

26 Water Resources

WATER RESOURCES

The Ministry of Water Resources lays down policies and programmes for development and regulation of the country's water resources. It covers sectoral planning, coordination, policy guidelines, technical examination and techno-economic appraisal of projects, providing central assistance to specific projects, facilitation of external assistance and assistance in the resolution of inter-state water disputes, policy formulation, planning and guidance in respect of minor irrigation, command area development and development of ground water resources, etc.

The National Water Policy, 2002 lays emphasis on the integrated water resources development and management for optimal and sustainable utilization of the available surface and groundwater; creation of well-developed information system; water conservation and demand management; quantity and quality aspects as well as environmental considerations; involvement of beneficiaries and stakeholders in the project planning and participatory approach in water resources management; adequate training and research; resettlement & rehabilitation aspects of project affected persons. The Policy also encourage Private Sector Participation in placing development and management of water resources project for diverse uses, wherever feasible with a view to introducing innovative ideas generating financial resources and introducing corporate management and improving service efficiency and accountability to users.

WATER RESOURCES POTENTIAL

The average annual water availability of the country is assessed as 1869 billion cubic metres (BCM). Of this, total utilizable water resource is assessed as 1123 BCM, surface water 690 BCM and ground water as 433 BCM.

IRRIGATION POTENTIAL

Expansion of irrigation facilities, along with consolidation of the existing systems, has been the main part of the core strategy for increasing production of food with sustain and systematic development of irrigation grains. The irrigation potential through major, medium and minor irrigation projects has increased from 22.6 million hectares (mha) in 1951 when the process of planning began in India to about 102.77 mha at the end of tenth plan. Plan-wise irrigation potential created and utilized through major, medium and minor irrigation projects in the country is as indicated hereunder:

TABLE 26.1 : PLANWISE POSITION OF IRRIGATION POTENTIAL

Plan Period	Potential (cumulative) created (Mha)	Potential (cumulative) utilised (Mha)
Pre-Plan period	22.60	22.60
First Plan (1951-56)	26.26	25.04
Second Plan (1956-61)	29.08	27.80

Third Plan (1961-66)	33.57	32.17
Annual Plans (1966-69)	37.10	35.75
Fourth Plan (1969-74)	44.20	41.89
Fifth Plan (1974-78)	52.02	48.46
Annual Plans (1978-80)	56.61	52.64
Sixth Plan (1980-85)	65.22	58.82
Seventh Plan (1985-90)	76.44	68.59
Annual Plans (1990-92)	81.09	72.85
Eighth Plan (1992-97)	86.26	77.21
Ninth Plan (1997-2002)	93.95	81.00
Tenth Plan (2002-2007)	102.77	87.23

MAJOR AND MEDIUM IRRIGATION PROJECTS

Irrigation projects with a Culturable Command Area (CCA) between 2,000 and 10,000 hectares are classified as medium projects and those with CCA of more than 10,000 hectares as major projects. The expenditure incurred on major and medium projects and the irrigation potential created during various plan periods is given below:

TABLE 26.2 : MAJOR AND MEDIUM IRRIGATION PROJECTS
(EXPENDITURE INCURRED AND POTENTIAL CREATED)

Period	Outlay/ expenditure (Rs crore)	Potential created (mha)	Cumulative (mha)
Pre-Plan period	-	9.70	9.70
First Plan (1951-56)	376	2.50	12.20
Second Plan (1956-61)	380	2.13	14.33
Third Plan (1961-66)	576	2.24	16.57
Annual Plans (1966-69)	430	1.53	18.10
Fourth Plan (1969-74)	1,242	2.60	20.70
Fifth Plan (1974-78)	2,516	4.02	24.72
Annual Plans (1978-80)	2,079	1.89	26.61
Sixth Plan (1980-85)	7,369	1.09	27.70
Seventh Plan (1985-90)	11,107	2.22	29.92
Annual Plans (1990-92)	5,459	0.82	30.74
Eighth Plan (1992-97)	21,072	2.22	32.95
Ninth Plan (1997-2002)	42,289	4.10	37.06
Tenth Plan (2002-2007)	71,213	5.30*	42.35

* Tentative

ACCELERATED IRRIGATION BENEFITS PROGRAMME

The Accelerated Irrigation Benefits Programme (AIBP) was launched during 1996-97 to give loan assistance to the States to help them complete some of the incomplete major/medium irrigation projects, which were in advanced stages of completion.

The Surface Minor Irrigation Schemes of North-Eastern States, Hill States of Sikkim, Uttarakhand, Jammu and Kashmir, Himachal Pradesh and KBK Districts of Orissa have also been provided Central Loan Assistance (CLA) under this programme since 1999-2000. Grant component has also been introduced in the programme from April 2004. As per existing AIBP criteria effective from December 2006, grant equal to 25% of the project cost for major and medium irrigation projects in non-special category States, 90% for major/medium/minor irrigation projects in special category States are provided to the selected projects. KBK districts of Orissa are treated at par with special category States. The minor irrigation schemes in non-special category States falling in drought prone, tribal and flood prone areas are treated at par with special category States and are also given 90% grant of the project cost. The State Governments have been provided an amount of Rs.27185.561 crore as Central Loan Assistance/Grant under AIBP upto 31st March, 2008 for 253 major/medium irrigation projects and 8666 Surface Minor Irrigation Schemes. After commencement of this Programme 98 major/medium and 5339 Surface MI Schemes have so far been completed. An additional irrigation potential of 4.952 million hectare has been created through major/medium irrigation projects and an irrigation potential of 0.261 million hectare has been created through Surface MI Schemes upto March, 2008.

HYDROLOGY PROJECT

Hydrology Project (Phase-I) was implemented with World Bank assistance of SDR 75.1 million under the credit agreement with Government of India. The Government of Netherlands provided grant-in-aid of Euro 14.64 million in the form of technical assistance under a bilateral Indo-Dutch agreement.

Hydrology Project Phase-II (HP-II), a follow-up of Hydrology Project Phase-I (HP-I) is being implemented by the Surface Water (SW) and Ground Water (GW) departments in 13 States, including 9 States of HP-I viz. Andhra Pradesh, Gujarat, Maharashtra, Karnataka, Kerala, Madhya Pradesh, Chhattisgarh, Orissa, and Tamilnadu; and 4 new States—Himachal Pradesh, Goa, Puducherry and Punjab. In addition, 8 Central Agencies—Ministry of Water Resources (CGWB); Central Water Commission (CWC); Central Ground Water Board (CGWB); National Institute of Hydrology (NIH), Central Water and Power Research Station (CWPRS), India Meteorological Department (IMD), Central Pollution Control Board (CPCB), and Bhakra—Beas Management Board (BBMB), are also participating in HP-II. Total project cost of HP-II is estimated to be US \$135.01 million, out of which the World Bank funding is US \$104.98 million in the form of International Bank of Reconstruction and Development (IBRD) Loan and the balance is to be funded by the Government of India.

