 States and Central agencies for utilization of HIS resources created during HP-I.

Central Water Commission's component for Hydrology Project Phase-II consists of two major components, namely, Institutional Strengthening and Vertical Extension. Under the Institutional Strengthening, it is proposed to increase awareness for data dissemination and knowledge sharing, providing logistical support, etc. Under the vertical extension component, the major activities envisaged by the Central Water Commission is Development of Hydrological Design Aids including standardization of methodology/ protocols.

The estimated cost of the proposal is ₹ 24.9 crore without contingencies and ₹ 29.63 crore with contingencies.

## Water Quality Monitoring

Central Water Commission is monitoring water quality continuously at 371 key locations covering all the major river basins of India. It has a three-tier laboratory system for analysis of the parameters. The level-I Laboratories are located at 258 field water quality monitoring stations on major rivers of India where physical parameters such as temperature, colour, odour, specific

conductivity, total dissolved solids, pH and dissolved Oxygen of river water are observed. There are 24 level-II Laboratories located at selected Divisional Headquarters to analyse 25 physico-chemical characteristics and bacteriological parameters of river water. 4 Level-III/II+ Laboratories are functioning at Varanasi, Delhi, Hyderabad and Coimbatore where 41 parameters including heavy elements/toxic parameters and pesticides are analysed periodically. The data generated are computerized in the database system and disseminated in the form of hydrological yearbook, status reports and bulletins. Water Quality Year Books are published and WQ Bulletins are issued regularly.

## Flood Forecasting and Inflow Forecasting

### 1. Flood Forecasting & Warning Services

There are 175 flood forecasting stations, of which 147 are level forecasting and 28 are inflow forecasting stations on major dams/barrages. It covers 9 major river systems in the country including 71 river sub-basins and 15 States.

On an average, over 6000 forecasts are being issued every year by the Central Water Commission during flood season. Normally, these forecasts are issued 12 to 48 hours in advance, depending upon the river terrain, the locations of the flood forecasting sites and base stations. For the purpose of flood forecasting, hydrological data is being observed at more than 700 gauge and discharge sites and hydro-meteorological data over 500 rain gauge stations and communicated through a network of about 550 wireless stations. Synoptic weather situations, weather forecast/heavy rainfall warnings etc. are also being collected from FMO's (Flood Meteorological Officers of IMD).

### 2. Flood Forecasting Performance during 2011

During the flood season 2011 (May to Oct.) 5991 flood forecasts (4848 level forecast and 1143 inflow forecasts) were issued out of which 5903 (98.53%) forecasts were found within accuracy limit of (+/-) 0.15 m for level forecast and (+/-) 20% for inflow forecast.

During the flood season of 2011 (May to October), out of 147 level forecasting sites, unprecedented flood situations were witnessed at 2 flood forecasting stations viz. Alipingal on river Devi, a distributary of river Mahanadi and Anandpur on river Baitarni both in the State of Odisha, where the Highest Flood Level (HFL) attained during the flood season exceeded their respective previous H.F.L.

In 2011, high flood situations were experienced at 14 forecasting stations (where peak level was attained within 0.5m of previous HFL) viz., Road Bridge on river Beki in Assam, river Ganga at Kannauj, Ankinghat, Kanpur and Dalmau, river Ramganga at Bareilly, river Ghaghra at Elgin Bridge and Ayodhya in Uttar Pradesh, river Ganga at Hathidah and Bhagalpur, river Ghaghra at Gangpur Siswan, river Bagmati at Benibad in Bihar, river Mahanadi at Naraj, river Kusabhadra at Nimapara and river Baitarani at Anandpur in Odisha.

### **3. Flood Bulletins**

During flood season 2011, Central Water Commission (CWC) issued 154 daily bulletins (once daily), 55 Orange Bulletins for High Flood Situation (Twice daily) and 6 Red Bulletins for Unprecedented Flood Situations (three hourly).

Central Water Commission is operating 578 wireless stations covering almost all river basins to transmit and receive the data from across the country.

### **4. Modernization of Flood Forecasting Services**

The Central Water Commission is making a constant endeavour in updating and modernizing the forecasting services.

During 9<sup>th</sup> Plan, telemetry system at 55 stations was installed in Chambal and Upper Mahanadi basins for real time data collection and transmission to forecast formulation centres under World Bank aided DSARP scheme. During 10<sup>th</sup> Plan, telemetry system at 168 stations has been installed in different river basins under the scheme "Establishment & Modernization of Flood Forecasting Network in India including Inflow Forecast". During XI<sup>th</sup> Plan, 222 telemetry stations are being installed in different river basins.

Out of 222 telemetry stations, 125 telemetry stations, 1 earth station and 10 modelling centres at Patna in Bihar, Jalpaiguri in West Bengal, Lucknow and Varanasi in Uttar Pradesh, Dehradun in Uttarakhand, Gandhinagar and Surat in Gujarat, Bhusaval in Maharashtra, Shimla in Himachal Pradesh and FFM Directorate in NCT, Delhi have been installed and data of 125 telemetry stations are being received at modelling centres.

To improve the flood forecast modelling, windows based Mike-11 have been procured and supplied to modelling centres established under IX<sup>th</sup> and X<sup>th</sup> Plans. Basin specific models have been developed for Chambal and Mahanadi basins. These are being used for real –time Flood Forecasting. Models for other basins are being developed. Regular training for working staff in field are being organised for working on Mike-11 models.

### **Development of Flood Forecasting Model**

Development of Mike-11 model for Flood Forecasting of Mathura and Agra on river Yamuna and for Inflow Forecasting of Hathnur dam on river Tapi has been taken up. The work of development of

mathematical models for flood forecast generation is in the progress.

### **Trainings**

Two training programs of five days duration each, on use of Mike-11 Mathematical Model for Flood Forecasting were organized. One of these programs was organized during 17-10-2011 to 21-10-2011 for the officers of Planning and Development Organization of CWC and the other was organized during 14-11-2011 to 18-11-2011 for the officers and staff of four field divisions of CWC.

### **Techno Economic Appraisal of Flood Management Schemes**

During 2011-12, a total of 153 Flood Management Schemes were received in Central Water Commission. Out of which, 97 schemes were cleared and 6 schemes were not found technically sound and returned. Further, 50 schemes are under appraisal.

### **Survey and Investigation**

CWC is carrying out surveys and investigations for preparation of Detailed Project Reports (DPRs) in the NE region and J&K, on the request of the respective States, for development of water resources potential for irrigation, hydro-power and other uses.

CWC has completed surveys and investigations for preparation of DPRs of Pancheshwar HE project and taken up surveys and investigations for Sapta Kosi high dam and Sun Kosi storage-cum-diversion project jointly with Nepal for mutual benefit of both the countries. Investigation activities, especially in the North-Eastern States have to be continued due to high untapped potential of water resources development in this region. Investigation for 57 minor irrigation schemes were taken up in the State of

Mizoram and DPR has been prepared and submitted to the State Government.

### **Morphological Studies**

The study of river morphology and implementation of suitable river training works 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.

Morphological study of six rivers was proposed in 10<sup>th</sup> Plan, out of which morphological studies of three rivers, namely, Ghaghra, Sutlej and Gandak rivers were taken up during 10<sup>th</sup> Plan period.

During 11<sup>th</sup> Plan, morphological studies of seventeen rivers were taken up under the Plan Scheme, 'R&D Programme in Water Sector'. The main components of the proposed works during 11<sup>th</sup> Plan are –

- (i) Morphological study using remote sensing images and other historical information like topo-sheets etc. and preparation of comprehensive report;
- (ii) Collection of field data like cross-sections of river for further studies in future.

The EFC Memo for the Plan Scheme 'R&D Programme in Water Sector' was approved during February 2008 for ₹ 295 crore. Out of this, the component for morphological study is ₹ 21.18 crore.

### **Coastal Erosion & Remedial Measures**

The Indian coastline is extending to a length of about 7516 km. Almost all the maritime States/UTs are facing coastal erosion problem in various magnitudes. Consolidated status of coastal erosion and protection in India is given in **Table-19**.

**Table-19**

Coastal Length (km) given by NHO*	Coastline Affected by Erosion(km)	Coastline Protected (km)	Coastline yet to be protected (km)
	(Consolidated data as reported by State/UT's)*		
7516.60	1650	830	820

\* excluding A&N Islands

### **Coastal Protection and Development Advisory Committee (CPDAC)**

Based on the decision of CPDAC in its 11<sup>th</sup> meeting, preparation of Shoreline Changes Atlas of India in collaboration with Space Application Centre (SAC), Ahmedabad was initiated during 2010-11 at an estimated cost of ₹ 60 lakh. As reported by SAC, work for the States of Tamil Nadu, Maharashtra and Gujarat has been completed till September, 2011. SAC, Ahmedabad was authorized to incur expenditure upto ₹ 20 lakh in 2011-12 for the above work.

### **Monitoring of Programmes**

The Planning and Development Directorate created during the re-organization of RM wing of CWC in April 1995 has carried out the following activities during the year 2011-12.

- National Project for Repair, Renovation & Restoration of Water Bodies directly linked to Agriculture.
- Monitoring of Centrally Sponsored Command Area Development Programme being monitored by Field units of Central Water Commission.
- Study/examination of BIS codes and conveying the comments to BIS, New Delhi.
- Secretariat services for Committee for mapping of Traditional Water Bodies.

In addition, CWC is providing assistance in the coordination and monitoring of CAD programme in respect of 203 irrigation projects spread over 22 States and 2 Union

Territories covering a CCA of more than 21 Mha. 37 status reports were received during the year 2010-11 and 24 status reports were received during the year 2011-12 from the field units and these reports were examined and comments/observations were made wherever necessary.

### **Inter-State Committees**

#### **(1) Ghaggar Standing Committee**

The Ghaggar Standing Committee was constituted in February, 1990 to examine and coordinate irrigation, flood control and drainage works in Ghaggar basin and laid down priority for their implementation and accord clearance to individual schemes in Ghaggar basin from the inter-State angle. 25<sup>th</sup> and 26<sup>th</sup> meetings of the Ghaggar Standing Committee under the Chairmanship of Member (RM), CWC were held on 11.11.2010 and 21.03.2011 respectively.

#### **(2) Yamuna Standing Committee**

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



The 77<sup>th</sup> and 78<sup>th</sup> meetings of the Committee under the Chairmanship of Member (RM), CWC were held on 8.01.2010 and 17.06.2011 respectively.

### **(3) Committee on Special Remedial Works for Flood Protection Embankment on Rivers Sutlej and Ravi**

The Committee on Special Remedial Works for Flood Protection Embankment on rivers Sutlej and Ravi was constituted in December, 1989 by the Ministry of Water Resources under the Chairmanship of Chief Engineer (FM), CWC. The 31<sup>st</sup> and 32<sup>nd</sup> meetings of the Committee were held at Amritsar on 8.01.2011 and 1.12.2011 respectively.

### **National Water Mission and Climate Change Issues**

The "National Water Mission" has been formulated by Ministry of Water Resources with main objective of "conservation of water, minimizing wastage and ensuring its more equitable distribution both across and within States through integrated water resources development and management". The document was approved by Hon'ble Prime Minister's Council on 30-08-10 and by the Union Cabinet on 06-04-11.

Mission Secretariat for operationalizing the National Water Mission for coordinated actions for addressing the impact of climate change on water resources has been created in the Ministry of Water Resources. Central Water Commission is engaged in taking stock of the current development in respect of climate change studies and other related issues. Climate Change cells have also been created in the National Institute of Hydrology, Roorkee, Brahmaputra Board, Guwahati and Central Ground Water Board, Faridabad for related studies.

MoWR has established six Chairs in academic institutes - IIT Kanpur, IIT Kharagpur, IIT Guwahati, IIT Roorkee, NIT Patna and NIT

Srinagar with the objective of carrying out studies and research on "Impact of Climate Change on Water Resources" during the year 2008.

CWC has also prepared "Inventory of Glacial Lakes/Water Bodies in the Himalayan Region of Indian River Basins" through NRSC, Hyderabad and started monitoring of these glacial lake water bodies on monthly basis during monsoon season. Another work of "Snowmelt runoff forecasting in Himalayan river Basin" has been taken up by CWC and development of model has been entrusted to NRSC, Hyderabad by CWC. Central Water Commission is also planning to extend its hydro-meteorological data collection network up to approx. 3000 sites in 12<sup>th</sup> Plan Period as envisaged in the Working Group Report on "Water Data Base Development and Management" of Planning Commission for 12<sup>th</sup> Plan Period.

### **Hydrological Studies**

The main function of Hydrology Study Organisation is to provide basic inputs of hydrology for realistic / rational planning of Water Resources Projects and assessing their feasibility. HSO also deals with practical application of hydrology viz., evaluation of water availability, design flood, reservoir sedimentation studies for design of water resources development schemes. It also provides supports in the field of hydrology related to capacity building and training, modernisation, BIS standardization, development of computer software as well as technical coordination with National and International organisations.

Development of Hydrological Design Aids (HDA) under HP-II is an important step in overcoming the limitation of the current design practices and to standardize these practices for uniform use all over the country. The work of development of HDA (SW) has already commenced from December, 2009

and is being carried out by Central Water Commission through consultant. The duration of the study is 37 months. The HDA (SW) has the following three major components:

- (i) Assessment of Water Resources Potential- Availability/yield Assessment (HDA-1)
- (ii) Estimation of Design Flood (HDA-2)
- (iii) Sedimentation Rate Estimation (HDA-3)

The draft reports are scheduled to be submitted by May, 2012 and project is scheduled to be completed by December 2012.

To compute the design flood in ungauged catchments, country has been divided into 7 zones and further into 26 hydro-meteorologically homogeneous sub-zones and flood estimation models have been developed for each sub-zone. So far, flood estimation reports covering 24 sub-zones have been published. The draft report of subzone-2(C) has been circulated in 2011 and the same is under finalisation. Efforts are being made for collection of data for preparation of subzone-6 Flood Estimation Report covering Andaman & Nicobar Islands.

Design precipitation (PMP/SPS) estimate are basic inputs in computing design flood magnitudes. The existing PMP Atlases prepared in the nineties are being widely used. Further work of preparation of 2 new PMP Atlases and updating of 6 existing PMP Atlases was taken up in October 2010 through consultant. During 2011-12, the draft interim reports of Ganga and Godavari basins have been submitted by the consultant in January, 2012 and are under examination.

Review of design flood under DRIP (Dam Safety Review and Improvement Project) for 6 projects has been carried out. Technical Appraisal / Review of Hydrological aspects for 103 projects and consultancy services for 16 projects has been carried out.

## Design

The Central Water Commission is actively associated with the design of majority of the mega water resources projects in India and the neighbouring countries viz. Nepal, Bhutan, Afghanistan and Myanmar by way of design consultancy or in the technical appraisal of the projects. Four design units are functioning to cater to specific requirements and to attend to special design related problems of different regions. These units have specialized directorates for Hydel Civil Design, Concrete & Masonry Dam Design, Embankment Design, Gates Design and Barrage & Canal Design.

At present, CWC is carrying out design consultancy in respect of 94 projects out of which 56 projects (including 18 from North-Eastern region) are at construction stage while the remaining 38 projects (including 11 from North-Eastern region) are either at investigation or at DPR stage.

Technical examinations for 28 projects were also carried out in the year 2011-12. In addition to above, special studies have been carried out and special problems handled in respect of 23 projects during the year.

## Dam Safety

As per the National Register of Large Dams (NRLD) maintained by CWC, presently there are 5125 large dams in India. Out of these 4728 are completed and 397 dams are under construction. About 10.11% of these dams are more than 50 years old and 2.66% are more than 100 years old. Dam Safety Monitoring Directorate of CWC has made another successful attempt to collect information from the State Government Organizations and update the NRLD. The updated NRLD is now available at CWC website ([www.cwc.gov.in](http://www.cwc.gov.in)).

## **Technical Examination of Projects for Seismic and Foundation Aspects**

Detailed Project Reports of 13 river valley projects in various States, namely, Arunachal Pradesh, Himachal Pradesh, Uttarakhand and Assam were examined with respect to investigations related to foundation engineering. 5 Detailed Project Reports have been cleared and compliance from project authorities is awaited in respect of remaining projects.

## **Dam Break and Glacial Lake Outburst Flood (GLOF) Studies**

Dam break analysis is carried out to prepare the inundation map and disaster management plan for a hypothetical case of dam failure. It estimates the maximum water level at the downstream locations of the dam in the event of its failure. The dam break analysis is being carried out by CWC on consultancy basis using the one dimensional Mathematical Model "MIKE 11".

Glacial Lake Outburst Flood (GLOF) studies are carried out to account for the flood, resulting from the breach of moraine dams in the design of the projects. During the year, the GLOF study reports in respect of Kalai-I, H.E. Project, Hutong –II, H.E. Project, Attuni H.E. Project and Etalin H. E. Project of Arunachal Pradesh were examined and cleared.

## **Dam Safety Legislation**

The Central Dam Safety Legislation on Dam Safety is intended to provide for proper surveillance, inspection, operation and maintenance of dams of certain parameters (called specified dams) to ensure their safe functioning, and thereby protect persons and property against risks associated with dam failures. In the first instance, the provision of the Bill shall apply to the States of Andhra Pradesh, West Bengal and the Union territories and also to their public sector undertakings and to the public sector

undertakings of the Central Government. It shall also apply to such owners of specified dams which are undertakings or company or institution or a body other than those owned by State Governments or Central Government. However, provisions of this Legislation shall apply to other such States also if resolution to that effect is passed by all the Houses of Legislatures of those States.

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

## **Dam Instrumentation**

Detailed Project Reports of 10 river valley projects in various States, namely, Arunachal Pradesh, Himachal Pradesh, Uttarakhand and Jammu & Kashmir have been examined and cleared with respect to instrumentation aspects. Also, comments /observations on Detailed Project Reports of 6 river valley projects in Arunachal Pradesh, Himachal Pradesh, Uttarakhand and Nepal have been given.

During the year, consultancy services towards planning and preparation of instrumentation drawing, specification etc. have been provided for the following projects:

- I. Tapovan Vishnugud H.E. Project (520 MW), Uttarakhand
- II. Punatsangchhu- I H.E. Project, Bhutan
- III. Arjun Sahayak Pariyojana, Kabrai Dam, Uttar Pradesh
- IV. Saheed Bhima Nayak Sagar Pariyojana across river lower Goi, Madhya Pradesh

- V. Kalisindh Gravity Dam, Jhalawar, Rajasthan
- VI. Anandpur Barrage Project, Odisha.

### **Rehabilitation & Resettlement**

The Rehabilitation and Resettlement (R&R) aspects of displaced/affected persons of Water Resources Projects are monitored by the Rehabilitation and Resettlement Directorate of Central Water Commission. In respect of 379 existing ongoing major & medium reservoir projects, data on rehabilitation measures have been collected and a data base has been generated and updated.

### **Environmental Impact Assessment**

Central Water Commission (CWC) has taken up Environmental Evaluation/Impact Assessment study of selected river valley projects in the country. Studies on Environmental (including social) impacts of completed Water Resources Projects have been taken up by EIA Directorate through Consultants, under an R&D Scheme of the Ministry of Water Resources. Draft final Report of Singur Project (AP) and Ramganga Dam (UP) were received and approved by the Project Management Committee (PMC) during its meeting held on 15.11.2011. The draft final report of Mahi Bajaj Sagar (Raj) and Mahanadi Delta Project (Odisha) is due for submission.

### **Application of Remote Sensing Techniques in Water Resources Sector**

Remote Sensing Directorate, CWC has undertaken the work of "Estimation of Sedimentation in Reservoirs using Remote Sensing Technique" under the scheme "Research & Development Programme in Water Sector" during 11<sup>th</sup> Five Year Plan Period. Satellite Remote Sensing based Reservoir Sedimentation study (In-house) of 1 reservoir i.e. Salandi (in Odisha State) has been completed. The work of sedimentation assessment using Remote Sensing technique

for 30 reservoirs was awarded to Maharashtra Engineering Research Institute (MERI), Nashik during May, 2010 with one year as the completion period. The final reports of 20 reservoirs have been prepared and circulated to concerned authorities. Rests of the reservoirs (10 nos.) are found non- feasible. Process to award the work of another 30 reservoirs during 2011-12 has been initiated and is under progress.

### **Development of Water Resource Information System**

CWC & ISRO have jointly undertaken the work of development of Water Resources Information System (WRIS) during 11<sup>th</sup> plan. The estimated cost of the project is ₹ 78.32 crore. MoU between the two parties was signed in December, 2008 with 4 years time as the completion period. The first full version of website of INDIA WRIS was launched by Hon' ble Minister, Water Resources on 7 December, 2010 in New Delhi. The updated version i.e. second version was launched by Chairman, CWC on 22.3.2012 at New Delhi. The URL of the website is [www.india-wris.nrsc.gov.in](http://www.india-wris.nrsc.gov.in) and can be seen for more details.