The objectives of HP-II are to extend and promote sustained and effective use of HIS by all potential users concerned with water resources planning and management, both in public and private, thereby investments in improved productivity and cost effectiveness of water related investments in the 13 States and 8 Central Implementing Agencies (IAs). The implementation of the project has three main components:

- (a) Institutional strengthening, covering all 13 states and 8 central agencies.
- (b) Vertical extension, covering the 9 states and 6 central agencies of HP-I; and
- (c) (Horizontal expansion, covering the 4 new states and 2 new central agencies (CPCB and BBMB).

The HP-II is to be implemented over a period of six years, effective from April, 2006.

WATER QUALITY ASSESSMENT AUTHORITY (WQAA)

In view of the problems of pollution of national water resources, the Ministry of Environment & Forests, issued the Notification on 22 June, 2001 constituting the "Water Quality Assessment Authority" with effect from 29 May, 2001.

The Secretariat of the WQAA is in the Ministry of Water Resources. The Water Quality Review Committees have been constituted in the States with an objective to improve coordination amongst the Central and State agencies, review/assess schemes launched/to be launched to improve quality of water resources, review water quality data analysis and interpretation in order to identify problem areas and developing action plans for improving quality on a sustainable basis, identify hot spots for surveillance monitoring and to look into other specific miscellaneous issues related to water quality arising from time to time.

Based on the recommendations of Expert Committee and Task Force, a gazette notification on the Uniform Monitoring Protocol for adoption by all the water quality-monitoring agencies has been issued in June, 2005. A Working Group has also been constituted by WQAA to deal with issues relating to minimum flows in riverine systems.

In accordance with the decisions of WQAA, the Water Quality Monitoring Committee (WQMC) was also constituted to assist the WQAA in its functions.

COMMAND AREA DEVELOPMENT & WATER MANAGEMENT PROGRAMME

The Centrally sponsored Command Area Development (CAD) Programme was launched in 1974-75 with the main objectives of improving the utilization of created irrigation potential and optimizing agriculture production and productivity from irrigated agriculture through a multi-disciplinary team under an Area Development Authority.

The programme was restructured and remained as "Command Area Development and Water Management (CADWM) Programme" from 1st April 2004. From the current financial year (i.e. 2008-09), the Planning Commission has decided to implement the programme as a State sector scheme which is under the process of approval.

The CAD programme was initiated with 60 major and medium irrigation projects. So far 332 irrigation projects with a Culturable Command Area (CCA) of about 29 Mha have been included under the programme, out of which 138 projects are currently under implementation.

The National Water Policy-2002 stresses participatory approach in water resources management. It has been recognized that participation of beneficiaries will help greatly for the optimal upkeep of irrigation system and utilization of irrigation water. The participation of farmers in the management of irrigation would give responsibility for operation and maintenance and collection of water charges from the areas under the jurisdiction of the Water Users' Associations (WUAs). A one-time functional grant of is also provided to the registered WUAs under the programme. Minimum contribution of 10 per cent for beneficiaries has been made mandatory in the cost of construction of field channels, full package OFD works, reclamation of water logged areas and one time functional grant to WUAs.

The evaluation made in the past has revealed that the CAD Programme made positive impact on various important indicators, like increase in the irrigated area, productivity and production, irrigation efficiency, etc. Despite best efforts for efficient irrigation water management, the problem of water logging has surfaced in many irrigated commands. Under the component on reclamation of water logged areas, 478 schemes of nine States, namely, Bihar, Gujarat, Madhya Pradesh, Jammu and Kashmir, Karnataka, Kerala, Maharashtra, Orissa and Uttar Pradesh have been approved till now at an estimated cost of Rs. 52.89 crore for reclamation of 63567 ha. of water logged area. Out of this, an area of about 46668 ha. has been reclaimed by these states up to March 2007.

REPAIR, RENOVATION AND RESTORATION OF WATER BODIES

The Government of India sanctioned a Pilot Scheme "National Project for Repair, Renovation and Restoration of Water Bodies directly linked to Agriculture" in January 2005 with an estimated cost of Rs. 300 crore to be shared by Centre and State in the ratio of 3:1 and to be implemented during the remaining period of Xth Plan. The objectives of the scheme are: to restore and augment storage capacities of water bodies, to recover and extend their lost irrigation potential. The water bodies having culturable command area of more than 40 hectares and upto 2000 hectares were included under the pilot scheme. The Scheme has been approved for 26 district projects in 15 States, namely, Andhra Pradesh, Bihar, Chhattisgarh, Jharkhand, Karnataka, Madhya Pradesh, Orissa, Rajasthan, Tamilnadu, West Bengal, Himachal Pradesh, J&K, Gujarat, Kerala and Maharashtra at an estimated cost of Rs. 299.92 crores. These projects cover 1098 water bodies with total original culturable command area of 1.72 lakh hectares. After completion, the scheme will generate an additional irrigation potential of 0.78 lakh hectare works on 894 water bodies in 13 States, which have been completed till date.

The Union Finance Minister in his budget speech for 2006-07 announced that the project for repair, renovation and restoration of water bodies would be expanded throughout the country through external assistance. In his budget speech 2007-08, the Finance Minister further drew attention to the announcement made by him about the launching of the pilot project on repair, renovation and restoration of water bodies in 2005 and its expansion throughout the country with external assistance. Accordingly, proposals received from the States of Tamilnadu, Andhra Pradesh, Karnataka, Orissa and West Bengal in this regard have been posed to the World Bank. The project has been conceived as 75 per cent loan by the World Bank to States and 25 per cent central subsidy. The World Bank Loan Agreement has been signed with Tamilnadu for Rs. 2182 crore to restore 5763 water bodies having a CCA of 4 lakh hectares on 12.02.2007. The project "Andhra Pradesh Community—Based Tank Management project" for Rs. 835 crore have also been signed with the world Bank in June, 2007 for restoration of 3000 water bodies with a CCA of 2.5 lakh hectares. The project of Karnataka Govt. has also been signed for Rs 268.78 crore with the World Bank of restoration of 1225 water bodies. The appraisal process of Orissa Project has since been completed and negotiation is fixed on July 14-18, 2008 with the World Bank. West Bengal project is still at appraisal stage.

It has been proposed to extend the programme/scheme throughout the country during the XI plan period and accordingly, a proposal has been mooted in consultation with various stakeholders for expansion of the programme throughout the country. A provision of Rs. 2750 crore is kept to fund 25 per cent of the project cost as Government of India contribution.

FLOOD MANAGEMENT

Out of the country's total geographical area of 329 million hectare, about 40 million hectare is prone to floods. Till March 2007, an area of 18.22 million hectare has been provided with protection against floods by way of construction of embankments, drainage channels, town protection works and raising on platforms.

The Union Government is providing Central assistance to the flood prone States to take up some of the critical works. The Central Government is also providing special assistance to the border and North eastern States for taking up certain priority works.

In order to mitigate the damages from floods, a nation wide Flood Forecasting and Warning System has been established by the Central Water Commission on interstate river basins and flood forecasts are being issued through 175 Stations, out of which 147 are river level forecasting Stations and 28 are inflow forecasting stations on major dams/reservoirs. Forecasts about (i) water levels in rivers likely to be attained as a result of floods and (ii) volume of inflow into reservoirs, are formulated and disseminated to various administrative authorities of Central Government, State Government and District Administration, media and other users on the basis of real time data.

RIVER WATER DISPUTES

As per the Inter-State River Water Disputes Act, 1956 (ISRWD Act, 1956) when the water dispute arises among two or more State Governments, the Central Government receives a request under Section 3 of the Act from any of the basis States with regard to existence of water dispute. The status of such inter-State water disputes under ISRWD Act, 1956 is as follows:

Sl.No.	River(s)	States	Date of Constitution of Tribunal	Date of Award
1.	Krishna	Maharashtra, Andhra Pradesh, Karnataka	April 1969	May 1976
2.	Godavari	Maharashtra, Andhra Pradesh, Karnataka, Madhya Pradesh and Orissa	April 1969	July 1980
3.	Narmada	Rajasthan, Madhya Pradesh, Gujarat, Maharashtra	October 1969	December 1979
4.	Cauvery	Kerala, Karnataka, Tamil Nadu and Union Territory of Pondicherry	June 1990	Report u/s 5(2) received. 5.2.2007
5.	Krishna	Maharashtra, Andhra Pradesh and Karnataka	April 2004	Report u/s 5(2) pending
6.	Model/ Mandovi/ Mahadayi/	Goa, Karnataka and	-	-
7.	Vansadhara	Andhra Pradesh & Orissa		

In accordance with the said Act, the Central Government is required to refer a dispute to a Tribunal after it is satisfied that the disputes cannot be settled by negotiations. Accordingly, the water disputes, related to Cauvery and Krishana were referred to the Tribunals for adjudication in 1990 and 2004 respectively.

The Cauvery Water Disputes Tribunal (CWDT) passed an interim Order on 25th June, 1991 and further Clarificatory Orders on the Interim Order in April, 1992 and December, 1995. Further, CDWT submitted its report and decision under Section 5(2) of the ISRWD Act, 1956 on 5.2.2007. With submission of report and decision under Section 5(2) of the Act, Central Government and the State Governments have sought explanation and guidance from the Tribunal under Section 5(3) of the Act. The matter is under consideration of the Tribunal. Further party States have also filed SLPs in the Hon'ble Supreme Court against the decision dated 5.2.2007 of the Tribunal and the matter is subjudice now.

The Krishna Water Disputes Tribunal (KWDT) passed orders on June 9, 2006 on the Interim Relief Application filed by the party States of Maharashtra, Karnataka and Andhra Pradesh declining to give interim relief as sought in the application and at the same time indicating certain norm with a view to facilitate adjudication of the dispute before the Tribunal. Subsequently, State of Andhra Pradesh filed Interlocutory Application under Section 5(3) of the ISRWD Act, 1956 seeking further explanation/guidance on the Order of the Tribunal of June 9, 2006 which is pending. The Tribunal is its hearing held in September and October 2006 has framed 29 of issues for adjudication of the dispute before it. Further hearings of the Tribunal are continuing.

In respect of Mahadayi/Mandovi and Vansadhara water disputes, the requests were received from States of Goa and Orissa in July 2002 and February, 2006. In respect of Mahadayi water dispute a view has emerged in this Ministry that the dispute cannot be settled through negotiations and further action as per ISRWD Act is being taken. In respect of Vansadhara river water dispute, the Central Government has been concluded so far that this dispute cannot be settled by negotiations.

RAVI & BEAS WATERS TRIBUNAL

Ravi & Beas Waters Tribunal (RBWT) set up in 1986 in pursuance of paragraphs 9.1 & 9.2 of Punjab Settlement (Rajiv-Longowal Accord, 1985) *inter-alia* to adjudicate the claims of Punjab and Haryana in Ravi-Beas waters, submitted its report on 30th January 1987. The Tribunal is to submit its further report to the Government on the references by the party States and the Central Government seeking explanation/guidance on its report. The hearings of the Tribunal have become dependent on the outcome of a Presidential reference on Punjab Termination of Agreements Act, 2004 before the Hon'ble Supreme Court.

SUTLEJ-YAMUNA LINK CANAL

Sutlej Yamuna Link (SYL) Canal envisages delivering Haryana share of Ravi-Beas waters. In the matter of non-completion of SYL Canal in Punjab portion, the Hon'ble Supreme Court in a judgment of 4th June 2004 had directed the Central Government to carry out its action plan for completion of the canal. Central Government took necessary action. However, Punjab legislature on 12th July 2004 enacted Punjab Termination of Agreements Act, 2004 terminating all agreements related to Ravi-Beas Waters and obligations thereunder. A Presidential reference in the matter of the above Act was fled before the Hon'ble Supreme Court, the outcome of which is awaited.

GROUND WATER DEVELOPMENT IN THE COUNTRY

The total annual replenishable ground water resources of the Country have been reassessed as 433 Billion Cubic Meters (BCM). Existing gross ground water draft as

on March 2004 for all uses is 231 BCM per year. The stage of ground water development is 58%. The development of ground water in different areas of the country has not been uniform. Highly intensive development of ground water in certain areas in the country had resulted in over exploitation leading to decline in the levels of ground water and sea water intrusion in coastal areas. There is a continuous growth in dark and overexploited areas in the country.

As per the latest assessment of ground water resources carried out jointly by the Central Ground Water Board (CGWB) and the States, the assessment units are categorized as 'Over exploited'/'Critical' and 'Semi-critical' based on the stage of ground water development and the long-term water level declining trend during the past decade (1995-2004). Out of 5723 assessment units (Blocks/Mandals/ Talukas) in the country, 839 units in various States have been categorized as 'Over exploited', i.e., the annual ground water extraction exceeds the annual replenishable resource. In addition 226 units, 11 'Critical', i.e., the stage of ground water development is above 90 per cent and within 100 per cent of annual replenishable resource. There are 550 semi-critical units, where/ the stage of ground water development is between 70 per cent and 100 per cent. List of these areas is being circulated to the State Pollution Control Boards and Ministry of Environment and Forests which refer the new industries/projects falling in these areas to the Central Ground Water Authority (CGWA) for obtaining clearance for water withdrawal.