### **Project Appraisal**

The appraisal of the project ensures that the project proposal is in tune with the overall development plan; the basic planning of the project is reliable and investigations are as per established norms. It is also ensured that international/ inter-State agreements or Tribunal awards for utilization of water are duly followed and the layout and design of the project are optimal.

Since 1961, CWC has so far appraised more than 1672 projects. During the year 2011-12, techno-economic appraisal of 31 Water Resources projects (11 major irrigation and 20 flood protections) were completed and accepted by the Advisory Committee. At present, 44 new irrigation schemes (26 major & 18 medium) as well as 5 revised estimates

(2 major & 3 medium) are under different stages of appraisal.

Apart from above, PAO, CWC is entrusted with technical examination of civil aspects and finalization of cost estimate of civil works of Hydro-electric project. During the year 2011-12, 8 Hydel projects having total installed capacity of 4072 MW have been cleared up to 31.12.2011.

### **Project Monitoring**

During 2011-12, CWC is carrying out general monitoring of 54 ongoing major, medium and Extension, Renovation and Modernization (ERM) projects.

The above 54 ongoing projects include 12 major pre-fifth / fifth Plan projects which have been put under vigorous monitoring i.e. which will be visited frequently or at least twice a year for achieving their completion during the XI Plan period i.e. by March, 2012.

The major, medium and selected minor surface water irrigation projects receiving Central Assistance under Accelerated Irrigation Benefits Programme (AIBP) are also monitored by CWC. As a part of AIBP monitoring, the projects are inspected twice a year and monthly expenditure reports and the Management Information System Reports giving physical & financial status of AIBP projects on quarterly basis are obtained from the Project Authorities for review. The recommendations of CWC form the basis for release of funds by the Ministry of Water Resources/ Ministry of Finance. CWC is monitoring 163 major and medium projects under AIBP.

Ministry of Water Resources entrusted to NRSC, Hyderabad the work of assessment of Irrigation Potential under AIBP funded irrigation projects using Cartosat-1 data covering about 5.45 Mha spread across 53 projects in 18 States in India. The reports

have been submitted to Central Water Commission (CWC).

MoWR has accorded approval for carrying out similar study in respect of additional 50 AIBP funded irrigation projects in India at an estimated cost of ₹ 181.95 lakh. An advance payment has been made to NRSC, Hyderabad and work is in progress. The target date of completion of the project is October, 2012.

### **Performance Overview of Irrigation Projects**

Central Water Commission is carrying out various studies and dealing with other related issues of completed major/ medium irrigation projects in the country. The details are given below:

#### **Performance Evaluation of Completed Irrigation Projects**

Central Water Commission is carrying out post project performance evaluation studies (PES) of completed major/medium irrigation projects in the country. Studies include evaluation of system performance and agro-economic, socio-economic and environmental impacts of project including economic analysis. Identifying deficiencies and recommending measures for improving the performance of project for achieving the envisaged objectives and targeted benefits are part of the studies.

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

During 2011-12, 6 State Governments were pursued for taking necessary steps as per findings & recommendations of six respective post project performance evaluation studies of major/medium irrigation projects.

The final reports of projects, namely, Chandan Reservoir project, Bihar, Kanchi-



Wier Irrigation project, Jharkhand and Loktak Lift irrigation project, Manipur were approved by TAC and are likely to be received from different WALMIs during 2011-12.

### **Water Use Efficiency Studies of Completed Major/Medium Irrigation Projects**

Irrigation sector is the biggest consumer of fresh water and its share in the overall demand of water is about 80%. However, water use efficiency in irrigation sector is relatively low. Central Water Commission is undertaking water use efficiency studies of completed major/medium irrigation projects in the country with the objective of having assessment of water use efficiency of irrigation projects. The studies cover the following aspects of irrigation projects:

- i. Reservoir Filling Efficiencies (Inflow and Release Pattern)
- ii. Delivery System/Conveyance Efficiency
- iii. On farm Application Efficiency
- iv. Drainage Efficiency
- v. Irrigation Potential Created and Utilized

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

During 2011-12, 13 studies of WUE are continuing from which the Draft Final Reports of four irrigation Projects have been received from Consultant (WALMI, Bihar). These reports have already been considered by the Core Committee of WUE. The studies of completed major/medium irrigation projects and the observation has been conveyed to WALMI, Bihar for timely compliance. Further, 20 studies are being taken up as per RFD of present financial year 2011-12.

### **Benchmarking of Irrigation Projects**

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

Core Group is playing an active role as a coordinator as well as a facilitator by way of providing technical support to the State Governments. National/ regional/ project level workshops are being organized by CWC through State Government institutions in various States to facilitate concerned State Governments to take up benchmarking of irrigation projects in their respective States. First National Workshop on Benchmarking of Irrigation Projects was organized in February, 2002 at Hyderabad and since then, ten regional workshops and five project level workshops have been organized in various parts of the country. During 2011-12, proposals for holding benchmarking workshops in two States are under process.

### **Guidelines for Water Audit and Water Conservation**

Water Audit is an important tool of water management and improving the water use efficiency in various sectors of its use. Central Water Commission and Central Ground Water Board under Ministry of Water Resources have brought out "General Guidelines for Water Audit and Water Conservation" related to all sectors of water use including irrigation. Aims & objectives of these guidelines are to introduce, standardize and popularize the water audit system for conservation of water in all sectors of water use and improvement in water use efficiency. The guidelines stipulates for adoption of water audit in all sectors of water use i.e. irrigation, domestic and industrial for judicious and efficient use of fresh water resources. These guidelines



have been sent to all the State Governments for formulating their own region-specific, project-specific, system-specific or service-specific guidelines.

### **Capacity Survey of Important Reservoirs in the Country**

Capacity Survey of Reservoirs has been a continuing scheme. Hydrographic surveys of 30 major reservoirs were initiated during the VIII plan and were continued through IX<sup>th</sup> and X<sup>th</sup> Plan. Upto the end of X<sup>th</sup> Plan, work of survey of 26 reservoirs had been completed. Report finalization of 3 reservoirs was carried over to the first year of XI<sup>th</sup> Plan.

During XI<sup>th</sup> Plan, an SFC memo covering 20 more reservoirs under capacity survey at an estimated cost of ₹ 410 lakh was sanctioned by the MoWR in February, 2008. Out of these 20 reservoirs, work of carrying out capacity survey of 10 reservoirs was commenced in December, 2010. The work of capacity survey of 3 reservoirs has been completed and work of remaining 7 reservoirs is in progress and is likely to be completed during current financial year. The works of capacity survey for remaining 10 reservoirs have been initiated.

### **Policy and Planning**

The National Water Resources Council (NWRC), under the Chairmanship of the Prime Minister and with Chief Ministers of States, Administrators of Union Territories and Union Ministers of concerned departments as Members, is the apex policy making body for the water resources development in India. Issues connected with the development of the water resources of the country as well as progress achieved in the implementation of the National Water Policy are required to be considered, reviewed and reported to the Council from time to time. The Government of India has, therefore constituted a National Water Board (NWB) of the National Water Resources Council, under the Chairmanship of the

Secretary (Water Resources) and Member (WP&P), CWC as Member-Secretary. Basin Planning & Management Organization under Water Planning & Projects wing of CWC is acting as the Nodal agency in providing technical inputs related to water policy and planning aspect to the Ministry and functions as technical secretariat for National Water Board. 5 meetings of NWRC and 13 meetings of the NWB have been held so far.

### **Re-Assessment of Basin-Wise Water Resources Availability in the Country – Strategy Identified under National Water Mission**

One of the strategies identified for implementation under the Comprehensive Mission Document of National Water Mission is, “Re-assessment 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.

The methodology for carrying out the pilot studies in two selected river basins i.e. Godavari and Brahmani-Baitarani was finalized after detailed deliberations among the officers of CWC, NRSC, CGWB and NIH. The highlights of the methodology are Water balance approach; Precipitation as primary resource (spatial interpolation); New technology tools i.e. satellite derived spatial data (land use, land cover, elevation, soil), GIS; Semi-distributed modeling approach; Concept of Hydrologic Response Unit (HRU) for water balance computation; Calibration and validation using CWC discharge

observations. The study is being jointly executed by CWC and NRSC officers.

### **Committee Constituted by MoWR for Re-Assessment of Water Availability in India**

MoWR has constituted a Committee under the Chairmanship of Chairman, CWC for re-assessment of water availability in India.

The Terms of Reference of the Committee are:

- i. Re-assessment of the water resources of the country
- ii. Suggestions for regular mechanism for periodic re-assessment of the water resources.

The first meeting of the Committee was held on 09.08.2011. During the meeting, the Committee accepted the methodology adopted jointly by CWC and NRSC for the pilot studies in Godavari and Brahmani-Baitarni river basins. It was further observed that in the next phase, river basins from western India, namely, Tapi, Mahi and Sabarmati basins, where utilization data may be available & can be obtained, may be taken up for further studies using the methodology adopted for the pilot studies. In this phase, the methodology used by CWC in 1993 can also be utilized for comparison purpose.

### **Joint Operation Committee of Rihand Reservoir**

The 24<sup>th</sup> meeting of Joint Operation Committee of Rihand reservoir was held in New Delhi on 29<sup>th</sup> September 2011 to finalise the operation plan for the year 2011-12 for Rihand reservoir to meet the irrigation requirement at Indrapuri Barrage (Bihar) and Hydro-power generation plan of Uttar Pradesh Power Corporation Limited and Uttar Pradesh Jal Vidyut Nigam Limited.

### **CENTRAL SOIL AND MATERIALS RESEARCH STATION (CSMRS)**

The Central Soil and Materials Research Station (CSMRS), New Delhi, is a premier organization in the country dealing with field explorations, laboratory investigations, and basic and applied research in the field of geotechnical engineering and civil engineering materials, particularly for construction of river valley projects and safety evaluation of existing dams. The Research Station primarily functions as an adviser and consultant to the various Departments of Government of India, State Governments and Government of India Undertakings. The Research Station has been constantly updating its facilities and training its staff for the last three decades and has acquired some unique capabilities in the country in the field of geotechnical engineering and construction materials' characterisation. The sphere of activities of the Research Station is covered under the following main areas:

- Soil Mechanics and allied areas, including soil dynamics, geotextiles, soil chemistry and rockfill technology and foundation engineering
- Concrete Technology including construction materials survey, non-destructive testing and concrete mix design
- Rock Mechanics including laboratory testing, field testing, instrumentation, engineering geophysics, drilling technology for sub-surface characterisation
- Concrete Chemistry, Electronics and Information Technology

### **Investigation for Projects**

Investigations for 28 projects, including 6 abroad and 3 in North-East, have been carried during the year. The investigations comprised of field and laboratory investigations for soil, rock, geosynthetics, geophysical, water and construction materials. The projects are:

1. Shwezaye H. E. Project, Myanmar
2. Tamanthi H.E. Project, Myanmar
3. Chamkarchhu H.E. Project, Zhemgang, Bhutan
4. Mangdechhu H.E. Project, Bhutan
5. Punatsangchhu-II H.E. Project, Bhutan
6. Salma Dam Project, Herat, Afghanistan
7. Earthen Dam over Kamsrat Nallah Water Supply Scheme, Andaman and Nicobar
8. Kamsrat Nallah Water Supply Scheme, Andaman and Nicobar
9. Indira Sagar Polavaram Project, Dowliswaram, Andhra Pradesh
10. Damanganga-Pinjal Link Project, Gujarat.
11. Sardar Sarovar Project, Gujarat Ujh Multipurpose Project, J&K
12. Harsi High Level Canal Project, Gwalior, Madhya Pradesh
13. Gararda Dam, Bundi, Rajasthan
14. Gerarda Dam Project, Kota, Rajasthan
15. Kabrai Dam Project, Mahoba, Uttar Pradesh
16. Ch. Charan Singh Lahchura Dam Project, Mahoba, Uttar Pradesh
17. Barrage for Bargarh Thermal Power Plant, Mahoba, Uttar Pradesh
18. Dhukwan H.E. Project, Jhansi, Uttar Pradesh
19. Rihand Dam Project, Uttar Pradesh
20. Barrage for Bargarh Thermal Power Plant, Mahoba, Uttar Pradesh
21. Kabri Dam, Arjun Sahayak Project, Mahoba, Uttar Pradesh
22. Flood Control Division, Sarda Nagar, Lakhimpur Kheri, Uttar Pradesh
23. Ch. Charan Singh Lahchura Dam Project, Mahoba, Uttar Pradesh
24. Bogudyar-Sirkari HE Project, Uttarakhand
25. Farakka Barrage Project, West Bengal
26. Kalai-I HE Project, Arunachal Pradesh
27. Dibrugarh W. R. Division , Assam
28. Kalej Khola & Suntaley HEP, Sikkim

### Self-Sponsored Research Schemes

The self-sponsored research schemes, currently in progress, are as follows:

1. Development of advanced chemical method for characterization of aggregates
2. Evaluation of strength characteristics of clayey soils by adding additives
3. Stabilization of expansive soil using fly ash
4. Electro remediation of contaminated soil
5. Correlation of Ultra Sonic Pulse Velocity and Strength Characteristics of Concrete
6. Effect of Acidic Environment on Geosynthetics and on Coatings
7. Constitutive Modelling of Rockfill materials and analysis of a Rockfill Dams
8. Effect of fines on liquefaction potential of soils

### Monographs/Manual

The monograph on *Rock Mass Classification System and Applications* has been published and the monographs/ manuals on the following topics are under progress:

1. Use of Metakaolin
2. Roller Compacted Concrete
3. Durability of Concrete
4. Polymer Concrete
5. Dispersivity of Soils with Indian case histories
6. Use of Geosynthetics in Hydraulic Structures with Indian case histories
7. Sand Liquefaction with Indian case histories
8. Rockfill material characterization with Indian case histories of rockfill dams
9. Geotechnical Instrumentation

## Training Programmes

CSMRS imparted practical training to 120 engineers from State Governments and different engineering colleges and IGNOU for 5 days from 26<sup>th</sup> September to 30<sup>th</sup> September 2011. It also conducted one training programme on "Dynamic Characterization of Soils" on 29-30<sup>th</sup> September 2011.

## SUB-ORDINATE OFFICES

### CENTRAL GROUND WATER BOARD (CGWB)

**Mandate:** Central Ground Water Board (CGWB), under the Ministry of Water Resources, is a multi-disciplinary scientific organization with a mandate to:

"Develop and disseminate technologies, monitor and implement national policies for the scientific and sustainable development and management of India's Ground Water Resources, including their exploration, assessment, conservation, augmentation, protection from pollution and distribution, based on principles of economic and ecological efficiency and equity."

The Board is headed by the Chairman and has four wings, namely (i) Sustainable Management & Liaison (ii) Survey, Assessment & Monitoring (iii) Exploratory Drilling & Materials Management and (iv) Technology Transfer & Water Quality. Each wing is headed by a Member. The Rajiv Gandhi National Ground Water Training and Research Institute, headed by Director (RGI) is located at Raipur. The Board has 18 regional offices, each headed by a Regional Director, supported by 17

Engineering Divisions and 11 State Unit Offices for undertaking various field activities.

**Website of CGWB:** CGWB has prepared a portal and put on their various activities/achievements at [www.cgwb.gov.in](http://www.cgwb.gov.in). The portal contains publications, downloads of manual/guides/reports, State ground water profiles, district brochures, Ground Water Information System (GWIS) and RTI.

## Achievements of CGWB during 2011-12

### 1. Ground Water Management Studies:

An area of 1.60 lakh sq. km was covered during pre-monsoon period and post-monsoon studies have been completed in 1.19 lakh sq. km up to 31<sup>st</sup> December 2011. The Central Ground Water Board has explored aquifers in various States/UTs under its scientific exploratory drilling programmes by utilizing latest studies and technologies which includes remote sensing and geophysical techniques.

During financial year 2011-12 (up to 31.12.2011), the Central Ground Water Board under their Ground Water Exploration Programme, constructed 495 wells (EW-267, OW-102, PZ-126) including 43 high yielding wells to assess the ground water potential in different hydrogeological set up. Priority was accorded to drought affected and tribal areas, hard rock areas, pollution affected areas etc. Out of 495 bore wells constructed, 86 wells and 107 wells were constructed for exploration in tribal and drought prone areas respectively.

The Board is monitoring the ground water levels in the country, four times a year (Jan/May/Aug/Nov) through a network of 15640 Ground Water Observation Wells.



High Yielding Well at Satrasen EW, Chopda Taluka, Jalgaon District

**2. Geophysical Studies:** The Board undertakes geophysical studies as an integral part of its activities to support and supplement ground water management studies, ground water exploration and short-term water supply investigations to demarcate bedrock configuration and thickness of overburden, saline -fresh water interface etc. CGWB carried out 1161 vertical electrical soundings, 1.80 line kilometer resistivity profiling and geophysical logging of 35 bore holes in various parts of the country during 2011-12 up to 31<sup>st</sup> December, 2011.

**3. Water Quality Analysis :** 14619 samples have been analyzed during the year 2011-12 up to 31<sup>st</sup> December, 2011, out of which 11532 samples were analysed for basic constituents, 2581 samples for heavy metals such as Cu, Zn, Fe, Mn, CO, Cd, Cr, Ni, Pb etc. and 506 samples for organic and specific constituents.

**4. Estimation of Ground Water Resources of the Country:** The Dynamic Ground Water Resources of the country have

been assessed jointly by respective State Ground Water Departments and Central Ground Water Board under the supervision of the State Level Committees. The base year of computation of Ground Water Resources is 2008-09. The report on "Dynamic Ground Water Resources of India" (as on 31<sup>st</sup> March, 2009) has been completed. Brief details are given in **Table-20**.

**5. Web Enabled Ground Water Information System (WEGWIS):** A Web Enabled Ground Water Information System for dissemination of ground water related information has been developed by CGWB. The Ground Water Information System provides access to various thematic layers as well as the nationwide data base on ground water level and water quality generated by CGWB. This initiative will help more effective sharing of information relating to ground water resource availability and water quality with user groups, planners and administrators.



**Table-20: Dynamic Ground Water Resources of India (2009)**

i.	Annual Replenishable Ground Water Resources	431 (bcm/yr)
ii.	Net Annual Ground Water Availability	396 (bcm/yr)
iii.	Annual Ground Water Draft for Irrigation, Domestic & Industrial Uses	243 (bcm/yr)
iv.	Stage of Ground Water Development	61%
v.	Categorization of Blocks/Mandals/Talukas	
	Total Assessment Units	5843
	Safe	4277
	Semi-critical	523
	Critical	169
	Over-exploited	802
	Saline	71

**6. Enactment of Legislation on Ground Water by States/UTs:** The Ministry of Water Resources has circulated a Model Bill to all the States/Union Territories to facilitate regulation and control of development and management of ground water and enactment of a suitable legislation on the lines of the Model Bill. Ministry of Water Resources has been persuading the States/UTs for early enactment of law on ground water. So far, ground water legislation has been enacted by 11 States/Union Territories. 18 States/UTs are at various stages of enactment of legislation.

**7. Central Ground Water Authority:** In pursuance of the order passed by the Hon'ble Supreme Court of India, Central Ground Water Board has been constituted as Central Ground Water Authority (CGWA) under sub-section (3) of Section 3 of the Environment (Protection) Act, 1986 vide notification No. S.O. 38 (E) dated 14.01.97 for the purpose of regulation and control of ground water management and development in the country.

The Central Ground Water Authority is functioning under the administrative control of the Ministry of Water Resources with its

Headquarters at Delhi. The Authority is headed by the Chairman and 14 other Members from different Ministries/ Department/ Organisations/ Institutions of Government of India including all the 4 Members of CGWB.

**The Authority performs the following functions: -**

- i. Exercise of powers under Section 5 of the Environment (Protection) Act, 1986 for issuing directions and taking such measures in respect of all the matters referred to in sub-section (2) of Section 3 of the said Act.
- ii. To resort to penal provisions contained in Sections 15 to 21 of the said Act.
- iii. To regulate and control, management and development of ground water in the country and to issue necessary regulatory directions for the purpose.
- iv. Exercise of powers under Section 4 of the Environment (Protection) Act, 1986 for the appointment of officers.

**Decentralization of Powers and Functions of CGWA**

As part of streamlining the regulatory function of "Central Ground Water Authority (CGWA)", District Magistrates / Deputy Commissioners of revenue districts have been appointed as authorized officers for grant of permission for extraction of ground water for drinking/domestic uses in notified areas. They have been advised to process requests for grant of permission for extraction of ground water for drinking/domestic purposes in notified areas as per guidelines issued by CGWA. Central Ground Water Authority has also framed revised guidelines for grant of NOC for ground water extraction by industries/projects in the country. Central Ground Water Authority has been entrusted with the responsibility of regulating and controlling ground water development and management in the country and issuing necessary directives for the purpose. CGWA has notified 82 areas for regulation of ground water development.