The CGWA has so far notified 43 over-exploited areas in the country for regulation of ground water development and management. For enforcement of the regulatory directions issued under Section 5 of Environment Protection Act, 1986, concerned Deputy Commissioners/ District Magistrates have been authorized to take necessary action in case of violation of directives of CGWA in the notified areas. For more effective regulation of ground water development and management, Advisory Committees under the Chairmanship of District Collector/ Deputy Commissioners with members drawn from various organizations have been constituted which will render advice in matters pertaining to regulation of ground water development and management.

The CGWA have also notified 65 over-exploited areas in various States, for registration of ground water abstraction structures, which showed a very steep decline in ground water levels and required action for regulation. The CGWA has issued directions to the Chief Secretaries of all States having over-exploited blocks to take all necessary measures to promote/ adopt artificial recharge to ground water/ rain water harvesting.

The CGWA has also decided to notify over-exploited areas in the country in compliance of its mandate. Following the provisions under rule 4 of the Environment (Protection) Rules, 1986.

ARTIFICIAL RECHARGE OF GROUND WATER ADVISORY COUNCIL IN THE MINISTRY OF WATER RESOURCES

- Artificial Recharge of Ground Water Advisory Council has been constituted by the Government in the year 2006 under the Chairmanship of Hon'ble Ministry (WR).
- Main objective of Advisory Council is to popularize concept of artificial recharge of ground water among stakeholders.
- The Advisory Council comprises of Members from different concerned Central Ministries/Departments, representatives of State Governments, public

undertakings, financial institutions, representative of industries and renowned subject experts/farmers/NGOs.

- 1st meeting of Advisory Council held in July 2006 and second in Sept., 2007.
- As per recommendations of the council various action have been initiated some of the main includes:-
 - ❑ Organisation of National Ground Water Congress.
 - ❑ Implementation of 5000 Farmers Participatory Action Research Programme (FPARP) in 25 States/UTs of the Country.
 - ❑ Institution of Ground Water Augmentation Awards & National Water Award to encourage the Non-Governmental Organizations (NGOs)/Gram Panchayats/Urban Local Bodies/Institutions/Corporates Sector and Individuals.
 - ❑ Report on "more crop and income per drop of water" prepared and follow up action on recommendation initiated.
 - ❑ Preparation of a policy for water for industries which is under finalization in MoWR.

NATIONAL GROUND WATER CONGRESS

- As per recommendations of the Artificial Recharge of Ground Water Advisory Council, the Central Ground Water Board (CGWB) under the auspices of Ministry of Water Resources, organized the first National Ground Water Congress at New Delhi on 11th September 2007 with a view to provide a platform for inter-action among scientists, engineers, planners, policy makers and representatives of industries/NGOs/VOs and Stakeholders on various aspects of ground water in Order to evolve a suitable policy framework on emergent ground water related issues.
- Hon'ble Prime Minister, Dr. Manmohan Singh inaugurated the Congress. Around 1000 eminent Scientists, farmers, students, representatives of NGOs and other organizations attended the Ground Water Congress.
- Her Excellency, the President of India gave away the first National Ground Water Award and Bhumijal Samvardhan Puraskars for the year 2007 during the valedictory session of first National Ground Water Congress.
- The MoWR has a proposal to organize second National Ground Water Congress during September, 2008 at New Delhi.
- Various issues related to Ground Water Resources Management, regulation and quality etc. would be discussed in the technical sessions.

FARMERS PARTICIPATORY ACTION RESEARCH PROGRAMME (FPARPS)

- During the inaugural address of the first meeting of the Artificial Recharge of Ground Water Advisory Council held on 22nd July, 2006 New Delhi, Hon'ble Prime Minister emphasized that "We have to minimize our water use—invest in science and technology to ensure that we can grow crops which use less water. In other words, find ways of valuing the crop per drop."
- To implement the suggestions of Prime Minister, the Council approved the "More Crop and Income per Drop of Water" report for implementation of Farmers Participatory Action Research Programme (PFARP) in the country.

- The Ministry of Water Resources has sanctioned 5000 demonstrations under FPARPs in 2 to 3 crop seasons through 60 identified institutes which include Agricultural Universities, ICAR Research Institutes, ICRISAT and WALMIS etc. in 25 States/UTs in the country at the cost of Rs. 24,4685 crore with the objective of demonstrating the technologies available to the farmers for increasing productivity and profitability of agriculture through generating synergy among water, crops and their varieties, agronomic practices, soil nutrients and implements.
- Each programme covers a minimum of one hectare and is being implemented in a participatory mode, with the farm family having a sense of ownership of the programme.
- More than 14347 farmers are participating in these programmes. Till Rabi Season, 980 demonstrations have been completed and by the end of Kharif Season, 3360 demonstrations are likely to be completed.
- The performances of these programmes are to be monitored by the field formations of CWC & CGWB.

GROUND WATER AUGMENTATION AWARDS & NATIONAL WATER AWARD

- The Ministry of Water Resources had instituted 18 Bhoomijal Samvardhan Puraskars including one National Water Award in the year 2007 to encourage registered NGOs, Gram Panchayats & Urban Local Bodies (ULBs) (for the population up to 1 lakh) for the adoption of innovative practices of Ground Water Augmentation through Rain Water Harvesting and Artificial Recharge.
- For the year 2007, Her Excellency, the President of India gave away the National Water Award to Hiware Bazar Gram Panchayat, Ahmednagar district, Maharashtra and Bhoomijal Samvardhan Puraskars to 14 Gram Panchayats/NGOs/Local Bodies.
- To widen the scope of these Awards, the guidelines have been revised and in addition to above three categories, 3 more categories for awards included viz. institutions implementing Farmers's Participatory Action Research Programme, Corporate Sector and individuals/Institutions.
- As per revised guidelines, the Ground Water Augmentation Award and National Water Award have been launched with an objective to encourage the NGOs/ Gram Panchayats/ULBs/Institutions/Corporate Sector and Individuals for adopting innovative practices of ground water augmentation by rainwater harvesting and artificial recharge, promoting water use efficiency, recycling & re-use of water and creating awareness through people's participation in the targeted areas resulting into the sustainability of ground water resources and development of adequate capacity amongst the stakeholders.
- In total, there will be 21 Awards including one National Water Award for all the six categories. National Water Award will be given from amongst these 21 award winners. National Water Award consist of a cash award of Rs. 10 lakhs and a plaque with citation and Ground Water Augmentation Award consisting of cash award of Rs. 1.0 Lakh each and a plaque with citation.
- The detailed guidelines of Awards is available on the Website of Ministry of Water Resources at <http://mowr.gov.in/> under Guidelines National Water Award.

- The last date for submission of nominations by the nodal Department of the States/UTs for the year 2008 is August 25, 2008. The nominations for Award/Puraskars would be shortlisted by a Selection Committee (July) comprising Chairperson and four expert Members.
- For the year, 2008, these awards are proposed to be given during valedictory session of National Ground Water Congress proposed to be held during September, 2008.

SCHEME ON ARTIFICIAL RECHARGE TO GROUND WATER THROUGH DUGWELLS

- Pursuant to the announcement made by Hon'ble Ministry of Finance in his Budget Speech, 2007, the State Sector scheme of 'Artificial Recharge of Ground Water Through Dugwells' is being implemented during XI Plan in the States of Andhra Pradesh, Gujarat, Karnatka, Madhya Pradesh, Maharashtra, Rajasthan and Tamilnadu. The scheme covers 146 districts comprising 1180 over-exploited, Critical and Semi-critical blocks in the States.
- The scheme envisages installation of 4.45 million ground water recharge structures in the existing irrigation wells of the farmers to facilitate large scale ground water recharge in the area. Of which 2.72 million owned by small and marginal farmers and 1.73 million owned by other farmers. Average cost of recharge per well is Rs. 4000, which varies from Rs. 3600 as in Maharashtra to Rs. 5700 as in Andhra Pradesh which is to be installed in the existing dug wells of the farmers.
- In order to encourage the farmers for participation in the scheme, provisions have been made in the scheme for subsidy to the beneficiary farmers to the extent of 100% for the 'Marginal' and 'Small Farmers' and 50% for 'Other' category of farmers.
- The recharge processes would inter-alia lead to improvements in water quality, sustainability of drinking water supplies & socio-economic conditions of the population of the affected areas beside. The outcome of the scheme would be evaluated through concurrent impact assessment studies by independent agency(s) to be identified by Ministry of Water Resources.
- The regional offices of Central Ground Water Board would provide necessary technical assistance to the State Government/implementing agencies in planning, execution and post project impact assessment studies. The cost of the scheme is Rs 1798.71 crore which is being funded by Ministry of Finance (MoF) through NABARD. As of now, funds amounting Rs 1536.75 crore have been sanctioned to NABARD by MoF. The Ministry of Water Resources is the Nodal Ministry for the 'purpose of monitoring of the scheme at national level and to take measures for experience sharing amongst all stakeholders, knowledge transfer and awareness. A Project Monitoring Unit (PMU) has been constituted in the Ministry for the purpose.
- In pursuant to the detailed operational guidelines circulated by the Ministry of Water Resources, the States have constituted the State level Steering Committees and identified Nodal Departments for implementation the scheme. Several State level and district level workshops have also been organized by NABARD in association State Government and with Central Ground Water Board for creating awareness and popularizing the scheme.

- Presently, the identification of beneficiary farmers are under progress in various States. The States are also in process of formulating detailed action plan for IEC activities, monitoring and implementation of the scheme. The designs of site specific ground water recharge structures are under finalization in consultation with Central Ground Water Board.

NATIONAL WATER RESOURCES COUNCIL

National Water Resources Council has been set up by the Government of India in March 1983. The Prime Minister is the Chairman and Union Minister of Water Resources is the Vice-Chairman. Minister of State for Water Resources, concerned Union Ministers/Ministers of State, Chief Ministers of all States & Lieutenant Governors/Administrators of the Union Territories are the Members. Secretary, Ministry of Water Resources is the Secretary of the Council.

NATIONAL WATER BOARD

The Government of India constituted a National Water Board in September 1990 under the Chairmanship of Secretary, Ministry of Water Resources 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. The Secretaries of Union Ministries of Agriculture, Rural Development, Urban Development, Surface Transport, Environment & Forests, Planning and Science & Technology, Chairman, Central Water Commission, Chief Secretaries of all States/Union Territories are its Members. Member (Water Planning & Projects), Central Water Commission is the Member Secretary of the Council.

INTERNATIONAL COOPERATION

(a) INDIA-NEPAL COOPERATION

The Union Government is having continuous dialogue with Government of Nepal at various levels for cooperation in the field of Water Resources Development.

A Treaty on Integrated Development of Mahakali River had been signed between the Government of India and Government of Nepal in February 1996; which came into force in June 1997 (Mahakali Treaty). Pancheshwar Multipurpose Project on river Mahakali (known as river Sarda in India), is the centerpiece of Mahakali Treaty. India – Nepal Joint Group of Experts (JGE) has been overseeing the physical and financial progress with respect to finalization of Joint Detailed Project Report of Pancheshwar Multipurpose Project. All the related field investigations have been completed and Detailed Project Report is to be finalized after resolving the pending issues; which are under discussion with Nepal. The project will have power & irrigation benefits besides incidental benefits of flood moderation.

Agreement has also reached with Nepal to take up the joint field investigations, studies and preparation of Detailed Project Report of Sapta Kosi High Dam Multipurpose Project and Sun Kosi Storage cum Diversion Scheme. A Joint Project Office was opened in August 2004 in Nepal for undertaking the above work. The work of field investigations is in progress.

For dealing with the problems of inadvertent inundation caused by the construction of various works on the border rivers between India and Nepal, a Standing Committee on Inundation Problems (SCIP) between India and Nepal is also functioning since 1986 with a view to identifying the problem areas and suggest possible solutions on a continuing basis.

In order to have interaction at higher level pertaining to the cooperation in the field of Water Resources, including implementation of various agreements and understandings, a Nepal-India Joint Committee on Water Resources (JCWR) headed by Water Resources Secretaries of both the countries is functioning with the mandate to act as an Umbrella Committee over all other committees and groups.

(b) INDIA-BHUTAN COOPERATION

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 35 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 Expert Team (JET) consisting of officials from the Government of India and Royal Government of Bhutan continuously reviews the progress and other requirements of the scheme.

The matter relating to problem of floods created by the rivers originating from Bhutan and coming to India was taken up with the Royal Government of Bhutan. A Joint Group of Experts (JGE) on Flood Management has been constituted between India and Bhutan to discuss and assess the probable causes and effects of the recurring floods and erosion in the southern foothills of Bhutan and adjoining plains in India and recommend to both Governments appropriate and mutually acceptable remedial measures.

The first meeting of JGE was held in Bhutan from 1st to 5th November 2004. The JGE had series of discussions and also made field visits to some of the affected areas, which included the sites prone to landslides, and dolomite mining areas. Based on the discussions, the JGE felt that a more detailed technical examination is required and accordingly a Joint Technical Team (JTT) under the Chairmanship of Member (PID), North Bengal Flood Control Commission has been constituted which held its first meeting in April, 2005.

JTT held its first meeting in April, 2005. The JTT studied some sources of sediment load, nature of slides and suggested further studies and preparation of maps to be taken up for deciding remedial measures to be recommended by the JTT. Preliminary report (Jan 2006) of Joint Technical Team was received in MoWR during Feb. 2006.