**8. Collaborative Studies by Central Ground Water Board:** Central Ground Water Board is taking up scientific studies in collaboration with premier Government Organizations/ Institutes which are engaged in specific field of study related to ground water. The areas of collaboration are ground water modeling, isotope studies, demarcation of fresh-saline water interface, mining hydrogeology, studies on arsenic in ground water, remote sensing etc. and the collaborating institutions include NIH, NGRI, NLC, GSI, ONGC, RITES, WAPCOS, BIT Mesra and NRSC. These studies have helped in better understanding and solving various problems in the ground water sector. The Board, with the help of its multi-disciplinary scientific activities, provides assistance to the State Governments through recommendations for better ground water development and management practices.

**9. Initiatives taken for Promotion of Rain Water Harvesting and Artificial Recharge of Ground Water**

**A. Scheme on Artificial Recharge to Ground Water through Dug Wells**

The Ministry of Water Resources implemented a scheme on "Artificial Recharge to Ground Water through Dug wells" in 6 States, namely, Maharashtra, Karnataka, Rajasthan, Tami Nadu, Gujarat and Madhya Pradesh with the objective to recharge rain runoff generated in agricultural fields through existing dugwells in areas underlain by hard rock terrain and having majority of over-exploited, critical and semi-critical assessment units. The approved cost of the scheme was ₹1798.71 crore for implementation during 2007-08. Total amount of subsidy of ₹ 260.525 crore has been released to 711488 beneficiaries. A total of 108671 dug well recharge structures have been constructed in the participating States till 31<sup>st</sup> December 2011. The total expenditure incurred under various component of the scheme as on 31<sup>st</sup> December 2011 is ₹ 280.402 crore. The State-wise progress made by the participating States is given in **Table-21**.

**Table-21**

Sl. No	State	No. of Units for which Subsidy Released	Subsidy Released (₹ crore)	Fund Released under IEC (₹ crore)	Fund Released to Ministry for Awareness (DAVP) (₹ crore)	Operating Cost Availed by NABARD @ 1% of Net Subsidy Released (₹ crore)	No. of Dug Well Recharge Structures Completed
1	Gujarat	141381	47.55	3.25	0.222 & 0.019	0.484	8974
2	Karnataka	68823	26.07	2.00		0.267	11007
3	Madhya Pradesh	92548	39.56	2.00		0.401	24077
4	Maharashtra	44623	14.04	2.00		0.140	38498
5	Rajasthan	88560	29.74	2.00		0.305	4619
6	Tamil Nadu	275553	103.58	5.75		1.038	21496
	<b>Total</b>	<b>711488</b>	<b>260.53</b>	<b>17.00</b>	<b>0.241</b>	<b>2.635</b>	<b>108671</b>



Construction of Nala Bund/Check Dam at Rajbhavan at Nagpur under CSS of ARP

## B. Demonstrative Projects on "Artificial Recharge to Groundwater & Rainwater Harvesting"

The CGWB is implementing demonstrative projects on artificial recharge to Groundwater and Rain Water Harvesting in the States of Kerala, West Bengal, Punjab, Arunachal Pradesh, Andhra Pradesh, Karnataka, Gujarat, Maharashtra, Madhya Pradesh, Jharkhand, Uttar Pradesh, Tamil Nadu, Odisha, Rajasthan, Himachal Pradesh, Jammu & Kashmir, Delhi, Bihar, Nagaland and UT of Chandigarh ( 20 States/UT) during XI Plan.

In the XI Plan, 83 Projects for construction of 1488 artificial recharge structures amounting to ₹ 8392.40 lakh have been approved in the XI Plan and ₹ 6469.88 lakh have been released to the 20 States as on 31<sup>st</sup> December 2011. 568 recharge structures have been completed till December, 2011 and the remaining are under progress. During the year 2011-12, 59 Projects for 413 artificial

recharge structures in Odisha, Rajasthan, Himachal Pradesh, Jammu & Kashmir, Delhi, Bihar, Nagaland, Kerala, Andhra Pradesh, Karanataka, Uttar Pradesh and Punjab, amounting to ₹ 3529.372 lakh have been approved and ₹ 3122.59 lakh have been released till December 2011. This includes ₹ 651 lakh released as second / third installment. A total of 215 artificial recharge structures were completed in this year till December, 2011. On completion of civil works of recharge facility, impact assessment studies will be taken up to demonstrate the efficacy of artificial recharge and rain water harvesting through the successful examples in these sites and for replication by the States in similar set ups in future.

**10. Ground Water Congress & World Water Day:** Central Ground Water Board organized National Ground Water Congress and World Water Day on 22<sup>nd</sup> & 23<sup>rd</sup> March, 2011. More than 400 representatives from various Central/State Government organizations, NGO's/academic institutions participated in the Congress.

## CENTRAL WATER AND POWER RESEARCH STATION

### Introduction

The Central Water and Power Research Station (CWPRS), established in 1916, is the premier hydraulic research institute offering comprehensive R&D support to a variety of projects dealing with water, energy resources development and water-borne transport; disseminating expertise and research findings amongst hydraulic research fraternity; and aiding and promoting research activities, besides training of research manpower. CWPRS is recognized as the Regional Laboratory for Economic and Social Committee for Asia and Pacific (ESCAP) since 1971. The institution, with an inter-disciplinary approach to its activities, provides unique R&D services to its national and international clientele.

### Organization *Website: [www.cwprs.gov.in](http://www.cwprs.gov.in)*

CWPRS provides specialized services through physical and mathematical model studies, field investigations, desk studies and/ or a combination of these in 5 major disciplines of CWPRS

- River Engineering
- Reservoir & Appurtenant Structures
- Coastal Engineering including Mathematical Modeling Centre
- Foundation & Structures including Applied Earth Sciences
- Instrumentation, Calibration and Testing Facility

### R&D Studies

CWPRS carries out basic, applied and field-oriented research under one umbrella, in 10 major laboratories, at its campus at Khadakwasla, Pune. The research output of the institution is primarily in the form of advice relating to safe, economic and rational technical solutions to the problems posed. Studies referred to the institution are mostly related to scrutiny of designs by way of

model/ desk studies, field investigations and calibration of equipment. In the specific area of design, aspects such as safety, optimization, feasibility and overall efficiency are covered. When the studies are related to investigation, adequate and reliable data on the basis of which planning can be made is provided to the project authorities. Calibration of current/ flow meters also form an important activity of CWPRS.

During 2011-12 (till 31.12.2011), a total of 82 technical reports based on various R&D studies were submitted to various project authorities.

CWPRS undertakes assignments on a no-loss, no-profit basis. During 2011-12 (till 31.12.2011), in the three major sectors of water resources, energy and water-borne transport, more than 100 studies were undertaken by the institution. Some of the major projects for which CWPRS undertook studies are: Kakrapar Atomic Power Plant; Sankosh Multipurpose HE Project, Bhutan; Jawahar Dweep, Mumbai; Paradip port; Kudankulam Nuclear Power Plant; Kandla Port/ Estuary; Koteswar Dam, Tehri; Kudgi Super Thermal Power Project (STPP), Karnataka; Mapang Bogudiyar HE Projects, Uttarakhand; Chilika Lake, Odisha; Hoogly Estuary; Belekeri Port, Karwar; Phoenix Bay, Port Blair; Naval Port/ Dockyard, Visakhapatnam; Vadinar Creek, Gujarat; Karanja Dam, Karnataka; Moorumsilli Dam, Chhatisgarh; Omkareshwar Dam; Muzaffarpur Thermal Power Project, Bihar; M/s Essar Steel Ltd. at Hazira; Chennai Port; Solapur Thermal Power Project; MERI, Nasik; and Bhagirathi River Project, West Bengal.

### Plan Schemes

During 2010-11, with a budget outlay of ₹ 9.00 crore, the major activities undertaken include: Construction of hangar for multipurpose wave basin for design of port layout as also related facilities such as model trays, flow channel, electrical works, road construction, etc.; Resurfacing and widening

of roads (about 2.5 km); Providing MS platform for standing wave flume; Area development around canal control laboratory/ office building; Procurement of Information and Communication Technology (ICT) equipment such as Communication Proxy Server, Windows OS, internet security and acceleration systems; HP-XW 6600 work station and Server OS on windows platform; and Mesh Generation Software.

### Hydrology Project II

During 2011-12, with an outlay of ₹ 0.92 crore, the following activities are being undertaken under CWPRS component of the project.

- Institutional strengthening (General & technical); Procurement of ICT equipment
- Training of personnel on Design Support System Planning [DSS-P] for water resources planning and

management and financial management reporting system

- Carrying out the Purpose Driven Study (PDS) entitled 'Optimisation of stream gauge and rain gauge network for Upper Bhima Basin
- Civil works : Modernisation of Library building of CWPRS, Renovation of VIP suits in CWPRS Guest House, Upgradation of Cavitation Lecture Hall/ ME Hall/ Conference Hall

### Dissemination of Technical Know-how

The mandate of CWPRS, inter-alia, includes dissemination of technical know-how by publishing research papers in national/ international journals, seminars/ conferences/ workshops, etc.; organising training courses/ workshops, publishing technical memoranda, delivering lectures and participation in technical committee meetings, etc. **Table-22** gives the physical targets and achievements during 2011-12 (up to 31.12.2011).

**Table-22: Physical Achievements during 2011-12 (upto 31<sup>st</sup> December 2011)**

No.	Item	2011-12		
		Targets	Achievements up to 31.12.2011	
<b>A.</b>	<b>R &amp; D Activities</b>			
1.	Physical/ Mathematical Model/ Desk studies	125	104	
2.	Testing of soil, rock, concrete, cement, fine and coarse aggregate samples, mechanical samples	700	577	
3.	Water quality analysis for salinity intrusion, sedimentation etc.- Testing of samples	500	369	
4.	Calibration of current meters/ flow meters	900	571	
5.	Technical Reports	80	90	
<b>B.</b>	<b>Dissemination of Information</b>			
1.	Publishing research papers (Journals/ Conferences/ Seminars & Technical Memoranda)	Papers	80	39
		Guidelines	02	Nil
2.	Training of staff	60	53	
3.	Organising workshops/ seminars/ symposia/ conferences	05	07	
4.	Delivering lectures	50	37	
5.	Participation in Technical Committee Meetings	30	21	



## **GANGA FLOOD CONTROL COMMISSION**

### **Introduction**

Ganga Flood Control Commission was established in 1972 with its Headquarters at Patna.

### **Organisation**

The Commission has been assigned the task of preparing comprehensive plans for flood management of the river systems in the Ganga basin, phasing/sequencing of programme of implementation, monitoring, performance evaluation of various flood management schemes, assessment of adequacy of waterways under road and rail bridges and providing technical guidance to the basin States, namely, West Bengal, Bihar, Jharkhand, Uttar Pradesh, Uttarakhand, Chhattisgarh, Madhya Pradesh, Delhi, Haryana, Himachal Pradesh and Rajasthan on flood management. The Commission also accords technical clearance of flood management schemes of the Ganga basin States.

The Commission is headed by a Chairman with two full time Members and other supporting officers and staff. The representatives of concerned central ministries and departments as well as the Engineer-in-Chief/Chief Engineers of the basin States are part time Members/permanent invitees.

### **Achievements during the Period 1<sup>st</sup> April, 2011 to 31<sup>st</sup> December, 2011**

#### **Maintenance of Flood Protection Works of Kosi and Gandak Projects**

The Flood Protection Works on river Kosi and Gandak are being done based on site inspection after every flood season and on the recommendations of Kosi High Level Committee (KHLC) and Gandak High Level Standing Committee (GHLSC) respectively. The reimbursement of expenditure incurred for maintaining the flood protection works

executed in Nepal portion is done by Government of India after utilization certificate of the same based on the recommendations of KHLC/GHLSC is received from the respective State Government of Bihar for Kosi and Uttar Pradesh for Gandak. Like previous years, this year also, the KHLC/GHLSC inspected the flood protection works taken up on river Kosi and right bank of river Gandak respectively, held meetings and finalized the recommendations for taking up flood protection works on these rivers before the floods of 2012.

#### **Updating of Comprehensive Plan for Flood Management**

Comprehensive plans for flood management for all the 23 river systems of the Ganga basin have already been prepared between 1975 and 1990. The updating of the comprehensive plans is underway. This is a continuing activity of GFCC. So far comprehensive plans for 22 river systems have been updated. During the year, the updation of the comprehensive plan of Kosi remained under finalisation. The comprehensive plan of Rupnarayan-Haldi-Rusulpur is under progress. Updating of these two plans is likely to be completed during the year.

#### **Monitoring of Important Flood Management Schemes**

GFCC is monitoring about 71 flood management schemes which, inter-alia, include (a) 55 flood management schemes supported under "Flood Management Programme" of Ministry of Water Resources (b) 2 schemes of Maintenance of flood protection works of Kosi and Gandak Projects in Nepal (c) 3 schemes viz., Extension of embankment along Lalbakeya, Kamla and Bagmati rivers in Nepal and (d) 11 schemes on common/border rivers in West Bengal along India-Bangladesh border under the Central Sector Scheme "River Management Activities and Work related to Border Areas".

## **Techno-economic Appraisal of Flood Management Schemes**

Techno-economic appraisal of flood management schemes of Ganga basin States is a continuing activity of GFCC. A number of flood management schemes have been examined in GFCC. 53 schemes pertaining to eleven States of Ganga basin were technically appraised in GFCC, out of which 9 schemes were cleared by GFCC.

### **Committees**

#### **Joint Committee on Inundation and Flood Management (JCIFM) between India and Nepal**

During the 4<sup>th</sup> meeting of Joint Committee on Water Resources held in March, 2009 at New Delhi, a committee for flood management known as Joint Committee on Inundation & Flood Management (JCIFM) was constituted after merging various relevant committees into a single committee. Since then five meetings of JCIFM have been held. The 5<sup>th</sup> meeting of the Committee was held during 18<sup>th</sup> to 23<sup>rd</sup> June, 2011 in Nepal.

#### **India-Nepal Joint Standing Technical Committee (JSTC)**

This Committee was constituted during the 3<sup>rd</sup> meeting of India-Nepal Joint Committee on Water Resources (JCWR) held from 29.9.08 to 01.10.08. This Committee co-ordinates all existing Standing Committees and Sub-Committee under the JCWR. So far three meetings of the Committee have been held. The 3<sup>rd</sup> meeting of the Committee was held on 13-14 September, 2011 at New Delhi.

#### **Ganga Flood Control Board Meeting**

The 15<sup>th</sup> meeting of Ganga Flood Control Board was held on 25<sup>th</sup> May, 2011 at New Delhi, in which various issues related to flood management in Ganga basin States were discussed.

## **FARAKKA BARRAGE PROJECT**

The Farakka Barrage Project was commissioned in 1975 for preservation & maintenance of the Calcutta Port and for increasing the navigation depth of the Bhagirathi-Hooghly waterway. The Farakka Barrage Project comprises of 2225 m long barrage across river Ganga at Farakka in Murshidabad district of West Bengal; a canal head regulator at Farakka for diverting water to Feeder Canal; 38.38 km long Feeder Canal and Jangipur Barrage at river Bhagirathi-Hooghly system, besides the road-cum-rail bridge across Ganga at Farakka; Navigation Locks at Farakka, Jangipur and Kalindri (Nurpur/ Malda); a road-cum-rail bridge across the Feeder Canal; Townships at Farakka, Airon and Khejuriaghat having 4000 dwelling units. Its appurtenant works include flood embankments, marginal bunds, afflux bunds and guide bunds.

Keeping in view the severe erosion problems in river Ganga–Padma in the upstream(u/s) and downstream(d/s) reaches and its possible effect on the barrage and its appurtenant works, the jurisdiction of Farakka Barrage was extended from Rajmahal (40km u/s of the Farakka Barrage) in Sahebganj district in Jharkhand to Jalangi town (80 km d/s of the Barrage) in Murshidabad district of West Bengal in 2005 and anti-erosion works on Ganga–Padma including its tributaries were undertaken.

During 2009-10, Farakka Barrage Project Authority (FBPA) completed the anti-erosion works in a length of more than 2.8 km at a cost of Rs. 46 crore.

Farakka Barrage Project Authority completed the anti-erosion works in a length of 700 m at Manikchak Ghat and in a length of 430 m at Birnagar on the upstream of Barrage on left bank of river Ganga in Malda district (West Bengal) at a total cost of Rs. 17.0 crore during 2010-11.





A view of execution of anti-erosion work at downstream of Manikchakghat 2011

During 2011-12, Farakka Barrage Project Authority has completed the anti-erosion work at Domhat on the left bank of river Ganga upstream of Farakka barrage in a length of 2200 m at the cost of Rs. 33.00 crore; Special repair and maintenance of six electrical control panels; Emergent anti-erosion work at Deepchandpur and Brahmangram on the right bank of river Ganga downstream of Farakka barrage; Emergency anti-erosion work on right bank of river Ganga/Padma downstream of off take point of river Bhagirathi Ch. 141.25 to Ch. 166.18 at a length of 760 m near Mithipur.

### **SARDAR SAROVAR CONSTRUCTION ADVISORY COMMITTEE**

#### **Composition and Functions**

The Sardar Sarovar Construction Advisory Committee (SSCAC) was constituted in 1980 by the Government of India in accordance with the directives of the Narmada Water Disputes Tribunal (NWDT) with a view to

ensure efficient, economical and early execution of Unit-I (Dam and Appurtenant works) and Unit-III (Hydro-power works) of the Sardar Sarovar Project. The Secretary, Ministry of Water Resources, is the Chairman of the SSCAC. The officers of the departments like Water Resources, Irrigation, Power, Finance and Revenue etc. concerned with the construction of the project, of the four party States viz. Gujarat, Maharashtra, Rajasthan and Madhya Pradesh along with concerned officers from Government of India and the Narmada Control Authority are Members of the Committee. The secretariat of the Committee is located at Vadodara and it has a full time Secretary of the rank of the Chief Engineer belonging to the Central Water Engineering (Group-A) Service.

#### **Sardar Sarovar Construction Advisory Committee (SSCAC) Meeting**

The 78<sup>th</sup> meeting of the SSCAC was held on 11<sup>th</sup> April 2011 at Kevadia Colony (Gujarat), wherein following important matters were

discussed and decisions taken on matters related to Sardar Sarovar Project (SSP):

- ❖ Insurance coverage for Sardar Sarovar Power Project.
- ❖ Real Time Data Acquisition System (RTDAS) Commissioning of Water Management System.
- ❖ Annual Development Plan 2009-10.
- ❖ Revised Implementation Schedule (RIS-September 2003) for construction of Garudeshwar Weir.
- ❖ Share Cost of SSCAC Secretariat.
- ❖ Payment of Share Cost of SSP by the party States.
- ❖ Brief report on the proceedings of the 99<sup>th</sup> & 100<sup>th</sup> PSC meetings
- ❖ Time extension and revision of rates for the civil works of Underground River Bed Power House (UGRBPH) and Main Dam works of SSP.
- ❖ Draft proposal for Annual Development Plan 2010-11 of Unit-I and Unit-III works of SSP.
- ❖ Claim put forth by M/s. Jaiprakash Associates (JPA) on account of shortfall in concrete progress during the various working seasons from 1993-94 to 1997-98 due to the restrictions imposed in raising the spillway of Sardar Sarovar Dam.
- ❖ Review of the progress of Unit-I and Unit-III works of Sardar Sarovar Project (a) Unit-I (Dam and Appurtenant works);(b) Unit-III (Hydro-power Works) and (c) Action Plan for completion of remaining works of SSP.

### Permanent Standing Committee (PSC) Meetings

The Sardar Sarovar Construction Advisory Committee has a Sub-committee, named as Permanent Standing Committee (PSC), with the Executive Member, Narmada Control Authority as the Chairman, and representatives from the Ministry of Water Resources, Central Water Commission, Central Electricity Authority and all the four

party States as Members. The Secretary, SSCAC is the Member-Secretary of the PSC.

101<sup>st</sup> meeting of PSC of SSCAC was held on 8<sup>th</sup> June 2011 at New Delhi wherein following important issues related to Sardar Sarovar Project (SSP) were deliberated and appropriate decision taken:

- Revised Implementation Schedule (RIS-September 2003) for construction of Garudeshwar Weir.
- Release of pending payment of M/s. BHEL for supply of equipments thereof.
- Closure of contract with M/s. BHEL for work package-I & II of EMC.
- Draft proposal for Annual Development Plan 2011-12 of Unit-I and Unit-III works of SSP.
- Review of the progress of Unit-I and Unit-III works of Sardar Sarovar Project.
- Insurance coverage for Sardar Sarovar Power Project.
- Revised estimate of Garudeshwar Weir of SSP at price level 2010-11 and variation in draft tender papers.
- Payment of share cost of SSCAC Secretariat.