Further, as per the decision taken in the first meeting of JGE, a five members Indian team visited Tsatichu lake in Eastern Bhutan (which was formed due to massive landslide which occurred on the right bank of river Tsatichhu on 10th September, (2003) alongwith the officials of Royal Govt. of Bhutan between 18th and 23rd December 2006. During the joint visit, it was observed that the quantity of water in the lake at present is very small and the threat of flood to downstream areas, including Indian Territory is negligible, however, it was recommended that there is a need to monitor any future development like further landslide leading to blockade of outlet and the level of water in the lake should be monitored specially during monsoon.

Second meeting of JGE was held on February 26-27, 2008 in New Delhi. During the meeting, preliminary report (Jan 2006) of Joint Technical Team, report of Joint visit (Dec. 2006) by India—Bhutan Exports Team to Tsatichu Lake in Bhutan and Permission of Royal Government of Bhutan (RGoB) for construction of bullheads on river Manas near Mathanguri were discussed.

During the second meeting of JGE, the JTT has been reconstituted and in the modified ToR of the reconstituted JTT, some rivers/Streams flowing from Bhutan into Assam to be identified by JTT based on the field visit have also been included for studies/recommendations for remedial measures. Further, during the second meeting of JGE, it has been decided to undertake another joint visit by India and Bhutan Experts Teams to the landslide dam site in 2008.

MEA vide their letter dated 10.04.2008 have conveyed approval of the concerned authorities of RGoB for construction of the said deflectors. In pursuance of MEA letter dated 10.04.2008, the permission of RGoB has been conveyed to the Secretary, Water Resources Deptt. Govt. of Assam with a request to approach the local administration of Panbang block of Zhemgang District of Bhutan to undertake the construction of the deflectors vide MoWR letter dated 22.04.2008.

(c) INDIA-BANGLADESH COOPERATION

An Indo-Bangladesh Joint Rivers Commission (JRC) is functioning since 1972 with a view to maintain liaison in order to ensure the most effective joint effort to maximize the benefits from common river systems which is headed by Water Resources Ministers of both the countries. The 36th meeting of the Indo-Bangladesh JRC was held at Dhaka from 19th–21st September 2005 wherein various matters pertaining to cooperation in Water Resources sector with Bangladesh were discussed. As per the decisions taken during 36th meeting of JRC the Hon'ble Ministers of Water Resources of India and Bangladesh alongwith their delegations undertook visits from 13th September to 21st September 2006 to sites of river banks protection, minor lift irrigation and drinking water schemes along the concerned common/border rivers including a stretch of river Ichhamati where river forms boundary between India and Bangladesh, to assess the situation on the ground. During field visit and discussions, there was good understanding between both sides and differences were narrowed down. There was also better appreciation and greater clarity on the issues involved. However, as some more technical details were required, agreement could not be reached. It was decided that further discussions on the matter will be made in the next meeting of JRC which is proposed to be held in India in due course.

A new chapter in the Indo-Bangladesh relations opened up with signing of a Treaty by the Prime Ministers of India and Bangladesh on 12th December 1996 on the sharing of Ganga/Ganges waters at Farakka during the lean season. As per the Treaty, the Ganges water is being distributed at Farakka (which is the last control point on river Ganga in India) during lean period, from 1st January to 31st May every year on 10-daily basis in as per the formula provided in the Treaty. The validity of Treaty is 30 years. Though there is a provision of review of Treaty after five years, no party has asked for its review so far. The sharing of water as per the Treaty is monitored by a Joint Committee comprising the Members, Joint River Commission from Bangladesh and India. Three meetings of the Joint Committee are held every year. The Treaty is being implemented to the satisfaction of both the countries since 1997.

India is providing the flood data of Farakka for Ganga (from 15th June to 15th October), and the flood data of Pandu, Goalpara and Dhubri for Brahmaputra and of Silchar for Barak during monsoon period (from 15th May to 15th October) to Bangladesh for use of their flood forecasting and warning arrangements, besides the data of river Testa, Manu, Gumti, Jaladhaka and Torsa, etc. The transmission of flood forecasting

information from India during the monsoon, which is being supplied free of cost has enabled the Civil and Military authorities in Bangladesh to shift the population affected by flood to safer places.

(d) INDO-CHINA COOPERATION

In the year 2002, the Government of India had entered into an 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 is providing hydrological information (Water level, discharge and rainfall) in respect of three stations, namely Nugesha, Yangcun and Nuxia located on river Yaluzangbu/Brahmaputra from 1st June to 15th, October every year, which is utilized in the formulation of flood forecasts by the Central Water Commission.

Another Memorandum of Understanding has been signed during the visit of the Chinese Premier to India in April, 2005 for supply of hydrological information in respect of Sutlej (Langquin Zangbu), in flood season. Chinese side is providing hydrological information in respect of their Tsada station on river Sutlej (Langquin Zangbu) from the monsoon of 2007.

The Hon'ble President of the People's Republic of China, paid a state visit to the Republic of India from 20 to 23 November, 2006. During the visit, it was agreed to set up an expert level mechanism to discuss interaction and cooperation 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 the Commissioner, Ministry of Water Resources. Chinese Delegation is led by Director, International Economic and Technical Cooperation and Exchange Center, Ministry of Water Resources, People's Republic of China.

The first meeting of the Joint Expert Level mechanism was held on 19-21 September, 2007 at Beaning wherein the issues related to bilateral cooperation on exchange of hydrological information between the two countries were discussed. The 2nd meeting of Expert Level Mechanism (ELM) on Trans-Border Rivers was held at New Delhi from 10-12th April, 2008. 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.

INDUS WATER TREATY, 1960

Under the Indus Water Treaty 1960, India and Pakistan have created two permanent posts of Commissioner for Indus Waters, one each in India and Pakistan, who are the representatives of the respective Governments for all matters arising out of the treaty and serve as the regular channel of communication with regard to implementation of the Treaty. The two Commissioners together form the Permanent Indus Commission (PIC). The PIC holds periodical meetings and also undertakes tours of inspection to projects/works in India and Pakistan. By way of implementation of the Treaty, the PIC held its 100th meeting at Lahore and its 101st meeting, to exclusively discuss the issues raised by Pakistan on Kishenganga Hydroelectric Project, at New Delhi. In the spirit of cooperation, the 107th tour of Inspection by PIC was also arranged in July 2008, on the request of the Pakistan Commissioner, to the Baglihar Hydro-Electric Project (J&K), nearing completion.

As a gesture of goodwill, flood data of the rivers Chenab, Ravi, Sutlej and Tawi is being communicated to Pakistan with effect from 01.07.08 for undertaking advance flood warning measures.

Keeping in view the national importance, the proposed Bursar Hydroelectric Project, Gyspa Hydroelectric Project, Ujh Multipurpose Project and Second Ravi-Beas Link Project besides Shahpurkandi Dam Project have been included in the list of National Projects to enable more effective utilization of the water resources potential available under the Treaty.