### Important Information about Sardar Sarovar Project

#### Revised Cost Estimate for SSP

Revised cost estimate of Sardar Sarovar Project amounting to ₹ 39240.45 crore (at 2008-09 price level) has been accepted by Planning Commission for investment in the State Plan in May 2010. An expenditure of ₹ 32823.33 crore has been incurred on the Sardar Sarovar Project upto the end of January 2011. Out of this total expenditure, an amount of ₹ 14143.96 crore is disputed expenditure which includes items like interest on market borrowing (₹ 12052.1 crore), expenditure on R&R booked under Unit-I (₹ 2005.41 crore) and expenditure on Rockfill Dykes and Link channels (₹ 86.45 crore).

## Progress of Main Dam Works

The work of raising blocks No.30 to 46 to 121.92 m commenced on 9<sup>th</sup> March 2006 and was completed on 31<sup>st</sup> December 2006. The balance works remaining to be carried out are raising of piers and installation of Radial Gates in the spillway portion of the dam. As per Court's directions, the permission for further raising of dam is now to be given by the NCA, after obtaining clearances from the Resettlement and Rehabilitation Sub-Group, the Environmental Sub-Group and in consultation with the Grievances Redressal Authorities (GRA's) of Gujarat, Maharashtra and Madhya Pradesh.

The overall progress of Main Dam (Unit-I) achieved up to December 2011 is given in **Table-23**.

**Table-23**

Items	Est. Qty.	Cumulative Progress up to December 2011	Percentage Progress up to December 2011
Excavation (lakh Cu.m)	64.00	63.59	99.36
Concreting (lakh Cu.m)	68.20	65.76	96.43
Drilling & Grouting (lakh RM)	2.82	2.50	88.65



## Progress of River Bed Power House (RBPH)

All the civil and electrical works of RBPH are complete and all the 6 Units of RBPH have been commissioned. Computerized Control System (CCS) has been established and put in operation from 14.06.2010.

### Power Generation

Total of 22384.78 million units (M.U.) energy was generated from both the power houses till December 2011, out of which 3726.22 M.U was generated in the financial year 2011-12 (01.04.2011 to 31.12.2011).

## Progress of Irrigation Bye-Pass Tunnel (IBPT)

The Irrigation Bye-Pass Tunnels (IBPT) arrangement comprises of two circular tunnels of 5.5 m finished diameter across the right bank hill connecting the main reservoir with the first irrigation pond. The twin IBPTs, with invert level of EL 88.39 m at the inlet, will have a discharge capacity of about 283.12 cumecs (10,000 cusecs) at reservoir level of 97.53 m and 424.81 cumecs (15,000 Cusecs) at reservoir level of 110.64 m.

IBPT works were completed in May 2008. Wet testing of gates has been done during September 2010.

The dam has overflowed this year from 15<sup>th</sup> August 2011 to 2<sup>nd</sup> October 2011 and maximum water level attained was 127.18 m.

## BANSAGAR CONTROL BOARD

### Organisation & Composition

The Bansagar Control Board was set up by the Government of India through a resolution in January 1976. The resolution was amended in 1990. The resolution was in accordance with an agreement reached between the Governments of Madhya Pradesh, Uttar Pradesh and Bihar on the 16<sup>th</sup> September 1973 for sharing the waters of river Sone and the cost of the Bansagar dam. After amendment, the main features of the resolution are as follows:

“In consultation with the Governments of Madhya Pradesh, Bihar and Uttar Pradesh, it has been decided to set up the Bansagar Control Board with a view to ensuring the efficient, economical and early execution of Bansagar dam including all connected works in Madhya Pradesh, but excluding the canal systems which will be executed by respective States, namely, Madhya Pradesh, Uttar Pradesh and Bihar. The Control Board will be in overall charge of the project including its technical and financial aspects. The actual work of construction will be carried out under the direction of the Control Board by the Chief Engineer concerned of the Madhya Pradesh Government.”

“The three State Governments agree to delegate powers to the Chief Engineer, Madhya Pradesh, to contract for works, supplies and services under the direction of the Control Board. The contract in respect of all works will, however, be executed in the name of the Governor of Madhya Pradesh.”

The Union Minister of Water Resources is the Chairman of the Board and the Minister of State for Water Resources, Union Minister of Power, Chief Ministers, Minister-in-Charge of Irrigation and Finance of the three States and Minister-in-Charge of Electricity of Madhya Pradesh are its Members. The Executive Committee set up under the Chairmanship of the Chairman, Central Water Commission, manages the day-to-day affairs of the Board. The expenditure on the office of the Board is initially met out of the budget grants of Union Ministry of Water Resources and subsequently reimbursed by the three States of Madhya Pradesh, Uttar Pradesh and Bihar.

### Bansagar Dam Project

Bansagar dam, on Sone river, a joint venture of the States of Madhya Pradesh, Uttar Pradesh and Bihar is being executed by the Water Resources Department, Government of Madhya Pradesh under the directions of the Bansagar Control Board. The party States are carrying out the execution of the canals and power systems independently under their jurisdiction.

The benefits and cost of the dam, including land acquisition and rehabilitation, are shared by Madhya Pradesh, Uttar Pradesh and Bihar in the ratio of 2:1:1. The project was originally estimated to cost ₹ 91.30 crore at 1978 price level. The project with the updated revised cost estimate of ₹ 1582.94 crore at 2009 price level has been accepted by the Advisory Committee of Ministry of Water Resources in its 102<sup>nd</sup> meeting held on 28<sup>th</sup> January 2010.

### Components of Bansagar Dam

The Bansagar dam envisages construction of

### Benefits from the Project

#### Irrigation Benefits-

- |       |   |  |
|-------|---|--|
| (i)   | Annual Irrigation in M.P. (in the districts of Rewa, Sidhi, Satna and Shahdol). | <b>2.49 lakh hectare</b>   |
| (ii)  | Annual Irrigation in U.P. (in the districts of Mirjapur and Allahabad)          | <b>1.5 lakh hectare</b>  |
| (iii) | Annual Irrigation in Bihar  | <b>0.94 lakh hectare towards stabilizing irrigation through old Sone Canal system.</b> |

#### Power Benefits-

Power generation in Madhya Pradesh	<b>425 MW</b>
------------------------------------	---------------

### Budget & State Shares

The Budget provision made for the project; sub-head wise expenditure during the financial year 2011-12 and cumulative expenditure up to December 2011 is given in **Table-24**.

**Table-24**

(₹ crore)				
Sl.No.	Sub-head	Budget Provision	Expenditure during 2011-12 up to 12/2011	Cumulative Expenditure up to 12/2011
1	2	3	4	5
1.	Establishment	14.388	11.274	203.675
2.	Tools & Plants	0.000	0.000	2.078
3.	Suspense (debit)	0.000	0.000	148.575
4.	Works	4.860	5.348	1323.207
Gross Total		19.248	16.622	1677.535
5.	Suspense (Credit)	0.000	0.082	142.841
Net total		19.248	16.540	1534.694

The State Government of Madhya Pradesh, Uttar Pradesh and Bihar fund the project in the ratio of 2:1:1. The details of share due/ received in relation to the expenditure incurred as on 31.12.2011 of ₹ 1534.694 crore is given in **Table-25**.

**Table-25**

(₹ crore)

Total Expenditure	Share Due Share Received			Balance Share		
	M.P.	U.P.	BIHAR	M.P.	U.P.	BIHAR
<b>Up to 31.03.2011: 1518.154</b>	<u>759.077</u> <i>828.793</i>	<u>379.5385</u> <i>299.799</i>	<u>379.5385</u> <i>389.562</i>	(+) 69.716	(-) 79.7395	(+) 10.023 5
<b>During 2011-12 up to 12/2011: 16.540</b>	8.270 <i>(-) 53.260</i>	4.135 <i>69.800</i>	4.135 <i>0.000</i>	(-) 61.530	(+) 65.665	(-) 4.135
<b>Total as on 31.12.2011: 1534.694</b>	<u>767.347</u> <i>775.533</i>	<u>383.6735</u> <i>369.599</i>	<u>383.6735</u> <i>389.562</i>	(+) 8.186	(-) 14.0745	(+) 5.8885

## UPPER YAMUNA RIVER BOARD

“Upper Yamuna” refers to the reach of Yamuna from its origin at Yamunotri to Okhla Barrage at Delhi. A Memorandum of Understanding (MoU) was signed on 12<sup>th</sup> May, 1994 amongst the basin States of Himachal Pradesh, Uttar Pradesh, Haryana, Rajasthan and Delhi, for sharing the utilizable surface flows of river Yamuna up to Okhla. The MoU also provided for creation of “Upper Yamuna River Board” to implement the said agreement.

Accordingly, the Central Government constituted the Upper Yamuna River Board in 1995 as a subordinate office under the Ministry of water Resources. After creation of Uttaranchal State in 2000, the resolution was modified to include Uttaranchal (now Uttarakhand) also in the Board.

The resolution also provided for constitution of a Review Committee, to be known as the Upper Yamuna Review Committee (UYRC), comprising the Chief Ministers (Governor in case of President's rule) of the co-basin States as Members and Union Minister/Minister of State for Water Resources as Chairman, to supervise the working of the Upper Yamuna River Board (UYRB).

## Organization

The Board comprises of Member (WP&P), Central Water Commission as the part time Chairman; one representative from each of the six basin States, Central Electricity Authority, Central Ground Water Board and Central pollution Control Board as its part-time Members and full time Member Secretary. The expenditure on the Board is shared equally by the six basin States. The Board has sanctioned staff strength of 58.

## Functions of UYRB

The functions of the Board include all aspects of water management in the Upper Yamuna Basin, viz. implementation of the water sharing agreement; water allocation; water accounting and data warehousing; monitoring and upgrading the quality of surface and ground water; controlling the ground water extraction; co-ordination of the constitution of all projects in the basin, integrated operation of all the projects, watershed development and catchment area treatment plans.

## Activities of UYRB

The Board has been making tentative seasonal distribution of water to basin States at various distribution points. The Board has



also been engaged in resolving the inter-State issues amongst the basin States related to water distribution and issues related to benefits and cost sharing from the proposed storage projects in Yamuna Basin. The Board had constituted Water Accounting Committee to prepare Water Accounting Manual for UYRB. The Committee submitted a draft report on Water Accounting Manual which has been circulated among Members of Basin States for comments. The Board had also awarded Surface Water- Ground Water Interaction Study in Palla region of Yamuna river to the National Institute of Hydrology (NIH), Roorkee. The NIH, Roorkee has submitted the Report on the Study which has been circulated among Members of Basin States for comments.

The Board has held 40 meetings till 31<sup>st</sup> December 2011. The last meeting was held on 27<sup>th</sup> September, 2011.

The Board had also formulated a scheme, "The Scheme for collection and transmission of data regarding flows of Yamuna, withdrawals for different purposes at various

points and the water going downstream of the river Yamuna at Okhla to office of UYRB on daily basis". In this regard, in the last meeting of the Board, Chairman, UYRB observed that the list of proposed points of observations be circulated to all the concerned States and the scheme should be studied thoroughly before taking further action.

Following the complaints from Rajasthan and Haryana that they were not receiving their due share of water from Okhla Barrage due to incorrect assessment of inflows at Okhla Barrage, it was decided that a gauge and discharge observation site would be established and measurement started at Hindon Cut Canal site.

On request from Delhi that full allocation as per share of Delhi in the monsoon season should be made and that the distribution of balance share of Delhi may be made from Wazirabad to Okhla reach, it was decided that Delhi's share may accordingly be reflected in the Statement of distribution from Wazirabad to Okhla reach.



4<sup>th</sup> Meeting of UYRC held on 19.7.2011

4<sup>th</sup> meeting of Upper Yamuna Review Committee (UYRC) under the Chairmanship of Hon'ble Union Minister for Water Resources was held on 19<sup>th</sup> July 2011 at New Delhi. The meeting was held after more than five years. The Chairman, UYRC emphasized the need for more frequent meetings with very active participation of all the Members for addressing the growing challenges in water sector to ensure maximum benefit to the people of the region.

## REGISTERED SOCIETIES

### NATIONAL WATER DEVELOPMENT AGENCY

#### Introduction

National Water Development Agency (NWDA) was established in July, 1982 as a registered Society under the Societies Registration Act, 1860 under the Ministry of Water Resources to study the feasibility of the Peninsular Component of National Perspective Plan. The NWDA is fully funded by Government of India through grants-in-aid. Subsequently in 1990-91, NWDA Society resolved to take up the studies of Himalayan Component also. Further, on 28<sup>th</sup> June, 2006, NWDA Society approved modifications in the functions of NWDA to include preparation of DPRs of link projects and pre-feasibility/ feasibility reports of intra-State links as proposed by States. Accordingly, MoWR vide resolution dated 30.11.2006 has modified the functions of NWDA Society. Further, MoWR vide resolution dated 19<sup>th</sup> May, 2011 modified the functions of NWDA to prepare DPR of intra-State links also and same has been published in the Gazette notification of Government of India dated 11<sup>th</sup> June, 2011.

The Agency functions with the following main objectives:

- (a) To carry out detailed surveys and investigations of possible reservoir sites

and inter-connecting links in order to establish feasibility of the proposals of Peninsular Rivers Development and Himalayan Rivers Development Components forming part of the National Perspective for Water Resources Development prepared by the then Ministry of Irrigation (now Ministry of Water Resources) and Central Water Commission.

- (b) To carry out detailed surveys about the quantum of water in various Peninsular river systems and Himalayan river systems which can be transferred to other basins/States after meeting the reasonable needs of the basin/States in the foreseeable future.
- (c) To prepare feasibility report of the various components of the scheme relating to Peninsular rivers development and Himalayan rivers development.
- (d) To prepare detailed project report of river link proposals under National Perspective Plan for Water Resources Development after concurrence of the concerned States.
- (e) To prepare pre-feasibility / feasibility / detailed project reports of the intra-State links as may be proposed by the States. The concurrence of the concerned co-basin States for such proposals may be obtained before taking up their FRs / DPRs.
- (f) To do all such other things the Society may consider necessary, incidental, supplementary or conducive to the attainment of above objectives.

The Hon'ble Union Minister of Water Resources is the President of the Society. The President exercises such powers for the conduct of the business of the Society as may be vested in him by the Society.

The Governing Body (GB) of the NWDA Society under the Chairmanship of the Secretary (Water Resources), Government of India manages, administers, directs and

controls the affairs and funds of the Society subject to the rules, bye-laws and orders of the Society and generally pursues and carries out the activities of the Society.

### **Organizational Set-up**

The NWDA is headed by the Director General of the rank of Additional Secretary to the Government of India. He is the Principal Executive Officer of the Society, responsible for the proper administration of the affairs and funds of the Society, assisted by Chief Engineer (HQ) and Directors and are also responsible for coordination and general supervision of the activities of the Society. The Headquarters of the Agency is at New Delhi. NWDA has 2 field organizations, each headed by a Chief Engineer, 5 Circles each headed by a Superintending Engineer, 16 Divisions each headed by an Executive Engineer and 2 Sub-Divisions each headed by an Assistant Executive Engineer/Assistant Engineer.

### **Major Activities**

#### **Inter-Basin Water Transfer Proposals**

The National Water Development Agency has been carrying out studies of National Perspective Plan for water resources development. The proposal comprises of two components, namely: (a) Peninsular Rivers Development Component and (b) Himalayan Rivers Development Component.

#### **Peninsular Rivers Development Component**

Under Peninsular Component, National Water Development Agency has completed collection of data and water balance studies of all 137 basins/sub-basins and 52 identified diversion points (including 3 additional studies), 58 reservoir studies, toposheet studies of 18 links including 1 additional study and all 18 pre-feasibility reports. Based on these studies, NWDA has identified 16

water transfer links under Peninsular Component for surveys and investigations and preparation of Feasibility Reports. So far, FRs of 14 links under Peninsular Component have been completed. DPR of one link, namely, Ken-Betwa (phase-I) has been completed and NWDA has taken up the surveys & investigation works of phase-II of Ken-Betwa link project. The copy of DPR has been submitted to concerned States of UP and MP. The work of preparation of DPR of Par-Tapi-Narmada & Damanganga –Pinjal link is in progress.

#### **Himalayan Rivers Development Component**

The studies in respect of Himalayan Rivers Development Component were started by NWDA during the year 1991-92. The Himalayan Component envisages construction of storage reservoirs on the principal tributaries of the Ganga and the Brahmaputra in India, Nepal and Bhutan, along with inter-linking canal systems to transfer surplus flows of the eastern tributaries of the Ganga to the west, apart from linking of the main Brahmaputra and its tributaries with the Ganga and Ganga with Mahanadi.

Under the Himalayan Rivers Development Component, NWDA has completed water balance studies of all the 19 diversion points, toposheet studies of 16 storage reservoirs & 19 water transfer links and pre-feasibility report of 14 links. Based on these studies, NWDA has identified 14 water transfer links under Himalayan Component for surveys and investigations and preparation of Feasibility Reports (FRs). So far, FRs of 2 links (Indian Portion) in the Himalayan Component have been completed. The surveys and investigations and other works of seven more links, entirely in India, have also been completed.

#### **Benefits from Inter-Basin Water Transfer Link Schemes**

The National Perspective Plan would give additional benefits of 25 million ha. of irrigation from surface waters, 10 million ha. by increased use of ground waters, raising the ultimate irrigation potential from 140 million ha. to 175 million ha. and generation of 34 million KW of power, apart from the incidental benefits of flood control, navigation, water supply, fisheries, salinity and pollution control etc. in various States.

National Water Development Agency has identified the States which are to be benefited from the inter-basin water transfer links and assessed the annual irrigation benefits likely to accrue to the concerned States from these link schemes. While the Himalayan Component of the inter-basin water transfer proposal will benefit directly Uttar Pradesh, Uttrakhand, Haryana, Rajasthan, Gujarat, Assam, West Bengal, Bihar, Jharkhand and Odisha and enrich the Peninsular Component from the surplus waters of Brahmaputra, the Peninsular Component will benefit Andhra Pradesh, Odisha, Karnataka, Tamil Nadu, Kerala, Puducherry, Madhya Pradesh, Uttar Pradesh, Rajasthan, Maharashtra and Gujarat.

### **Other Initiatives**

#### **(a) Preparation of Detailed Project Report (DPR)**

##### **(i) Ken-Betwa Link Project**

The DPR of Ken-Betwa link project has been completed by December, 2008 as scheduled and the report was sent to Government of MP and UP for their examination and comments in February, 2009. The comments of Government of M.P. and U.P. were received and after examination by NWDA / MoWR, Secretary (WR) convened a meeting with concerned Principal Secretaries of MP and UP on 3.02.2010, to sort out various issues raised by them, during which it was decided that the DPR of the project will be prepared in two phases. In Phase-I, Daudhan dam, two power houses, link canal and in Phase-II,

projects to be proposed in Betwa Basin will be taken up simultaneously due to huge submergence of proposed Makodia reservoir earlier proposed in Upper Betwa Basin. The Government of M.P. has suggested alternative projects viz. i) Series of 25 Barrages on Betwa river ii) Malhargarh Diversion Scheme on Betwa river iii) Series of 10 Barrages on tributaries iv) Five identified medium projects & v) Lower Ore Project on d/s of existing Matatila project for Upper Betwa Basin, which were not considered earlier. It was decided that these projects will be taken up in Phase-II after completion of their survey & investigation work and examining their techno-economic viability. The DPR of Phase – I of the project has been completed by NWDA in April, 2010 and submitted to Government of M.P. and U.P. in May, 2010. Necessary action for obtaining clearances of various central appraising agencies is now taken up by NWDA.

The status of the Ken-Betwa link was further discussed in the meeting taken by Secretary (WR) on 04.08.2010 during which it was decided that the survey & investigation works of major/medium projects in Upper Betwa Sub-basin will now be taken up by NWDA on priority after firming up the feasibility of these projects and S & I works of minor projects i.e. series of barrages on Betwa river and projects on tributaries of Betwa would be taken up thereafter. NWDA has taken up the work of preparation of DPR of Phase-II of Ken-Betwa link Project.

The link project has been included in the list of National Projects.

##### **(ii) Par-Tapi-Narmada & Damangaga-Pinjal Link Project**

MoU for preparation of DPRs of both these links was signed by the Chief Ministers of Gujarat, Maharashtra and Union Minister (WR), in the presence of Hon'ble Prime Minister, on 03.05.2010. The Monitoring Committee under the Chairmanship of Chairman, CWC has reviewed the progress of

preparation of DPR of these links in the meetings held on 15.2.2010, 31.08.2010 & 23.11.2011. DPRs of these links have been targeted to be completed in 2012-13.