CENTRAL ORGANISATIONS

(a) CENTRAL WATER COMMISSION

The Central Water Commission (CWC) is a premier technical organisation in the country in the field of water resources since 1945. The Commission is entrusted with the responsibilities of initiating, co-ordinating and furthering, schemes for control, conservation and utilisation of water resources throughout the country in consultation with the state governments concerned for purposes of flood control, irrigation, drinking water supply and hydro power development. CWC also undertakes investigation, construction and execution of any such schemes as required.

The CWC is headed by a Chairman, who also holds the status of Ex-officio Secretary to the Government of India. It has three technical wings, namely, (i) Design and Research, (ii) Water Planning and Projects and (iii) River Management. Each of the wings is headed by an engineering officer designated as Member, with the Ex-officio status of an Additional Secretary to the Government of India. The wings consist of organisations headed by Chief Engineers, with Directorates under them, each headed by a Director/S.E. There are 32 organisations and 147 Directorates/Circles under the CWC.

There are thirteen regional organisations of CWC which are functioning from Bangaluru, Bhopal, Bhubaneswar, Chandigarh, Coimbatore, Delhi, Hyderabad, Lucknow, Nagpur, Patna, Shillong, Silliguri and Gandhi Nagar, each headed by a Chief Engineer. These organisations closely interact with the states and are entrusted with the monitoring of medium and major projects, command area development, Rehabilitation and Renovation of water bodies, minor irrigation and other water management activities, appraisal of medium projects, flood forecasting and hydrological observations.

Broad Functions of CWC

The functions of CWC are:

- To undertake surveys and investigations to prepare designs and schemes for the development of river valleys for hydro power generation, irrigation by gravity flow or lift, flood management, environmental management, rehabilitation and resettlement, soil conservation, anti-water logging measures, reclamation of alkaline and saline soils, drainage and for drinking water supply;
- To advise and assist the State Governments in the investigation, surveys and preparation of river valley and hydro-power development schemes;
- To undertake construction work of any river valley development scheme on behalf of the Government of India or State Government concerned;

- To collect, co-ordinate the collection of, publish and analyse the data relating to rainfall, runoff and temperature, silting of reservoirs, behaviour of hydraulic structures, environmental aspects etc.
- To collect, maintain and publish statistical data relating to water resources and to act as the Central Bureau of Information relating to water resources;
- To initiate morphological studies to visualise river behaviour, bank erosion/ coastal erosion problems;
- To advise the Government of India and the concerned State Governments on the basin-wise development of water resources;
- To advise the Government of India with regard to all matters relating to the Inter-State water disputes;
- To initiate studies on socio-agro-economic and ecological aspects of irrigation projects for the sustained development of irrigation.

(b) CENTRAL SOIL AND MATERIAL RESEARCH STATION

The Central Soil & Materials Research Station (CSMRS), New Delhi is a premier National Institute of the country devoted to research and investigations, primarily in geotechnical engineering, construction materials and concrete technology. In addition to water resources sector involving hydroelectric and irrigation projects, CSMRS has been undertaking the challenging works pertaining to nuclear and super-thermal power projects, and other construction works. The Research Station also functions as consultant in India and for neighbouring countries such as Nepal, Bhutan, Mauritius, Sri Lanka and Afghanistan for projects and for organizations dealing with such works in the following areas of its specialization: Soil Mechanics and Foundation Engineering, Soil Dynamics, Rock Fill Technology, Geotextile, Grout Technology, Drilling Technology; Engineering Geophysics, Rock Engineering, Construction Materials and Concrete Technology, Geotechnical Instrumentation and Chemical aspects of Water and Engineering Materials.

SUBORDINATE ORGANISATIONS

(a) CENTRAL WATER AND POWER RESEARCH STATION

The Central Water and Power Research Station (CWPRS), Khadakwasla, Pune, is the center of excellence in hydraulic research at the national level. From its beginning in 1916 as an institution dealing with the twin problems of irrigation and drainage, the institution has grown to an institution of international standing for hydraulic research. CWPRS undertakes basic and applied research in the fields of hydraulics and is in the forefront in the use of complex physical and mathematical modeling techniques in solving diverse water resources issues related to riverine and coastal environment. As the Regional laboratory of ESCAP since 1971, CWPRS has offered its services to a number of projects in the neighborhood as well as countries in the Middle East and Africa.

The major disciplines/laboratories of CWPRS are: River Engineering, Reservoir and Appurtenant Structures, Coastal and Offshore Engineering. Ship Hydrodynamics, Hydraulic Machinery, Earth Science, Mathematical Modeling, Foundations and Structures and Instrumentation and Control Engineering. About 50 divisions well equipped with state-of-the-art equipment and software duly supported by infrastructure of high standards, associated with these disciplines are engaged in research.

(b) CENTRAL GROUND WATER BOARD (CGWB)

The Central Ground Water Board is the National Apex Organization in the field of ground water under the Ministry of Water Resources, Government of India, The Board has the mandate to "Develop and Disseminate technologies and 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 a multidisciplinary scientific organisation consisting of Hydrogeologists, Geophysicists, Chemists, Hydrologists, Hydrometeorologists and Engineers, entrusted with the responsibilities of scientific studies, investigations, exploration, monitoring of ground water regime, assessment, augmentation and regulation of ground water resources in the country. The Board is headed by the Chairman who also heads the Central Ground Water Authority. It has four technical wings, each headed by a Member, namely : (i) Survey, Assessment and Monitoring Wing; (ii) Exploratory Drilling and material Management Wing; (iii) Sustainable Management and Liaison Wing and (iv) Training and Technology Transfer Wing. Central Ground Water Board has 18 Regional Offices, each headed by a Regional Director, 11 State Unit Offices and 17 Engineering Divisions in the country.

Central Ground Water Board carries out ground water management studies in 1.5 lakh sq km area every year to evaluate the changes in quantity and quality aspects of the ground water regime owing to various development activities and to prepare ground water management plan. The data generated from these investigations provide a scientific base for preparation of ground water development and management schemes by the state governments. Areas having problems of ground water depletion, seawater ingress and geogenic contamination etc., are accorded priority and special studies are undertaken to assess the magnitude of the problem and suggest suitable ground water management plans.

The Central Ground Water Board carries out exploratory drilling aided by geophysical and remote sensing studies to decipher the potentiality of various geological formations. The Board has 87 rigs of 300 to 700 m drilling capacity, located all over the the country. The Board has drilled 14,668 exploratory wells till 31st March 2008. The successful exploratory wells are handed over to the state governments for utilization. In addition, it has constructed 5782 observation wells, 3142 piezometers, 360 slim holes and 3635 Deposit Wells to collect scientific data. Priority is accorded to drought prone areas, tribal areas, areas affected by geogenic contamination etc. to assist the State Governments for mitigating the drinking water problems.