### **(b) Consensus Group Headed by Chairman, CWC**

The objective of the Consensus Group headed by Chairman, CWC is to discuss and expedite the process of arriving at consensus amongst the States regarding sharing of surplus water in river basins/sub-basins and quantum of surplus water to be transferred from surplus basins to deficit basins/areas as per the proposals of inter-basin water transfer of NWDA and helping the States. The tenth meeting of the Consensus Group was held on 23.07.2010.

### **(c) Committee of Environmentalists, Social Scientists and other Experts**

As a follow up action on comprehensive assessment of inter-linking of rivers, the Ministry of Water Resources had constituted a Committee of Environmentalists, Social Scientists and other Experts in December, 2004 under the Chairmanship of Secretary, MoWR to make the process of proceeding on inter-linking of rivers fully consultative. Nine meetings of this Committee have been held upto 31<sup>st</sup> March, 2012. The 8<sup>th</sup> meeting was held on 5.3.2010 in which TORs of EIA studies of Par-Tapi-Narmada & Damanganga-Pinjal link were discussed. The 9<sup>th</sup> meeting of the committee was held on 12.09.2011.

### **(d) Intra-State Links**

NWDA has received 36 proposals from 7 States. The proposals received from States viz. Jharkhand, Maharashtra, Bihar, Gujarat, Odisha, Rajasthan and Tamil Nadu have been examined / discussed by NWDA officers with

the officers of these States in various meetings and based on discussion / outcome, NWDA has initiated action for preparation of PFRs of these intra-State link proposals. PFRs of the 15 intra-State links (3 Jharkhand, 6 Bihar, 1 Odisha and 5 Maharashtra) have been completed and sent to concern States.

### **(e) Other Important Meetings held during the year 2010-11 & Public Awareness Programme**

#### **Annual General Meeting (AGM) of NWDA**

26<sup>th</sup> Annual General Meeting of NWDA was held on 18.04.2011 under the Chairmanship of Hon'ble Minister of Water Resources & President of the NWDA Society. The meeting was attended by the senior officers of NWDA, CWC, MoWR and other Central and State Government Departments.

#### **Governing Body (GB) Meeting of NWDA**

56<sup>th</sup> & 57<sup>th</sup> Meetings of the GB of NWDA were held on 08.04.2011 & 15.12.2011 respectively at New Delhi. Shri Dhruv Vijai Singh, Secretary (Water Resources) and Chairman, Governing Body presided over the meetings. The meeting was attended by the senior officers of NWDA, CWC, MoWR and other Central and State Government Departments.

#### **Participation in India International Trade Fair**

NWDA participated in India International Trade Fair held from 14.11.2011 to 27.11.2011 by putting up a stall on the activities of NWDA for creating public awareness.





Shri Dhruv Vijai Singh, Secretary (WR) chairing 57<sup>th</sup> meeting of the Governing Body of NWDA held on 15.12.2011 at New Delhi. Sitting to the left of Chairman are Shri G. Mohan Kumar, Additional Secretary (WR) and Shri R.C.Jha, Chairman, Central Water Commission and sitting to the right are Shri A.B.Pandya, Director General, NWDA & Member-Secretary of the Governing Body and Shri Pradeep Kumar, Commissioner (PR), Ministry of Water Resources.

## NATIONAL INSTITUTE OF HYDROLOGY

The National Institute of Hydrology, a Government of India Society under the Ministry of Water Resources, established in December 1978 at Roorkee, is conducting basic, applied and strategic research in the fields of hydrology and water resources development. The Institute is fully aided by the Ministry of Water Resources, Government of India.

### Objectives

- To undertake, aid, promote and coordinate systematic and scientific work on all aspects of hydrology;
- To cooperate and collaborate with other national and international organizations in the field of hydrology;
- To establish and maintain a research and reference library in pursuance of the objectives of the society and equip the same with books, reviews, magazines and other relevant publications; and

- To carry out activities that the Society may consider necessary, incidental or conducive to the attainment of the objectives for which the Institute has been established.

### Organization

The Union Minister of Water Resources is the President of the NIH Society and the Union Minister of State of Water Resources is its Vice- President. The Ministers-in-Charge of Irrigation/Water Resources in the States (ten States to be nominated for every three years by the President of the Society), the Secretaries of Ministries in the Government of India concerned with water and related areas, and eminent experts in hydrology and water resources are Members of the Society. The Secretary, Ministry of Water Resources, Government of India, is the Chairman of the Governing Body. The Institute's research and other technical activities are monitored and guided by the Technical Advisory Committee (TAC), headed by the Chairman, Central



Water Commission. The Director of the Institute is appointed by the Government of India and is the Principal Executive Officer of the Society.

The Institute has set up 6 regional centres in order to deal with the area specific hydrological issues of different regions in the country and for providing effective interaction with the States in the region. These centres are: Hard Rock Regional Centre (Belgaum), Western Himalayan Regional Centre (Jammu), Deltaic Regional Centre (Kakinada); Ganga Plains Regional Centre (Sagar), Centre for Flood Management Studies for Brahmaputra basin (Guwahati), and Centre for Flood Management Studies for Ganga basin (Patna). The studies and research in the Institute are carried out under five scientific themes at the Headquarters, two Centres for Flood Management Studies and four regional centres. The five scientific themes at the Headquarters are: i. Environmental Hydrology, ii. Ground Water Hydrology, iii. Hydrological Investigations, iv. Surface Water Hydrology, and v. Water Resources Systems. The Institute has a Research Coordination and Management Unit (RCMU), which provides the interface with various research and academic institutions.

### Major Research Areas (XI Plan)

- Hydrology of extremes
- Impact of climate change on water resources
- Groundwater modeling and management
- Sustainable water systems management
- Surface water modeling and regional hydrology
- Environmental hydrology

### Studies and Research

The studies and research in the Institute are being carried out broadly under the following major categories:

- Basic studies and research
- Applied studies and research
- Software development

- Field and laboratory oriented and strategic research
- Sponsored research

### Sponsored Research Activities

The Institute has been undertaking research studies for providing solutions to the real life hydrological problems in the field using advanced techniques. Some of the significant contributions of NIH include studies for solution of real-life problems related to augmentation of water supply and water management in cities, glacier contribution in streamflow of Himalayan rivers for hydro-electric power projects, watershed development, water quality management plan for lakes, watershed development, storm water drainage network in cities, flood inundation mapping and flood risk zoning, and water quality assessment in major cities.

### Consultancy Capabilities

The Institute has excellent capabilities in the areas of hydrology and water resources to take up national and international consultancy. The Institute is taking up consultancy projects, which provide a good opportunity for the scientists of NIH to implement the results of their research for solving need-based problems.

### Laboratories

The Institute has the following well equipped laboratories with state-of-art instruments to provide the necessary support to field studies:

- Nuclear Hydrology
- Remote Sensing & GIS
- Soil Water
- Snow & Glacier
- Water Quality
- Ground Water Modeling
- Hydrological Instrumentation

### Technical Publication

The research output of the Institute is published in the form of reports and peer reviewed scientific papers. During the year 2011-12, the Institute has published 178 papers in reputed international and national journals and proceedings of international and national conferences and symposia. About 29 studies are going on.

### Technology Transfer

One of the main objectives of the Institute is to transfer the developed technology to the target users. Besides wide dissemination of reports and research papers, organization of workshops, training courses, seminars, symposia, conferences, brain storming sessions, etc. have been major activities under the Technology Transfer programme. The Institute has organized 18 training programmes for field engineers, scientists, researchers, etc.

### Capacity Building Activities

NIH organized a 2-day training course on, "Hydrology for Drinking Water Sector Professionals" under Key Resource Centre programme during August 18-19, 2011 at Roorkee. The objective of the training course was to upgrade the knowledge, skills and attitudes of the PHED engineers, PRI representatives, master trainers and other stakeholders operating in different States. It also intends to enhance knowledge and skills about convergence with other related programmers launched at the Central and State level.

Four scientists of the Institute were trained at DHI, Denmark, during 2011-12, to acquire in-depth knowledge about the Decision Support System (Planning) for Integrated Water Resources Development and Management. Four scientist of the Institute were trained at UNESCO-IHE, The Netherlands

### Important Events

The Institute organized a 2-day workshop on "Integrated Water Resources



Management Strategy for Water Scarce Bundelkhand region in India” supported by the TIFAC (DST, GoI) under India-IIASA Program during Dec. 6-7, 2011. The objective of this workshop was to discuss the complexities and issues involved in the integrated water resource management, and to deliberate on the tools and techniques as well as innovative approaches in developing effective water management solutions in water-scarce Bundelkhand region in India.

The Institute participated in the 31<sup>st</sup> India International Trade Fair (IITF-2011), held at New Delhi during Nov 14-27, 2011, by putting up a stall in the pavilion of Ministry of Water Resources showcasing activities of the Institute. A physical operational model of Hydrologic Cycle was displayed during the exhibition.

An Achievement Review Committee (ARC) was constituted by the Ministry of Water Resources (GoI) to review the work done by the Institute during the years 2004-2010. The ARC had submitted its recommendations to

the Honorable Minister of Water Resources, Government of India and President of NIH Society in April 2011.

A Memorandum of Understanding was signed between National Institute of Hydrology and University of Applied Sciences, Dresden (HTWD), Germany on 31<sup>st</sup> May, 2011 for establishment and operation of an “Indo-German Competence Centre for Riverbank Filtration (IGCCRBF)” at NIH, Roorkee. The main objective of IGCCRBF is to establish and promote national and international linkage for collaborative multidisciplinary research on River Bank Filtration systems in India.

NIH has joined a consortium of 20 organizations from 8 countries to collaborate in the R & D project entitled “Saph Pani - Enhancement of natural water systems and treatment methods for safe and sustainable water supply in India”, under 7<sup>th</sup> Framework Programme (Theme–ENV.2011.3.1.1.2) of the European Commission. The project duration is 36 months starting from October 2011.



## STATUTORY BODIES

### BRAHMAPUTRA BOARD

#### Background

The Brahmaputra Board was constituted in 1980 by an Act of Parliament (Act 46 of 1980 called "The Brahmaputra Board Act") with the objective of planning and integrated implementation of measures for control of floods and bank erosion in Brahmaputra and for matters connected therewith. It started functioning since January 11, 1982 with headquarters at Guwahati, Assam. The jurisdiction of the Board includes the States of Arunachal Pradesh, Assam, Meghalaya, Manipur, Mizoram, Nagaland, Tripura, Sikkim and a part of West Bengal falling within the Brahmaputra Basin

#### Organisation

The Board consists of the Chairman, Vice-Chairman, General Manager and Financial Adviser as Ex-officio Members and 17 part time Members representing 7 States of the North-Eastern region, North-Eastern council, concerned Ministries of Government of India, namely, Water Resources, Finance, Agriculture, Power, Road Transport & Highways and Organizations of Government of India, namely, Central Water Commission, Central Electricity Authority, India Meteorological Department and Geological Survey of India.

#### Major Functions

The main function of the Board as per the Act is survey and investigations in the Brahmaputra Valley and preparation of Master Plans for the control of flood and bank erosion and improvement of drainage and development and utilization of water resources of the Brahmaputra Valley for irrigation, hydro-power, navigation and other beneficial purposes.

Other functions include preparation of Detailed Project Reports (DPR) and estimates of projects proposed in the Master Plans as approved by the Central Government and construction of Multipurpose Dams and other works proposed in the Master Plans as approved by the Central Government.

### NARMADA CONTROL AUTHORITY

The Government of India framed the Narmada Water Scheme, which, inter-alia, constituted the Narmada Control Authority and Review Committee in 1980 for proper implementation of the decisions and directions of the Narmada Water Disputes Tribunal.

The Narmada Control Authority (NCA) has been vested with powers for the implementation of the orders of the Tribunal with respect to the storage, apportionment, regulation and control of the Narmada water, sharing of power benefits from Sardar Sarovar Project (SSP), regulated release of water by Madhya Pradesh, acquisition of land likely to be submerged under the Sardar Sarovar Project by the concerned States, compensation, resettlement/rehabilitation of the oustees, and sharing of costs and implementation of the environmental safeguard measures.

#### Organisation

The Authority is headed by the Secretary, Ministry of Water Resources, Government of India, as its Chairman, with Secretaries of the Union Ministries of Power, Environment & Forests, Social Justice & Empowerment and Tribal Welfare, Chief Secretaries of the four party States, viz. Madhya Pradesh, Maharashtra, Gujarat & Rajasthan, one full time Executive Member and three full time Members appointed by the Central Government and four part time Members,

one each nominated by party States as Members.

The Review Committee for Narmada Control Authority (RCNCA), headed by the Union Minister of Water Resources comprises Union Minister for Environment & Forest and Chief Ministers of four party States viz. Madhya Pradesh, Rajasthan, Maharashtra & Gujarat as Members.

The Narmada Control Authority has its Headquarter at Indore.

### Meeting of Narmada Control Authority

During the year, only one meeting of NCA i.e. 84<sup>th</sup> meeting was held on 13<sup>th</sup> September, 2011.

### Environmental Monitoring Activities

Environment Sub-group of Narmada Control Authority chaired by Secretary, Ministry of Environment and Forests monitors various surveys, studies and implementation of Environmental Safeguard Measures in respect of Sardar Sarovar Project and Indira Sagar Project as per terms of Narmada Water Scheme and various clearances issued to the projects by the Central Government including clearance from environmental angle issued by Ministry of Environment & Forest, Government of India. Accordingly, the progresses on following activities are being monitored by the Narmada Control Authority.

1. Phased Catchment Area Treatment
2. Compensatory Afforestation
3. Command Area Development
4. Flora, Fauna & Carrying Capacity of surrounding area
5. Seismicity
6. Health Aspects
7. Archaeological & Anthropological aspects

Progress reports received from the party States are being displayed on website of the NCA. NCA officers are also making field visits to review & reconcile the progress.

### Resettlement and Rehabilitation Activities

### (A) Sardar Sarovar Project (SSP)

The progress of R&R is being monitored by the Resettlement and Rehabilitation (R&R) Sub-group chaired by the Secretary, Ministry of Social Justice and Empowerment and also by a Task Force constituted by the NCA. **Table-26** given below indicates overall cumulative progress of R&R of Project Affected Families (PAF) of SSP up to 31<sup>st</sup> December, 2011.

**Table-26: Sardar Sarovar Project (SSP) Progress of R&R upto 31<sup>st</sup> December 2011**

STATE	Total Project Affected Families (PAFs)	Total PAFs resettled	Balance Families to be resettled
GUJARAT (i)	4764	4760	4
MAHARASHTRA In Gujarat	748	748	0
In Maharashtra	3479	3219 <sup>\$</sup>	260
Total (ii)	4227 <sup>a</sup>	3967	260
<i>MADHYA PRADESH</i> In Gujarat	5555	5555	0
In Madhya Pradesh	32174	32174	0 <sup>a</sup>
Total (iii)	37729 <sup>a</sup>	37729	0
Total (i+ii+iii)	46720	46456	264

a. This number may change after inclusion of PAFs to be declared by GRA/State Governments, including impact of backwater level.

\$. 333 major sons are yet to be allotted additional 1 ha. agricultural land.

- Number of PAFs eligible for land -4566
- Number of PAFs opted for SRP -4363
- Number of PAFs allotted Government land -203
- Number of PAFs purchased land through SRP - 2906
- Number of Fake registration - 686 (Justice Jha Commission is inquiring the matter)
- Number of PAFs who obtained 1<sup>st</sup> installments but yet not purchased land -1457
- Number of PAFs without land (Fake +1<sup>st</sup> installment) -2143
- In Gujarat, 4 PAFs from Home State are balance for resettlement.



## (B) Indira Sagar Project (ISP)

In pursuance to the direction of Hon'ble High Court and decisions of R&R Sub-group of NCA from time to time, the NCA is coordinating with GRA-ISP, NVDA and NHDC, and NCA's. R&R officials are also undertaking field visits. **Table-27** given below indicates the progress of R&R upto 30<sup>th</sup> November 2011.

**Table-27**

### Progress of Indira Sagar Project of R&R upto 30<sup>th</sup> November 2011

SI No	Description	Total Project Affected Families (PAFs)	Total PAFs resettled	Balance PAFs to be resettled
1.	Upto FRL	40026	40024	02
2.	In Harsud Left out ward 9,12,13	693	691	02
3.	Islands affected	111	111	0
4.	Additional PAFs identified in re-survey			
	-PAFs between FRL & BWL	2785	867	1918
	-PAFs due to mistake in survey upto FRL	263	263	0
	-PAFs due to mistake in survey upto BWL	476	9	467
	<b>Grant Total (1+4)</b>	<b>44354</b>	<b>41965</b>	<b>2389</b>

### Energy Management Centre (EMC)

Energy Management Centre (EMC) is planning, scheduling & coordinating activities of Power Generation of Sardar Sarovar Power Complex (River Bed Power House 6X200 MW & Canal Head Power House 5X50 MW) in consultation with

Western Regional Power Committee (WRPC), Western Regional Load Dispatch Centre (WRLDC), Central Electricity Authority (CEA) and beneficiary States & concerned State Generation/ Distribution/ Transmission departments. The generation planning, daily scheduling, monitoring of generation, transmission planning, schedule for maintenance and energy accounting etc. were carried out. The total energy generation of SSP complex was 3726.214 MUs during the year 2011 -12 (April 2011 to Dec. 2011) which was shared among the party States i.e. Madhya Pradesh, Maharashtra and Gujarat in the ratio prescribed by provisions of NWDT Award. The planned generation for the remaining period of year 2011 – 12 is 514 MUs. Apart from energy generation, RBPH units are also being operated in synchronous condenser mode as per requirement, for voltage regulation and to provide stability to the grid. During this year (up to Dec.2011), the SSP machines were operated for 812.02 hrs. in synchronous condenser mode.

Further, in compliance to the directions issued by Western Regional Power Committee (WRPC), quarterly mock drill for crisis management/disaster management is being carried out at SSP and the quarterly reports are being sent regularly to all concerned organizations viz. WRPC/CEA. A black start mock exercise, in coordination with WRPC, WRLDC & SLDC Gujarat is also proposed in Feb.-Mar. 2012 at Sardar Sarovar Project.

Further, in compliance to the requirement under Indian Electricity Grid Code (IEGC) and subsequent decisions taken in various fora regarding SSP real time data transmission and its monitoring, SSP real time data of RBPH is being transmitted to Western Regional Load Dispatch Centre (WRLDC), through RTUs hired on rental basis from Gujarat Energy Transmission Company Limited (GETCo.) since November 2009.



**(i) Performance of River Bed Power House (RBPH) ( 6 X 200 MW)**

The total energy generation achieved from RBPH from April, 2011 to Dec. 2011 was 3345.95 MUs.

**(ii) Performance of Canal Head Power House (CHPH) ( 5 X 50 MW)**

The total energy generation achieved from CHPH from April, 2011 to Dec. 2011 was 380.262 MUs.

**Hydrometeorological Network**

The proposal for strengthening of the network has been drawn, keeping in focus for the inflow forecasting of Indira Sagar and Sardar Sarovar wherein the density of stations in the existing network was inadequate. The tendering process for implementation of new RTDAS based on GSM technology is in pipeline.

**BETWA RIVER BOARD**

**Organisation and its Composition**

A decision to harness the available water resources of Betwa river was taken in a meeting held on 22<sup>nd</sup> July 1972 between Chief Ministers of Uttar Pradesh and Madhya Pradesh. Further, Uttar Pradesh and Madhya Pradesh in a meeting held on 9<sup>th</sup> December 1973 agreed for setting up of a tripartite Control Board for the speedy, smooth and efficient execution of the various inter-State projects of both the States. Betwa River Board (B.R.B) was constituted in 1976 by an Act of parliament to execute the Rajghat Dam Project and Power House. The project authority started construction of the project under the overall guidance of Betwa River Board after promulgation of Betwa River Board Act 1976. The benefits and cost of the above projects are being shared equally by both the State Governments.

The Union Minister of Water Resources is the Chairman of the Board. Union Minister of

Power, Chief Ministers and Ministers-in-charge of Finance, Irrigation and Power of the two States are its Members. An Executive Committee of the Board headed by Chairman, Central Water Commission manages the activities of the Board.

**Rajghat Dam Project**

The Rajghat Dam with appurtenant structures has been constructed across river Betwa to provide irrigation facilities to 1.38 lakh ha. in Uttar Pradesh and 1.21 lakh ha. in Madhya Pradesh with power generation of 45 MW through Rajghat Hydro-electric project at the toe of Dam on left flank. The costs as well as benefits of the project are to be shared equally by both the States. Construction work of Dam and Power House is almost complete.

**Land Acquisition**

The Dam submerges 38 villages in U.P. and 31 villages in M.P. States. Compensation in M.P. area has been completed. In U.P., the District Administration, Lalitpur had paid the land compensation of 25 villages and for balance 13 villages, the land properties are being acquired through mutual negotiation by the Betwa River Board. Approximate 98% work have been completed and this year, the Dam filled upto FRL i.e. 371.00 M.

**Planning and Present Status of Rajghat Power House Works**

The estimate of Rajghat Hydro-electric project at 1997 price level was ₹ 131.26 crore, which included ₹ 58.41 crore for the civil works. The revised cost of the civil works of Power House at December, 1999 price level was ₹ 66.89 crore. MPPGCL have contributed ₹ 59.51 crore. The total expenditure incurred on civil works of Rajghat Power House was ₹ 63.15 crore till June, 2008.

The three units of Power House have been tested and commissioned during 1999-2000.

Since commissioning, the power generation are 280, 572, 1047, 676, 1431, 931, 1328, 1335, 518, 1320, 1175, 412 & 932 lakh unit during the year 1999-2000, 2000-2001, 2001-2002, 2002-2003, 2003-2004, 2004-2005, 2005-2006, 2006-2007, 2007-08, 2008-09, 2009-10, 2010-11 and 2011-12 (up to 31-12-2011).

### O & M Estimate of Rajghat Dam Project during Transition Period

Towards O&M, the State of U.P. have paid only ₹ 36.41 crore and M.P. has paid only ₹ 29.41 crore against their due share of ₹ 51.675 crore each upto 12/2011.

### Utilization of Present Storage

The phase-1 of the construction of Dam upto Spillway crest level was completed in 1992. Since then reservoir storage is being utilized in downstream in Betwa Canal System (U.P) and Bhandar Canal System (UP & MP). The impounding of water above crest level has been started since 1999-2000.

FRL of the reservoir is 371.00 m. Reservoir has been filling up gradually during the last 11 years, details of which are given in **Table-28**.

**Table-28**

SI.No.	Year	Filling level
1.	2001-2002	368.35 m.
2.	2002-2003	367.00 m
3.	2003-2004	370.00 m.
4.	2004-2005	370.00 m.
5.	2005-2006	369.85 m.
6.	2006-2007	370.20 m.
7.	2007-2008	366.75 m.
8.	2008-2009	370.15 m
9.	2009-2010	370.35m
10.	2010-2011	369.05 m.
11.	2011-2012	371.00 m.

### Financial position of B.R.B.

The financial position of Rajghat Dam Project is given in **Table-29**.

**Table-29**

### Rajghat Dam

(₹ crore)

S.No.	Item	U.P.	M.P.	Total
1.	Apportioned cost as per revised cost estimate	150.30	150.30	300.60
2.	Contribution received	150.30	150.30	300.60
3.	Balance to be contributed	Nil	Nil	Nil
4.	Revenue/other receipts	-	-	27.60
5.	Contribution due against O&M head upto December, 2011	51.675	51.675	103.35
6.	Contribution received against O&M head upto December, 2011	36.41	29.41	65.82
7.	Balance to be contributed against O&M head upto December, 2011.	15.265	22.265	37.53
8.	Gross expenditure upto 12/2011	-	-	386.55
9.	Balance available with BRB in 12/2011	-	-	7.47

## TUNGABHADRA BOARD

### Introduction

The Tungabhadra Board was constituted by the President of India in exercise of the powers vested under Sub-section (4), Section 66 of Andhra State Act 1953 for completion of the Tungabhadra project and for its operation and maintenance. The Board is regulating water for irrigation, Hydro-power generation and other uses from the reservoir.

### Organization

The Board consists of a Chairman, appointed by the Government of India, and three Members, one each representing the States of Andhra Pradesh, Karnataka and Government of India. In the discharge of its assigned functions, the Board exercises powers of a State Government. It makes rules for the conduct of its own business. The Government of Andhra Pradesh and the Government of Karnataka provide funds in agreed proportions and also depute staff to man the various specified posts, as per an agreed proportion. The working table for canal wise distribution of water to the States is prepared every year by the Tungabhadra Board in consultation with the State Governments and is reviewed from time to time during the water year. The regulation of water is carried out in accordance with the agreed working table.

### Status of Activities

#### Irrigation

The Tungabhadra reservoir filled up to the full reservoir level 497.738 (1633.00 feet) in this year. The inflow into the reservoir from June 2011 to December 2011 was 8228.154 Million Cubic Meters (Mcum) (290.575 Thousand Million Cubic feet (TMCft.).

The utilization of water by the States of Karnataka and Andhra Pradesh till the end of December 2011 was 1901.303 Mcum (67.144 TMCft) and 1138.222 Mcum (40.196 TMCft) respectively as against the likely abstraction of 4190.886 Mcum (148.000 TMCft) for the water year 2011-2012. Evaporation losses from June 2011 to December 2011 were 175.451 Mcum (6.196 TMCft) to be shared by Karnataka and Andhra Pradesh in the ratio of 12.5:5.5. A total quantity of 3523.863 Mcum (126.210 TMCft) of water has out flowed over spillway including extra power generation.

#### Hydro Power

Two Power Houses are maintained by the Tungabhadra Board, with a total installed capacity of 72 MW and a target of 178 million units of power generation is envisaged during the water year 2011-2012. Against this, the power generated till end of December 2011 was 145.58 million. The power generated is shared between the States of Karnataka and Andhra Pradesh in the ratio of 20:80.

#### Mini Hydel Power Plant

A Mini Hydel Plant at the head of Right Bank High Level Canal of the Tungabhadra Project under Build, Operate, Own and Transfer (BOOT) system through an independent power producer viz., MIs NCL Energy Ltd., Hyderabad has been commissioned on 27-10-2004. The mini Hydel plant comprised 3 units of 2.75 MW each and generated 23.810 million units upto December 2011. The power generated is purchased by the Transmission Corporations of Karnataka and Andhra Pradesh in the agreed ratio of 20:80.

#### Fisheries

The Tungabhadra reservoir has a water spread area of 378 sq.km at full reservoir level affording tremendous scope for

development of fisheries. Quality fish seeds are reared in the Board's Fish Farm to meet the demand of the public and for stocking in the reservoir to increase the biomass. The fishing rights of the reservoir were auctioned for the year 2011-12 to a local Fishermen's Cooperative Society for ₹ 123.08 lakh. In order to facilitate preservation of fish catch, the Board is running an ice-cum-cold storage plant.

### **Board Meeting**

During the year, the Tungabhadra held no meetings till the end of December, 2011.

## Chapter 10

### Public Sector Enterprises

#### Water and Power Consultancy Services (WAPCOS) Limited

##### Introduction

WAPCOS Limited is a “MINI RATNA-I” Public Sector Enterprise under the aegis of the Union Ministry of Water Resources. Incorporated on June 26<sup>th</sup>, 1969 under the Companies Act, 1956, WAPCOS has

been providing consultancy services in all facets of Water Resources, Power and Infrastructure Sectors in India and Abroad. WAPCOS comply with the Quality Assurance requirements of ISO 9001:2008 for Consultancy Services in Water Resources, Power and Infrastructure Development Projects.



Presentation of Mini Ratna Category-I Certificate by Hon'ble Minister of Water Resources, Shri Pawan Kumar Bansal to CMD, WAPCOS



## Financial Status

Authorized and paid up capital of the Company is ₹ 3.00 crore. During the year 2010-11, the Company achieved turnover of ₹ 35117.76 lakh as against the previous year of ₹ 30124.07 lakh. The net profit of the company was ₹ 3618.42 lakh in 2010-11 as compared to ₹ 3003.09 lakh in the previous year. A dividend of ₹ 760 lakh was paid for the year 2010-11.

## Fields of Specialisation

Main fields of specialization of the Company cover Irrigation and Drainage, Flood Control and Land Reclamation, River Management, Dams, Reservoir Engineering and Barrages, Integrated Agriculture Development, Watershed Management, Hydropower and Thermal Power Generation, Power

Transmission and Distribution, Rural Electrification, Ground Water Exploration, Minor Irrigation, Water Supply and Sanitation (Rural and Urban), Environmental Engineering including Environmental Impact Assessment and Environmental Audit, Ports and Harbours and Inland Waterways, Rain Water Harvesting, Survey & Investigations, Human Resource Management, System Studies and Information Technology. WAPCOS has also been venturing into newer fields such as Software Development, City Development Plans, Financial Management System, Technical Education, Quality Control and Construction Supervision, Roads & Bridges. The Company has amended its Articles of Association to provide concept to commissioning services for developmental projects in India and Abroad.



Dr. Manmohan Singh, Hon'ble Prime Minister presenting the Top Performing CPSEs' "MoU Excellence Award" to Shri R.K. Gupta, CMD, WAPCOS, in the presence of Shri Praful Patel, Hon'ble Union Minister of Heavy Industries & Public Enterprises, Government of India on 31<sup>st</sup> January, 2012 at Vigyan Bhawan, New Delhi.

## Registration with International Organisations and Operations Abroad

WAPCOS is registered with various international funding agencies like World Bank/International Bank for Reconstruction and Development, African Development Bank, Asian Development Bank, Food and Agriculture Organization, International Fund for Agricultural Development, United Nations Development Program, World Health Organization, West African Development Bank, Indian Technical and Economic Cooperation (ITEC) Programme, Overseas Economic Cooperation Fund, Japan Bank for International Cooperation (JBIC), United Nations Office for Project Services (UNOPS) etc.

WAPCOS is currently engaged in providing consultancy services in Afghanistan, Bangladesh, Bhutan, Cambodia, DR Congo, Laos, Myanmar, Nepal, Nigeria, Rwanda, Togo and Zimbabwe.

## NATIONAL PROJECTS CONSTRUCTION CORPORATION LIMITED (NPCC)

National Projects Construction Corporation Limited, a Government of India Enterprise under the aegis of the Ministry of Water Resources, was established on 9<sup>th</sup> January, 1957, to carry out infrastructure work and other related activities for development of the nation. NPCC is an ISO 9001-2000 certified Public Sector Company.

## Financial Status

The authorized share capital of the Company is ₹ 700 crore and its paid up capital is ₹ 94.53 crore. The Company achieved a turnover of ₹ 1061.90 crore in 2010-11 as compared to previous year's turnover of ₹ 991.11 crore. The Company also registered net profit of ₹ 72.74 crore (including deferred tax of ₹ 40.65 crore) in 2010-11.

## Fields of Specialization

Main fields of specialization of the Company cover Townships & other Residential Buildings, Institutional Buildings, Office Complexes, Roads, Bridges & Fly-overs, Hospitals and Health Sector Projects, Surface Transport Projects, Thermal Power Projects, Hydro-electric Power Projects, Dams, Barrages & Canals, Tunnels and Underground Projects, Real Estate Works etc.

# Chapter 11

## Training

### National Water Academy (NWA)

National Water Academy, Pune is a centre of excellence in CWC for imparting training on almost all facets of Water Resources Development and Management covering the areas of planning, design, evaluation, construction, operation and monitoring of water resources projects and also the application of high-end technology in water sector. In the beginning, it was set up to provide training to primarily in-service engineers and water professionals of various Central and State agencies. Subsequently, the programs at NWA were opened to all stakeholders of water sector including those from NGOs, Media, Private Sector Organisations, Academic Institutions, PSUs, Individuals and Foreign Nationals.

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.

In the year 2011-12, NWA took the following initiatives:

- a) Workshop on EHP – at Indian Meteorological Department, Pune
- b) Leadership Skills, Managerial Effectiveness and Influencing Changes (off- campus program at Gujarat)
- c) Orientation Program for WAPCOS Officers (off-campus) at Gurgaon

d) Consultation Meeting with Panchayati Raj Institutions (Representatives from Madhya Pradesh, Gujarat, Goa and Maharashtra States attended the meeting)

e) Training Program on Construction and Contract Management

f) International Training Programme on “Preparation of Detailed project Report” for African Nationals, under ITEC, from 28<sup>th</sup> November to 9<sup>th</sup> Dcember, 2011. 16 numbers of trainees from 12 African countries participated in the programme.

g) Seminar on “Understanding Environmental Flows”

Since its inception in the year 1988, NWA has conducted a total of 383 training programmes (up to December 2011) and trained 8839 officers. During the year 2011-12, it conducted 31 training programs (up to March 2012) consisting of total 36.4 weeks of training and trained 711 trainees.

### Rajiv Gandhi National Ground Water Training and Research Institute (RGNTRI)

Rajiv Gandhi National Ground Water Training & Research Institute (RGI) under Central Ground Water Board has been established at Raipur, Chhattisgarh to conduct training courses for CGWB and other Central / State Government Organizations, Universities, Institutes etc. RGI imparts training at the induction,

mid-career and senior management levels in all relevant aspects of hydrogeological investigations, exploration, assessment, development and management of ground water. During the year 2011-12 (upto 31.12.2011), 23 training programmes were conducted by RGI and 409 trainees were trained.

### **Human Resources Development**

As part of developing the human resources, 38 officials of the Ministry were sent on training in various institutes like Institute of Secretariat Training and Management, Engineering Staff College of India etc., to enhance their capabilities and skills.

## Chapter 12

### Transparency

#### The Right to Information Act, 2005

The Right to Information Act, 2005 came into effect from 12.10.2005. As provided under Section 4(1) (b) of the Act, all the 17 manuals in respect of Ministry (proper) and its organizations were prepared and have been placed in the Ministry's website <http://www.mowr.gov.in>. Appointment of Central Public Information Officers (CPIOs) in respect of Ministry and its organizations have been made in terms of Section 5 (1) and (2) of the said Act and hosted in the website of the Ministry and concerned organizations.

The Coordination Section of Ministry of Water Resources, Room No. 19, B-wing, Ground Floor, Shram Shakti Bhawan, Rafi Marg, New Delhi has

been assigned the task of accepting applications and the fees under the RTI Act. The RTI petitions are forwarded to the concerned CPIOs and the fees are deposited with the DDO, MoWR. The requisite fees for providing information under RTI Act, 2005 can be paid either through Demand Draft/ Postal Order issued in favour of Pay & Account Officer, Ministry of Water Resources, or by cash.

During the year 2011, 343 applications were received under RTI Act-2005. All the applications were dealt within time and the requisite information was provided to the applicants.

The particulars of Appellate Authorities and Central Public Information Officers in respect of Ministry of Water Resources are given at **Annexure-VI**.

## Chapter 13

# Role of Women in Water Resources Management

Role of women in water resources management and conservation has been duly recognized. The National Water Policy 2002 while stressing on participatory approach in water resources management, specifically provides for necessary legal and institutional changes to be made at various levels for the purpose of ensuring appropriate role for women.

In pursuance of the provisions in the National Water Policy 1987 (and also 2002), farmers are to be involved progressively in various aspects of management of irrigation systems, particularly in water distribution and collection of water charges. The Ministry of Water Resources, while issuing guidelines in April, 1987 specifically emphasized that the States consider representation of women in the Water Users' Associations (WUAs) at all levels. As a result, many States have amended their Irrigation Acts or

came out with Specific Acts on Participatory Irrigation Management.

Considering the importance of women in terms of their numerical strength and the significant contribution they make to the agricultural labour force, there is a need to encourage participation of women in management of water resources. Water Users' Associations can contribute significantly in this regard and bring in a new culture among the water users.

Madhya Pradesh has attempted to ensure that all farm owners, be it men or women, are made rightful Members of the outlet committees. Efforts have also been made to ensure that where there are no women Members, at least one woman from the area must be taken even if she is not a land owner. Further, at least one woman shall be nominated to the Governing Body of the Association.



## Chapter 14

### Progressive use of Hindi

Effective measures have been taken for the progressive use of Hindi for official purposes during the year. Efforts were also made to ensure compliance of various orders/instructions issued by the Department of Official Language.

During the period under review, the second sub-committee of the Parliamentary Committee on Official Language inspected 5 offices of the Ministry of Water Resources viz.(i) WAPCOS, Ahmedabad (ii) WAPCOS, Kolkata (iii) WAPCOS, Gurgaon (iv) WAPCOS, Chennai and (v) Office of the Chief Engineer, Central Water Commission, New Delhi. During these inspections, the Parliamentary Committee on official Language suggested various measures for progressive use of Hindi.

Keeping in view the importance of inspection of the work done in Hindi in the various sections and offices of the Ministry, 8 sections and 6 offices of the Ministry were inspected. During these inspections, concerned officers and staff were encouraged to do their official work progressively in Hindi.

The meetings of the Official Language Implementation Committee of the Ministry under the Chairmanship of

Economic Advisor and in-charge Official Language, Ministry of Water Resources have been organising regularly. In these meetings, the Committee reviews the progress made in the use of Hindi in the Ministry as well as in its various offices.

It is the policy of the Government of India to promote use of Hindi through inspiration and incentives. In order to motivate and encourage staff to do their work in Hindi, various incentive schemes have been implemented.

Under Hindi Teaching Scheme of the Department of Official Language, officers and employees were nominated for training in Hindi Language and Hindi typing.

In order to encourage the use of Hindi in the official work of the Ministry, appeals were issued by the Hon'ble Union Minister of Water Resources and Secretary, Ministry of Water Resources on 14.09.2011. Hindi Fortnight was also organized in the Ministry during September, 2011. The activities and competitions like Rajbhasha Quiz, Hindi Noting & Drafting, Hindi Essay, Hindi Typing, Sulekh, Hindi Debate and Hindi Poetry Recitation were organized. Officers and employees of the Ministry enthusiastically participated in these competitions. First, Second and Third prizes of ₹ 5000/-, ₹ 3000/ and ₹ 2000/-

respectively were given for each of these competitions. Two consolation prizes of ₹ 1000/- each were also given for each of these competitions. The prizes were given by Secretary (WR) to 40 meritorious participants.

The last meeting of Hindi Advisory

Committee under the Chairmanship of Hon'ble Union Minister for water Resources was held on 26<sup>th</sup> September 2011. As the tenure of the Hindi Advisory Committee was completed on 30.9.2011, the reconstitution of the Committee is under process

## Chapter 15

### Staff Welfare

#### Administration Wing

The Administration section of the Ministry is primarily responsible for the establishment, personnel and administrative matters of the officers and staff of the Ministry (Proper) besides being the cadre controlling authority of posts borne on CSS/CSSS/CSCS sanctioned in the Ministry (Proper) and those in Central Water Commission and Central Soil & Materials Research Station. Other aspects of the administration like filling up of posts by direct recruitment/deputation / promotion, termination of probation, confirmation, grant of financial upgradation under Assured Career Progression Scheme, release of annual increments, pay fixation, maintenance of Confidential Reports, sanction of TA/LTC advance, House Building Advance, Motor Car/Scooter/Cycle advances, GPF advances /withdrawals, framing/amendment of recruitment rules, finalization of pension/family pension case, leave of all kinds, forwarding of applications etc., are also dealt with.

#### Monitoring of Reservation for SC/ST/OBC

The Scheduled Caste / Scheduled Tribe and Other Backward Classes (SC/ST/OBC) Cell also form part of the Administration Section. It renders secretariat assistance

to Liaison Officers for SC/ST and for OBC in discharging their functions on various matters relating to reservation for SC/ST/OBC in Government services and carrying out inspections of reservation rosters.

During the year 2011-2012 (upto 31.12.2010), the Liaison Officer carried out inspection in respect of six attached/sub-ordinate organisations viz., CSMRS (New Delhi), CWPRS (Pune), Farakka Barrage Projects (Kolkata), Brahmaputra Board (Guwahati), WAPCOS (Gurgaon) and CWC office at Shillong and the shortfall/ deficiencies were intimated to them for reflection in their reservation rosters. The cell is also regulating and monitoring the status of filling up the backlog vacancies for SCs /STs / OBCs in its attached/ subordinate offices and taking corrective measures wherever found necessary.

#### Complaints Committee on Sexual Harassment of Women Employees

In compliance with the guidelines laid down by the Hon'ble Supreme Court of India on prevention of sexual harassment of women employees, a Committee is functioning to look into the complaints of the women working in the Main Secretariat of the Ministry. The composition of the Committee is given below:-

(i) Smt. Mamta Saxena, DDG (Stat.) -

(ii) Shri D.K. Paliwal, Under Secretary (PSU) -

(iii) Smt. Neelam Sharma, Section Officer (E-I) - Member

The Complaint Committee shall be deemed to be the Inquiring Authority appointed by the disciplinary authority for the purpose of CCS (CCA) Rules, 1965 and its reports are to be treated as enquiry report. It will examine the complaints made against sexual harassment by women employee(s) and, if necessary, conduct an enquiry. On completion of the same, the Committee will submit its findings to the Joint Secretary (Admn.), MoWR for further necessary action.

During the year ending 31<sup>st</sup> December 2011, the Committee received no complaints from the women employees working in the Ministry (Proper). Similar Committees have also been constituted in the organizations under this Ministry.

### **Redressal of Staff Grievances**

A Grievances Redress Cell was set up in the Ministry of Water Resources, which

entertains the grievances of employees/officers working in various organizations under the Ministry. Shri K. V. Langel, Deputy Secretary (Coordination), has been designated as Director (Public & Staff Grievances) and all grievances are to be disposed off within a period of 60 days. Most of the grievances received are related to service matters, payment of pensionary benefits etc. Further, Centralized Public Grievances Redress and Monitoring System (CPGRAMS) software developed by Deptt. of AR & PG, is regularly monitored in the Ministry.

During the period from 1<sup>st</sup> January, 2011 to 31<sup>st</sup> December, 2011, this Ministry received 21 grievance petitions directly from the petitioners and 273 grievance petitions received through CPGRAMS/CPENGRAMS. Out of these 294 petitions, 161 petitions (8 directly received petitions and 153 petitions through CPGRAMS/CPENGRAM) have been settled and disposed off.

[A list of postal addresses of public/ staff grievance officers in the Ministry of Water Resources and its organisations is at \*\*Annexure-VII\*\*.](#)

## Chapter 16

### Vigilance

The vigilance matters relating to this Ministry and its organizations are handled by the Vigilance Division of this Ministry. The Division functions under the guidance, supervision and control of a part-time Chief Vigilance Officer of the level of Joint Secretary assisted by a Director and the Vigilance Section. Various aspects pertaining to vigilance cases of all the employees of the Ministry (Proper) and all Group A and B officers of the attached/subordinate offices as well as Group-A officers of other organizations under the Ministry, including PSUs are dealt with by the Division.

The Vigilance Division functions as a link between the Ministry and the Central Vigilance Commission and other Authorities in the matters pertaining to vigilance. This Division tenders advice, wherever required, on vigilance matters, to the Attached and Subordinate Offices, PSUs, Statutory Bodies, Registered Societies etc. under the administrative control of the Ministry, in consultation with CVC and other agencies/departments.

This Division monitors the disciplinary cases and related matters of the organizations under the Ministry through periodical returns prescribed by CVC, DoPT, etc. and also update the status of disciplinary cases in the Monitoring and Management Information System devised by DoPT. The Division prepares the "List of officers of Doubtful Integrity" and the "Agreed List" in consultation with CBI.

This year, Vigilance Awareness Week was observed by the Vigilance Division from 31.10.2011 to 05.11.2011. Preventive Vigilance Inspection under CVC instructions has been conducted in respect of the Water Quality Division, MoWR, CSMRS and National Institute of Hydrology, Roorkee during the year, 2011, with a view to check various irregularities and identify corruption prone areas. The performance of CVOs/VOs of various organizations under the Ministry was reviewed for assessing the effectiveness and progress of their vigilance activities.

The Vigilance Division is also responsible for calling of the Annual Property Returns of all Group A and B officers and monitoring them. Annual Property Returns for the year ending 2011 have been called for and after the returns are received, the same will be computerized. The immoveable property returns in respect of Group 'A' Central Services (including General Central Services) belonging to various organisations, whose Cadre Controlling Authority is the Ministry of Water Resources, has been placed on the web-sites of the respective organisations and information sent to DoP&T. Software has been prepared by the NIC Cell of MoWR relating to online data of Complaints/ Vigilance Cases/ Revision/ Review Petitions being handled by the Vigilance Division.

## Chapter 17

### Appointment of Disabled Persons

#### **Monitoring of Reservation for Physically Handicapped**

Monitoring of the recruitment of physically handicapped is being done to ensure fulfillment of 3% quota for the category by the Ministry as well as various organisations under it. Periodic reports on the progress made are being sent regularly to the Ministry of Social Justice & Empowerment. Accordingly, 3% of posts/vacancies (1% each for Orthopaedic, Blind & Hearing Handicapped) are reserved to be filled up from physically handicapped persons. The physically handicapped persons are given facilities, concessions and relaxations at the time of test/interview as per the rules on the subject matter. The posts identified to be filled up by the disabled persons in Groups A,B, C & D categories as per the revised list of posts notified by the Ministry of Social Justice and Empowerment, are filled up as per the requirement of the different offices under this Ministry. The relevant reservation rosters as prescribed by the Government are also maintained for planning the reservation of disabled persons.



# ANNEXURES

## Staff Strength of Ministry of Water Resource and its Organisations

Sl. No.	Name of Office	Group A					Group B									
		Total	SC	ST	PH	OBC	(Gazetted)					(Non Gazetted)				
8	9						10	11	12	13	14	15	16	17		
1	Ministry of Water Resources	78	7	6	-	5	53	12	2	1	4	111	16	5	1	4
2	Controller of Accounts, Ministry of Water Resources	2	1	-	-	-	81	7	-	-	1	-	-	-	-	-
3	Central Water Commission	491	66	34	4	44	411	77	13	3	2	941	122	25	7	25
4	Central Soil & Materials Research Station	61	10	3	1	7	55	5	2	2	6	-	-	-	-	-
5	Central Water & Power Research Station	138	21	6	2	13	66	13	4	2	8	179	25	6	6	14
6	Central Ground Water Board	382	50	16	-	26	297	42	18	-	20	168	27	9	2	14
7	Farakka Barrage Project	18	2	1	-	1	35	5	2	1	1	31	6	1	-	2
8	Ganga Flood Control Commission	19	-	-	-	-	12	1	-	-	-	2	-	1	-	-
9	Bansagar Control Board	2	-	-	-	-	-	-	-	-	-	1	-	-	-	-
10	Sardar Sarovar Construction Advisory Committee	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Brahmaputra Board	80	3	1	-	-	-	-	-	-	-	-	-	-	-	-
12	Betwa River Board	11	-	-	-	-	19	-	-	-	-	17	-	-	-	-
13	Narmada Control Authority	30	3	1	-	-	37	6	-	-	6	-	-	-	-	-
14	National Water Development Agency	61	4	-	-	-	15	3	-	-	-	59	9	1	-	1
15	National Institute of Hydrology	71	9	2	1	7	-	-	-	-	-	48	5	-	-	1
16	Water & Power Constultancy Services (I) Ltd.	318	43	6	3	28	59	9	3	2	2	25	2	1	-	1
17	National Projects Construction Corporation Ltd.	330	18	1	-	2	-	-	-	-	-	216	15	-	-	-
	<b>Total</b>	2096					1140					1798				

\*In group C post, two physically handicapped employees is also SC, OBC

\*\*In group D post, one physically handicapped employee is Visually Handicapped

## Staff Strength of Ministry of Water Resource and its Organisations

Sl. No.	Name of Office	Group C					Group D					Grand Total				
		Total	SC	ST	PH	OBC	Total	SC	ST	PH	OBC	Total	SC	ST	PH	OBC
1	2	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
1	Ministry of Water Resources	165	63	10	5	14			-	-	-	414	104	18	8	41
2	Controller of Accounts, Ministry of Water Resources	97	27	8	-	15	20	11	2	-	4	200	47	10	-	19
3	Central Water Commission	1387	262	101	16	40	-	-	-	-	-	3230	527	173	30	111
4	Central Soil & Materials Research Station	139	46	7	3	6	1					256	61	12	6	19
5	Central Water & Power Research Station	561	108	45	22	24										
6	Central Ground Water Board	1718	340	127	8	108	1123	278	63	5	97	3688	737	234	15	265
7	Farakka Barrage Project	551	44	15	1	19	237	27	1	0	2	878	84	20	2	25
8	Ganga Flood Control Commission	41	9				15	5	1	2	1	89	15	2	2	1
9	Bansagar Control Board	9	-	-	-	-	7	-	-	-	-	19	-	-	-	-
10	Sardar Sarovar Construction Advisory Committee	5	1	-	-	-	2	1	-	-	1	11	3			
11	Brahmaputra Board	381	51	30	4	40	161	25	11	5	6	622	79	41	9	53
12	Betwa River Board	75	7	-	-	-	1	1	-	-	-	123	8	-	-	-
13	Narmada Control Authority	90	18	7	3	10						157	27	8	3	16
14	National Water Development Agency	336	51	18	6	22	117	39	11	2	1	588	106	30	8	24
15	National Institute of Hydrology	74	16	-	1	4	41	17	-	-	5	234	47	2	2	17
16	Water & Power Constultancy Services (I) Ltd.	64	14	2	1	8	41	18	4	1		507	86	16	7	39
17	National Projects Construction Corporation Ltd.	197	27	3	5	2	88	10	2	-	-	830	70	6	5	4
	<b>Total</b>	5890					1854					11846	2001	572	97	634

\*In group C post, two physically handicapped employees is

\*\*In group D post, one physically handicapped employee is

## Staff Strength of Ministry of Water Resource and its Organisations

Sl. No.	Name of Office	Group A					Group B									
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3	Central Water Commission	491	66	34	4	44	411	77	13	3	2	941	122	25	7	25
4	Central Soil & Materials Research Station	61	10	3	1	7	55	5	2	2	6	-	-	-	-	-
5	Central Water & Power Research Station	138	21	6	2	13	66	13	4	2	8	179	25	6	6	14
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8	Ganga Flood Control Commission	19	-	-	-	-	12	1	-	-	-	2	-	1	-	-
9	Bansagar Control Board	2	-	-	-	-	-	-	-	-	-	1	-	-	-	-
10	Sardar Sarovar Construction Advisory Committee	4	1	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Brahmaputra Board	80	3	1	-	-	-	-	-	-	-	-	-	-	-	-
12	Betwa River Board	11	-	-	-	-	19	-	-	-	-	17	-	-	-	-
13	Narmada Control Authority	30	3	1	-	-	37	6	-	-	6	-	-	-	-	-
14	National Water Development Agency	61	4	-	-	-	15	3	-	-	-	59	9	1	-	1
15	National Institute of Hydrology	71	9	2	1	7	-	-	-	-	-	48	5	-	-	1
16	Water & Power Constultancy Services (I) Ltd.	318	43	6	3	28	59	9	3	2	2	25	2	1	-	1
17	National Projects Construction Corporation Ltd.	330	18	1	-	2	-	-	-	-	-	216	15	-	-	-
	<b>Total</b>	2096					1140					1798				

\*In group C post, two physically handicapped employees is also SC, OBC

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## Staff Strength of Ministry of Water Resource and its Organisations

Sl. No.	Name of Office	Group C					Group D					Grand Total				
		Total	SC	ST	PH	OBC	Total	SC	ST	PH	OBC	Total	SC	ST	PH	OBC
1	2	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
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2	Controller of Accounts, Ministry of Water Resources	97	27	8	-	15	20	11	2	-	4	200	47	10	-	19
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4	Central Soil & Materials Research Station	139	46	7	3	6	1					256	61	12	6	19
5	Central Water & Power Research Station	561	108	45	22	24										
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8	Ganga Flood Control Commission	41	9				15	5	1	2	1	89	15	2	2	1
9	Bansagar Control Board	9	-	-	-	-	7	-	-	-	-	19	-	-	-	-
10	Sardar Sarovar Construction Advisory Committee	5	1	-	-	-	2	1	-	-	1	11	3			
11	Brahmaputra Board	381	51	30	4	40	161	25	11	5	6	622	79	41	9	53
12	Betwa River Board	75	7	-	-	-	1	1	-	-	-	123	8	-	-	-
13	Narmada Control Authority	90	18	7	3	10						157	27	8	3	16
14	National Water Development Agency	336	51	18	6	22	117	39	11	2	1	588	106	30	8	24
15	National Institute of Hydrology	74	16	-	1	4	41	17	-	-	5	234	47	2	2	17
16	Water & Power Constultancy Services (I) Ltd.	64	14	2	1	8	41	18	4	1		507	86	16	7	39
17	National Projects Construction Corporation Ltd.	197	27	3	5	2	88	10	2	-	-	830	70	6	5	4
	<b>Total</b>	5890					1854					11846	2001	572	97	634

\*In group C post, two physically handicapped employees is

\*\*In group D post, one physically handicapped employee is

**Annexure – III**

**List of Addresses of Heads of Organisations under the Ministry of Water Resources**

<b>S. No.</b>	<b>Name of the Organisation</b>	<b>Head of the Organisation</b>
	Government of India Ministry of Water Resources, Room No. 412, IV Floor, Shram Shakti Bhavan, Rafi Marg, New Delhi-110 001.	Shri Dhruv Vijai Singh, Secretary Tel No. 23710305, 23715919 Fax. 23731553
<b>Attached Offices</b>		
1.	Central Water Commission, Room No. 326, Sewa Bhawan, R.K. Puram, New Delhi	Shri R.C.Jha, Chairman Tel. No.26108855 Fax: 26108614
2.	Central Soil and Materials Research Station, Room No. 309, Hauz Khas, New Delhi-110016	Shri. Murari Ratnam, Director Tel. No. 26961894, 26967980 Fax: 26853108
<b>Subordinate Offices</b>		
3.	Farakka Barrage Project, P.O. Farakka Barrage, Distt. Murshidabad-742212 (W.B.)	Shri A.K. Sinha, General Manager Tel. No. 03485-253644
4.	Ganga Flood Control Commission, Sinchai Bhawan, III floor, Patna-800015	Shri Shankar Mahto, Chairman Tel. No. 0612-2217294
5.	Central Water and Power Research Station, P.O. Khadakwasla, Pune-411024	Dr. I.D. Gupta, Director Tel. No. 020-24380511/ 24380652 Fax: 020-24381004
6.	Central Ground Water Board, Jamnagar House, New Delhi	Dr. S. C. Dhiman, Chairman Tel. No. 0129-24190750, 129 – 2425870 Fax: 23382051 & 95129-2412524
7.	Bansagar Control Board, Samab Colony, Rewa (Madhya Pradesh)	Shri S. K. Haldar, Secretary Tel. No. 07662-226318
8.	Sardar Sarovar Construction Advisory Committee, Narmada Bhawan,	Shri N.K Bhandari, Secretary Tel. No. 0265-2421272 Fax 0265-2437262



	A Block, IV Floor, Vadodara-390001	
9.	Upper Yamuna River Board 202, "S", Sewa Bhawan, R.K. Puram, New Delhi	Shri Chetan Pandit, Chairman Tel. No. 26108590 Fax: 26195289
<b>Public Sector Undertakings</b>		
10.	Water and Power Consultancy Services (India) Limited, 5 <sup>th</sup> Floor, 'Kailash', 26, Kasturba Gandhi Marg, New Delhi-110001	Shri R.K.Gupta, Chairman & Managing Director Tel. No. 23313881/23313502 Fax: 23313134
11.	National Projects Construction Corporation Limited, Plot No. 67-68, Sector-25, Faridabad (Haryana)	Shri A.K. Jhamb, Chairman & Managing Director, Tel. No. 95129-2231269
<b>Autonomous Bodies</b>		
12.	National Institute of Hydrology, Jal Vigyan Bhawan, Roorkee-247667 (Uttaranchal)	Dr. R.D.Singh, Director Tel. No. 01332-272106 Fax: 01332-272123/ 273976
13.	National Water Development Agency, 18-20, Community Centre, Saket, New Delhi-110017	Shri A.B. Pandya, Director General Tel. No. 26519164 Fax: 26960841
<b>Statutory Bodies</b>		
14.	Narmada Control Authority, BG-113, Scheme No. 74-C, Vijay Nagar, Indore-452010	Shri M.K. Sinha, Executive Member Tel. No. 0731-257276
15.	Brahmaputra Board, Basistha, Guwahati	Shri Y Abdul Basheer, Chairman Tel. No. 0361-2301099/ 2302527 Fax: 0361-2301099/ 2307454/ 2308588
16.	Betwa River Board, Nandanpura, Jhansi-284003	Shri R.S. Ram, Chief Engineer & Secretary Tel. No. 0517-2480210
17.	Tungabhadra Board, Tungabhadra Dam, Taluk: Hospet, Distt: Bellary, Karnataka State, PIN: 583225	Shri V.N. Wakpanjar, Chairman Tel. No. 040-23308640 Fax: 040-23308642

## Annexure- IV

### BUDGET AT A GLANCE(SECTOR-WISE)

(₹ crore)

Sl No.	Sector/ Organisation /Scheme	Actuals 2010-11		BE 2011-12		RE 2011-12		BE 2012-13		Total B.E . 2012-13
		Plan	Non- Plan	Plan	Non- Plan	Plan	Non- Plan	Plan	Non- Plan	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
<b>I.</b>	<b>Secretariat- Economic Services</b>									
1.	Ministry of Water Resources	0.00	32.31	0.00	57.17	0.00	59.04	0.00	62.42	62.42
2.	Ravi-Beas Waters Tribunal	0.00	0.83	0.00	0.97	0.00	0.29	0.00	0.57	0.57
3.	Cauvery Water Disputes Tribunal	0.00	2.24	0.00	2.36	0.00	2.18	0.00	2.36	2.36
4.	Krishna Water Disputes Tribunal	0.00	1.67	0.00	1.78	0.00	1.65	0.00	1.75	1.75
5.	Vansadhara Water Dispute Tribunal	0.00	0.55	0.00	4.16	0.00	4.17	0.00	4.04	4.04
6.	Mahadayi Water Disputes Tribunal	0.00	0.08	0.00	3.54	0.00	2.92	0.00	4.14	4.14
	<b>Total : ecretariat- Economic Services</b>	<b>0.00</b>	<b>37.68</b>	<b>0.00</b>	<b>69.98</b>	<b>0.00</b>	<b>70.25</b>	<b>0.00</b>	<b>75.28</b>	<b>75.28</b>
<b>II.</b>	<b>Major &amp; Medium Irrigation</b>									
	<b>Central Water Commission</b>									
1.	Direction & Administration	0.00	22.70	0.00	23.82	0.00	24.97	0.00	25.03	25.03
2.	Data Collection	0.00	84.16	0.00	87.75	0.00	86.68	0.00	91.77	91.77
3.	Training	0.00	0.32	0.00	0.35	0.00	0.36	0.00	0.38	0.38
4.	Research	0.00	2.37	0.00	2.54	0.00	2.09	0.00	2.14	2.14
5.	Survey & Investigation	0.00	8.68	0.00	5.69	0.00	4.90	0.00	5.50	5.50
6.	Consultancy	0.00	24.31	0.00	23.83	0.00	25.88	0.00	25.92	25.92
7.	Contribution to international bodies Seminars and conferences on water resources on water.	} 0.00	0.01	0.00	0.01	0.00	0.02	0.00	0.02	0.02
8.										
9.	Exhibition and Trade Fair	0.00	0.12	0.00	0.09	0.00	0.09	0.00	0.14	0.14
10.	Modernization of equipment CWC Offset Press	0.00	0.36	0.00	0.29	0.00	0.28	0.00	0.28	0.28
11.	Cell for Monitoring externally aided projects	0.00	0.98	0.00	1.04	0.00	1.15	0.00	1.19	1.19
12.	Water Planning Wing	0.00	1.89	0.00	2.06	0.00	1.91	0.00	1.92	1.92
13.	Hydrological	0.00	1.90	0.00	2.02	0.00	1.88	0.00	2.29	2.29

Sl No.	Sector/ Organisation /Scheme	Actuals 2010-11		BE 2011-12		RE 2011-12		BE 2012-13		Total B.E. 2012-13
		Plan	Non-Plan	Plan	Non-Plan	Plan	Non-Plan	Plan	Non-Plan	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
14.	observations in Chenab basin National Water Academy	2.95	0.00	3.00	0.00	4.00	0.00	0.00	0.00	0.00
	<b>Total : CWC</b>	<b>2.95</b>	<b>147.80</b>	<b>3.00</b>	<b>149.50</b>	<b>4.00</b>	<b>150.21</b>	<b>0.00</b>	<b>156.58</b>	<b>156.58</b>
15.	Central Soil and Materials Research Station	0.00	7.74	0.00	8.31	0.00	8.31	0.00	8.49	8.49
16.	Central Water & Power Research Station	0.00	32.57	0.00	35.67	0.00	35.67	0.00	36.42	36.42
17.	National Institute of Hydrology	0.00	9.80	0.00	8.50	0.00	8.50	0.00	10.05	10.05
18.	Sardar Sarovar Construction Advisory Committee	0.00	0.74	0.00	0.81	0.00	0.83	0.00	0.80	0.80
19.	Bansagar Control Board	0.00	0.23	0.00	0.24	0.00	0.24	0.00	0.25	0.25
20.	Sutlej Yamuna Link Canal Project	0.00	0.00	0.00	2.06	0.00	2.06	0.00	18.04	18.04
21.	Upper Yamuna River Board	0.00	1.16	0.00	1.90	0.00	1.90	0.00	1.90	1.90
22.	Research and Development Programme	41.36	0.00	46.19	0.00	37.00	0.00	100.00	0.00	100.00
23.	Development of Water Resources Information System	39.36	0.00	58.94	0.00	58.89	0.00	84.99	0.00	84.99
24.	Hydrology Project	27.22	0.00	80.00	0.00	50.00	0.00	70.00	0.00	70.00
25.	Investigation of Water Resources Development Schemes	44.27	0.00	54.00	0.00	54.00	0.00	0.00	0.00	0.00
26.	Information, Education and Communication	13.30	0.00	25.00	0.00	18.00	0.00	0.00	0.00	0.00
27.	River Basin Organization/ Authority	0.00	0.00	4.00	0.00	0.00	0.00	0.00	0.00	0.00
28.	Dam Safety Studies and Planning	1.11	0.00	3.00	0.00	2.00	0.00	0.00	0.00	0.00
29.	Infrastructure Development	2.82	0.00	3.00	0.00	2.15	0.00	3.20	0.00	3.20
30.	Human Resource Development/ Capacity Building	0.00	0.00	0.00	0.00	0.00	0.00	85.00	0.00	85.00
31.	River Basin Management	0.00	0.00	0.00	0.00	0.00	0.00	110.00	0.00	110.00
32.	Implementation of National Water Mission	0.00	0.00	0.00	0.00	0.00	0.00	200.00	0.00	200.00

Sl No.	Sector/ Organisation /Scheme	Actuals 2010-11		BE 2011-12		RE 2011-12		BE 2012-13		Total B.E . 2012-13
		Plan	Non-Plan	Plan	Non-Plan	Plan	Non-Plan	Plan	Non-Plan	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
33.	Irrigation Management Programme	0.00	0.00	0.00	0.00	0.00	0.00	100.00	0.00	100.00
34.	Dam Rehabilitation and Improvement Programme	0.00	0.00	0.00	0.00	0.00	0.00	24.00	0.00	24.00
	<b>Total: Major &amp; Medium Irrigation</b>	<b>172.39</b>	<b>200.04</b>	<b>277.13</b>	<b>206.99</b>	<b>226.04</b>	<b>207.72</b>	<b>777.19</b>	<b>232.53</b>	<b>1009.72</b>
<b>III.</b>	<b>Minor Irrigation</b>									
1.	Central Ground Water Board	0.00	100.46	0.00	105.02	0.00	105.14	0.00	105.98	105.98
2.	Rajiv Gandhi NGWTRI	3.19	0.00	3.00	0.00	3.60	0.00	0.00	0.00	0.00
3.	Ground Water Management and Regulation	80.93	0.00	120.00	0.00	132.00	0.00	318.00	0.00	318.00
4.	Development of Water Resources Information System	0.07	0.00	0.06	0.00	0.11	0.00	0.01	0.00	0.01
5.	Infrastructure Development	6.86	0.00	11.40	0.00	7.85	0.00	41.80	0.00	41.80
6.	Human Resource Development/ Capacity Building	0.00	0.00	0.00	0.00	0.00	0.00	15.00	0.00	15.00
	<b>Total : Minor Irrigation</b>	<b>91.05</b>	<b>100.46</b>	<b>134.46</b>	<b>105.02</b>	<b>143.56</b>	<b>105.14</b>	<b>374.81</b>	<b>105.98</b>	<b>480.79</b>
<b>IV.</b>	<b>Flood Control Central Water Commission</b>									
1.	Flood Data Collection	0.00	66.51	0.00	72.39	0.00	71.39	0.00	72.04	72.04
2.	Payment to Govt. of Bhutan for maintenance of flood forecasting and warning centres	0.00	0.53	0.00	1.08	0.00	1.08	0.00	1.05	1.05
3.	Strengthening and moderni-zation of flood forecasting and hydrological network in Brahmaputra and Barak Basin	0.00	2.37	0.00	1.88	0.00	2.55	0.00	2.53	2.53
	<b>Total : CWC</b>	<b>0.00</b>	<b>69.41</b>	<b>0.00</b>	<b>75.35</b>	<b>0.00</b>	<b>75.02</b>	<b>0.00</b>	<b>75.62</b>	<b>75.62</b>
4.	Emergent Flood Protection Measures in Eastern and Western Sectors	0.00	3.00	0.00	3.00	0.00	3.00	0.00	3.00	3.00

Sl No.	Sector/ Organisation /Scheme	Actuals 2010-11		BE 2011-12		RE 2011-12		BE 2012-13		Total B.E. 2012-13
		Plan	Non-Plan	Plan	Non-Plan	Plan	Non-Plan	Plan	Non-Plan	
1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
5.	Pagladia Dam Project	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
6.	Flood Forecasting	24.02	0.00	36.00	0.00	36.00	0.00	48.00	0.00	48.00
7.	River Management Activities and Works related to Border Areas	179.52	0.00	188.00	0.00	138.00	0.00	125.00	0.00	125.00
8.	Infrastructure Development	9.48	0.00	14.00	0.00	5.00	0.00	10.00	0.00	10.00
9.	River Basin Management	0.00	0.00	0.00	0.00	0.00	0.00	90.00	0.00	90.00
	<b>Total : Flood Control</b>	<b>213.02</b>	<b>72.41</b>	<b>238.01</b>	<b>78.35</b>	<b>179.00</b>	<b>78.02</b>	<b>273.00</b>	<b>78.62</b>	<b>351.62</b>
<b>V.</b>	<b>Other Transport Services</b>									
1.	Farakka Barrage Project	44.02	34.11	70.40	35.29	71.40	34.79	75.00	41.14	116.14
2.	Jangipur Barrage	0.00	2.13	0.00	2.46	0.00	2.21	0.00	2.37	2.37
3.	Feeder Canal	0.00	4.30	0.00	4.64	0.00	4.60	0.00	5.08	5.08
	<b>Total : Transport Services</b>	<b>44.02</b>	<b>40.54</b>	<b>70.40</b>	<b>42.39</b>	<b>245.00</b>	<b>41.60</b>	<b>75.00</b>	<b>48.59</b>	<b>123.59</b>
	<b>TOTAL: (I to V) *</b>	<b>520.48</b>	<b>451.13</b>	<b>720.00</b>	<b>502.73</b>	<b>620.00</b>	<b>502.73</b>	<b>1500.00</b>	<b>541.00</b>	<b>2041.00</b>
<b>VI.</b>	<b>AIBP and other Water Resources Programme **</b>	<b>8757.53</b>	<b>0.00</b>	<b>12620.00</b>	<b>0.00</b>	<b>7460.00</b>	<b>0.00</b>	<b>14242.00</b>	<b>0.00</b>	<b>14242.00</b>
	<b>GRAND TOTAL</b>	<b>9278.01</b>	<b>451.13</b>	<b>13340.00</b>	<b>502.73</b>	<b>8080.00</b>	<b>502.73</b>	<b>15742.00</b>	<b>541.00</b>	<b>16283.00</b>

Source of financing : \* Demand No.104 – Ministry of Water Resources for 2012-2013 (excluding AIBP)

\*\* Figures are not available with the Budget Section of MoWR.

**Draft National Water Policy (2012)-  
Salient Features**

1. Even while recognizing that the States have the right to frame suitable policies, laws and regulations on water, the draft NWP, 2012 lays emphasis on the need for a national water framework law, comprehensive legislation for optimum development of inter-State rivers and river valleys, public trust doctrine, amendment of the Indian Easements Act, 1882, etc.
2. Basic minimum quantity for essential health & hygiene and sustenance of ecology has been defined as pre-emptive need, which must be ensured. Water has been recognized as economic good, over and above pre-emptive need, for the first time, which would promote maximization of value of water and its conservation and efficient use.
3. The draft NWP, 2012 presents a holistic picture of ecological need of the river rather than restricting it to only minimum flow requirement. It states that the ecological needs of the river should be determined recognizing that river flows are characterized by low or no flows, small floods (freshets), large floods and flow variability and should accommodate development needs. A portion of river flows should be kept aside to meet ecological needs ensuring that the proportional low and high flow releases correspond in time closely to the natural flow regime.
4. The draft NWP, 2012 recognizes the need to adapt to climate change scenario in planning and implementation of water resources projects. Coping strategies for designing and management of water resources structures and review of acceptability criteria has been emphasized.
5. Need and approaches towards enhancing water availability have been stipulated. Direct use of rainfall and avoidance of inadvertent evapo-transpiration have been proposed as the new additional strategies for augmenting utilizable water resources.
6. Mapping of the aquifers to know the quantum and quality of ground water resources (replenishable as well as non-replenishable) in the country has been proposed with provision of periodic updation.
7. Water use efficiency has been emphasized. A system to evolve benchmarks for water uses for different purposes, i.e., water footprints, and water auditing should be developed to ensure efficient use of water. Project financing has been suggested as a tool to incentivize efficient & economic use of water.
8. Provision of setting up of Water Regulatory Authority and adequate water pricing to incentivize recycle and re-use has been specified.
9. Water Users Associations should be given statutory powers to collect and retain a portion of water charges, manage the volumetric quantum of water allotted to them and maintain the distribution system in their jurisdiction.
10. The draft NWP, 2012 proposes reversal of heavy under-pricing of electricity, which leads to wasteful use of both electricity and water.
11. The draft NWP, 2012 recognizes encroachment and diversion of water bodies and emphasizes the need for their restoration with community participation.
12. The draft NWP, 2012 proposes setting aside a suitable percentage of the costs of infrastructure development, which along with collected water charges, may be utilized for repair and maintenance.



Contract for construction of projects should have inbuilt provision for longer periods of proper maintenance and handing over back the infrastructure in good condition.

13. *Pari-passu* planning and execution of all components of water resources projects have been proposed so that intended benefits start accruing immediately after completion and there is no gap between potential created and potential utilized.
14. All water resources projects, including hydro-power projects, should be planned to the extent feasible as multi-purpose projects with provision of storage to derive maximum benefit from available topology and water resources.
15. Project affected families to be made partners in progress and given a share in the benefits comparable to project benefitted families, who may bear part of the cost of resettlement & rehabilitation through adequate pricing.
16. The draft NWP, 2012 lays emphasis on preparedness for flood / drought with coping up mechanisms as an option. Frequency based flood inundation maps should be prepared to evolve coping strategies.
17. There is a need to remove the large disparity between stipulations for water supply in urban areas and in rural areas to bring equality between rural and urban people.
18. The draft NWP, 2012 proposes a forum at the national level to deliberate upon issues relating to water and evolve consensus, co-operation and reconciliation amongst party States. A similar mechanism should be established within each State to amicably resolve differences in competing demands for water amongst different users of water, as also between different parts of the State.
19. The "Service Provider" role of the State should be gradually shifted to that of a regulator of services and facilitator for strengthening the institutions responsible for planning, implementation and management of water resources. The water related services should be transferred to community and / or private sector with appropriate "Public Private Partnership" model.
20. Appropriate institutional arrangements for each river basin should be developed to collect and collate all data on regular basis with regard to rainfall, river flows, area irrigated by crops and by source, utilizations for various uses by both surface and ground water and to publish water accounts on ten daily basis every year for each river basin with appropriate water budgets and water accounts based on the hydrologic balances.
21. The draft NWP, 2012 proposes negotiations about sharing and management of water of international rivers on bilateral basis in consultative association with riparian States keeping paramount the national interests.
22. All hydrological data other than those classified as secret on national security consideration should be in public domain. Setting up of a National Water Informatics Center has been proposed.
23. Continuing research and advancement in technology should be promoted to address the issues in water sector in a scientific manner. Innovations in water resources sector should be recognized and awarded. A center for research in water policy should also be established to evolve policy directives for changing scenario of water resources.
24. It is necessary to give adequate grants to the States to update technology, design practices, planning and management practices, preparation of annual water balances and accounts for the site and basin, preparation of hydrologic balances for water systems, and benchmarking and performance evaluation.

**Annexure- VI**

**List of CPIOs and Appellate Authorities in Ministry of Water Resources  
(Proper)**

<b>S.No</b>	<b>Nam &amp; Designati of CPIO appointed (S/Shri/Smt)</b>	<b>Name of the Section / Desk/ work</b>	<b>Name &amp; Designation of the Appellate Authority appoint (S/Shri</b>
1 .	L.P. Sharma, Under Secretary	Administration Section & Sc/ST /OBC Cell	Khatchin Langel, DS (Coord Admn)
2.	Arun Kumar, Under Secretary (Coord)	Coordination Section	
A	Arun Kumar, Under Secretary (Parliament)	Parliament	Ram Swarup, Deputy Secretary (E-III & GA) for establishment matters of FBP
3.	Ashok Kumar Under Secretary (General Administration)	Gener Administration & CR Sections	
4.	Jeetendar Chadha, Under Secretary (E-III)	Establishment III	
5.	P.S. Chakraborty Under Secretary (WB)	Water Bodies Section	
6.	Narendra Singh, Under Secretary (E-I)	Establishment I	Charul Baranwal, Director except for matters related to restructuring of CW and CGWB
7.	Vineeth Abraham, Under Secretary (CGWB)	Central Ground Water Board	
8.	D.K. Paliwal, Under Secretary (PSU&	Public Sector Undertakings Section and PPP Cell	
9.	Nandan. N, Under Secretary (GW)	Ground Water Desk	Rajeev Kumar, Director
10.	Dalbir Kaur Bahri, Section Officer (WS)	Internal Work Study	
11.	Suresh Vij, Section Officer (ID)	Infrastructure Development	Srikanta Panda, Director (Vigilanc & e-including for matters related to restructuring of CWC and CGWB and for matters of
12.	K.K. Sharma, Section Officer	Vigilance Section	
13.	Surendra Kumar, Section Officer ( e-Governance Cell)	e-governance cell	
14.	Nagendr Kumar-II, Section Office (Water Quality)	Water Quality Issues	Anoop Seth, Dir (E-II)
15.	Shashi Pal, Under Secretar (Information, Educatio and Communication)	Information, Education and Communication Cell	
16.	Rajendra Kuma Ojha, Under Secretary (E-	Establishment-II	
17.	Karam Bir Singh, Deputy Director (OL)	Official Language Section	Ramesh Bab Aniyeri, Director (OL)
18.	N. Mukherjee, Sr Joint Commissioner	Hydrology Project matters of Brahmaputra & Barak Wing	Narender Kumar,

19.	R.K. Sund, Under (B&B)	Matters of Brahmaputra & Barak Win other than Hydrology Project	Commissioner
20.	A.S.P. Sinha, Sr Joint Commissioner	Ganga Wing	Devendra Sharm Commissioner (Ganga)
21.	Ravish Ali, Under (PP)	Policy and Planning Section	M.K. Sinha, Sr Joint Commissioner
22.	M.C. Chand, Deputy Secretary	Command Area Development and Water Management Wing	G.S. Jha, Commission (CADWM)
23.	Asit Chaturvedi, Deputy Commissioner	Projects Win - works relating to Basin Management Section and Inter-Linking of Rivers/ National water Development Agency	Shri Bhupinder Singh Sr. JC (BM) - except for matters related to Sardar Sarovar Construction Advisory Committee and Narmada Control Authority
24.	Ajay Kumar, Under Secretary (BM)	Projects Wing - works relating to Ganga Basin Section along with matters related to Sardar Construction Advisory Committee and Narmada Control Authority	
25.	Anant Ram, Section Officer (Projects)	Project Wing excluding Sardar Sarovar Construction Advisory Committee and Narmada Control Authority	T.D. Sharma, Sr Joint Commissioner (PR) including the matters related to Sardar Sarovar Construction Advisory Committee and Narmad Control Authority
26.	Anil Kumar, Assista Engineer (MI)	Minor Irrigation	S.L. Jain, Sr Joint Commissioner (MI)
27.	Dr. Samir Chatterjee, Sr. Joint Commissioner	Indus Wing	G. Aranganathan, Commissioner (Indus)
28.	Mamta Saxena, DD (MI Stats)	Minor Irrigation Statistics	Vijay Kumar, Additional Director General
29.	Vijay Srivastava, Under Secretary	Finance Wing - Finance Desks and Budget Section	S.K. Thakur, Director (Finance)
30.	V.K. Balayan Under Secretary (EA)	External Assitanc Desks including Foreign Training & Bilateral issues	Vijay Kumar, Advisor (Eco)

**Annexure- VII**

**LIST OF POSTAL ADDRESSES OF PUBLIC/ STAFF GRIEVANCE OFFICERS IN THE  
MINISTRY OF WATER RESOURCES AND ITS ORGANISATIONS**

<b>S. No.</b>	<b>Name of the Organization</b>	<b>Address</b>	<b>Name &amp; Designation of P.G./ S.G. Officer</b>
1.	Ministry of Water Resources	Room No.425, Shram Shakti Bhavan, New Delhi-110001 (Tele No. 23714734)	Shri Khatchin Langel, Deputy Secretary (Coord) & Director (PG & SG)
2.	Narmada Control Authority	Narmada Sadan, Sector-B, Scheme No. 74, Vijay Nagar, Indore – 452010(MP) (Tele No. 0731-2554477)	Shri Manoj Tiwari, Secretary and Grievance Redressal Officer
3.	Bansagar Control Board	Bansagar Control Board, Samab Colony, Rewa (MP) (Tele No. 07662-226318), 0755-2762059 (Fax No. 07662-242433 –Fax No. 0755-2558264)	Shri S.K. Haldar, Secretary & Director (Staff Grievances)
4.	Betwa river Board	O/o Pay & Account Officer, Betwa river Board, Nandanpura, Jhansi-284003 (U.P) (Tele No. 0510-2480279)	Shri Ram Avatar, Pay & Account Officer & Public Grievance Officer
5.	Central Ground Water Board	CGWB, CHQ, Faridabad (Tele No. 95129- 2419075) Fax No.95129-2419059	Shri U.V. Singh, LIO & Staff Grievances Officer
		CGWB, CHQ, Faridabad (Tele No.95129-2415024 & (Fax No. 95129-2412524)	Dr. S.K. Jain, Sr. Hg. Scientist 'D' & Public Grievances officer
6.	Central Soil and Materials Research Station	Room No. 309, CSMRS, Olof Palme Marg, Hauz Khas, New Delhi – 110 016 (Tel No.26562114, 26850025)	Shri S.L. Gupta, CRO & Director Grievances
7.	Central Water Commission	Room No. 313(S), Sewa Bhawan, R.K. Puram, New Delhi-110066 (Tele No. 26187232) (Fax No. 26195516)	Shri K. Vohra, Secretary & Grievances Officer
8.	Central Water & Power Research Station	Central Water & Power Research Station, P.O. Khadakwasla Research Station, Pune – 411024 (Tele No. 020-24103236) (Fax No. 020-24381004)	Shri R.K. Kamble, Joint Director & Chairman (Grievance Cell)

9.	Farakka Barrage Project	P.O. Farakka Barrage, Distt. Murshidabad, West Bengal-742212 (Tele No. 03485 – 253285) (Fax No. 03485-253608)	Shri R. D. Deshpande, Superintending Engineer (Coord.) & Director (Staff Grievances)
10.	Ganga Flood Control Commission	Ganga Flood Control Commission, Sinchai Bhawan, IIIrd Floor, Patna-800015 (Tele No. 0612-2233591) (Fax No. 0612-2222294)	Shri S.K. Gangwar, Director (Adm) & Director (Staff Grievances & Public Grievances)
11.	National Institute of Hydrology	Jal Vigyan Bhawan, Roorkee-247667 (Uttaranchal) (Tele No. 01332-276414)	Dr. J.V. Tyagi, Scientist F, Public Grievance Officer & OIC, Staff Grievances
12.	National Projects Construction Corporation Limited	NPCC Ltd., Plot No. 67-68, Sector 25, Faridabad (HNA) (Tele No. 0129-2234760) (FAX No.-0129-4067915)	Shri K.K Gupta, General Manager (HR) and Director (Staff Grievances)
			Shri K.K.Sharma, Joint GM, Director (Public Grievances)
13.	National Water Development Agency	18-20, Community Centre, Saket, New Delhi-110017 (Tele No. 26852735) (Fax No. 26960841)	Shri R.K. Jain, Chief Engineer (HQ) & Grievance Officer
14.	Sardar Sarovar Construction Advisory Committee	Sardar Sarovar Construction Advisory Committee, Narmada Bhavan, "A" Block 4 <sup>th</sup> Floor, Vadodara – 390001 (Tele No. 0265-2421272) Fax No. 0265-2437262 (Telefax)	Shri R.K. Suryawanshi, Deputy Secretary & Director (Grievances)
15.	Water & Power Consultancy Services (India) Ltd.	76-C, Institutional Area, Sector-18, Gurgaon-122015 (Tele No. 0124-2348022, 2397392)	Shri S.K. Ahuja, Director (Staff/Public Grievances)
16.	Brahmaputra Board	Basistha, Guwahati – 29 (Tele No.0361-2300128) (Fax No. 0361-2308588)	Shri G.P Singh, Secretary & Director (Staff/Public Grievances)
17.	Upper Yamuna river Board	Upper Yamuna river Board, wing No. 4, Ground Floor, West Block No. 1, R.K. Puram, New Delhi-110066 (Tele.-26174147, 26184025)	Shri H.K. Sahu, Member Secretary & Director of Grievances
18.	Tungabhadra Board	Tungabhadra Board, Tungabhadra Dam, Taluk: Hospet, Distt: Bellary, Karnataka State, PIN: 583225 Phone-08394-259113	Shri L.A.V. Nathan, Secretary & Director of Grievances