Central Ground Water Board undertakes countrywide ground water monitoring through a network of 15,000 shallow and deep observation wells to assess the ground water regime changes in time and space. Ground water levels are measured four times a year and water samples are collected once in a year during April/May to generate background information on ground water quality changes on regional scale. Select observation wells are equipped with digital water level recorders (DWLR) (1200 in number) to give high frequency data for observing regular changes in water levels.

To meet the challenge of increased water demand and reduced availability of fresh water in the country, the Central Ground Water Board promotes the practice of

artificial recharge to ground water including Rain Water Harvesting. CGWB, with active involvement of State Govt. departments, has taken up 190 demonstrative rainwater harvesting & artificial recharge pilot projects in which more than 750 artificial recharge structures were constructed to establish their suitability in different hydrologically settings in the country. Impact assessment studies conducted after construction of recharge structures under pilot projects have shown local rise in ground water levels/arrest in declining ground water level trends, improvement in ground water quality, and sustainability of ground water in shallow bore wells/tube wells during summer and revitalization of ground water in shallow bore wells/tube wells during summer and revitalization of dry dug wells/tube wells. Pilot projects on recharge taken up by the Board has also helped in establishing the techno-economic feasibility of artificial recharge structures and their replication through awareness and capacity building. The Board has also disseminated knowledge gained from these projects through manuals, guides, pamphlets, films, mass awareness and training programmes in local languages. The Board is providing technical guidance for site-specific designs of artificial recharge and rainwater harvesting structures to various Central/State Govt. departments, industries, and individuals in the country. During 2006-08, demonstrative Artificial Recharge Projects for implementation in compact area basis for recharging of ground water aquifers have been taken up in eight identified areas selected on scientific basis in the State of Tamilnadu, Karnataka, Andhra Pradesh and Madhya Pradesh facing water scarcity, under the scheme of Ground Water Survey, Exploration and Investigation of the Board. 200 area specific recharge structures are being constructed in coordination with state agencies under the demonstrative recharge scheme. Efficacy of demonstrative recharge projects is being evaluated so that such techniques can also be replicated in other areas of similar geohydrogeological settings.

Central Ground Water Board is taking up scientific studies in collaboration with premier Govt. 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, BARC, NLC, RSMML and BIT Mesra. These studies have helped in better understanding and solving various problems in the Ground water sector. The Board, with the help of its multidisciplinary scientific activities, provides assistance to the State Governments through recommendations for better ground water development and management practices.

CGWB has played a lead role in standardization of methodologies for collection, validation, processing and analysis of ground water related data. CGWB has developed a dedicated software named Ground Water Estimation and Management System (GEMS) for ground water data processing and analysis. The World Bank aided Hydrology Project-II is being implemented in 13 States/UTs (Andhra Pradesh, Gujarat, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Tamilnadu, Chhattisgarh, Goa, Himachal Pradesh, Punjab & Puducherry) with an objective to improve water resources planning and management, drought management and shared vision amongst the stakeholders. The major activities to be taken up during the project are development of Hydrological Design Aid, Decision Support System and implementation of Purpose Driven Studies. The duration of the project is 6 years.

The Board regularly publishes scientific reports and maps on ground water development and management scenario. It has also published various reports/maps

including Hydrogeological Map of India, Hydrogeological Atlases, State Reports, Master Plan on Artificial Recharge to Ground Water and Manual on Artificial Recharge to Ground Water. CGWB website (www.cgwb.gov.in) hosts important information in ground water domain. The Board has prepared user friendly "Ground Water sector planners. It is prepared in ARC GIS environment and is available on CGWB Website. The Board has been regularly publishing its scientific activities since 1985 through a quarterly journal, "Bhujal News".

The Board is also preparing a comprehensive Web Enabled Ground Water Information System, which will provide valuable data and information to the user community and policy planners for management and development of Ground Water resources.

Central Ground Water Board is playing a lead role in providing training in the field of ground water investigations, development and management techniques and more than 2300 professionals and sub professionals of CGWB and other Central and State Govt. organizations have been trained through more than 100 courses. The courses involve induction level course for ground water scientists and water well drilling engineers, use of advanced technologies in the remote sensing, geophysics, hydrochemical, ground water modeling, artificial recharge etc. At present, 16 training courses are being organized to train 300 officers and staff yearly. Rajiv Gandhi National Ground Water Training & Research Institute is being relaunched at Raipur to strengthen the training and research needs in the ground water sector.

Central Ground Water Board has organized the first National Ground Water Congress at Vigyan Bhawan, New Delhi on 11th September 2007. It was inaugurated by Hon'ble Prime Minister of India, Dr. Manmohan Singh and was attended by about 1000 eminent scientists, engineers, planners, farmers, school children, representatives from NGOs, VOs, industries etc. The Congress provided a common platform for interaction among the participants on various aspects of ground water in order to evolve suitable policy framework on emergent ground water related issues. The Valedictory Session was chaired by Hon'ble President of India, Smt. Pratibha Devsingh Patil who also gave away the National Water.

Central Ground Water Authority

The Central Ground Water Authority (CGWA) 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. The CGWA has so far notified 43 over-exploited areas in the country for regulation of ground water development and management. For enforcement of the regulatory directions issued under Section 5 of EPA, 1986, concerned Deputy Commissioners/ District Magistrates have been authorized to take necessary action in case of violation of directives of CGWA in the notified areas. In these notified areas, installation of new ground water abstraction structures is not permitted without prior approval of the CGWA. Advisory Committees under the Chairmanship of District Collector/ Deputy Commissioners with members drawn from various organizations have been constituted which will render advice in matters pertaining to regulation of ground water development and management. The CGWA have also notified 65 over-exploited areas in various States, for registration of ground water abstraction structures, which showed a very steep decline in ground water levels and required action for regulation.

The CGWA is regulating withdrawal of ground water by industries/projects in over-exploited, semi-critical and critical blocks/talukas/mandals/districts through clearance of such proposals. The CGWA also conducts mass awareness and water management training programmes throughout the country as proactive measures to create awareness and capacity building in ground water management.

The CGWA has issued directions to all concerned to adopt roof top rain-water harvesting systems. The CGWA has issued directions to all the Chief Secretaries of States having over-exploited blocks to take all necessary measures to promote/adopt artificial recharge of ground water/rain-water harvesting.

(c) FARAKKA BARRAGE PROJECT

The Farakka Barrage Project was constructed for preservation and maintenance of Kolkata Port by improving the regime and navigability of the Bhagirathi-Hoogly river system. The river Bhagirathi, the feeder canal and navigation Lock at Farakka form part of the Haldia-Allahabad Inland Waterway. The Principal components of the project are: (a) 2,245 metre long barrage across the Ganga with a rail-cum-road bridge necessary for river training works, and a head regulator on the right side, (b) 213 metre long barrage across the river Bhagirathi at Jangipur, (c) Feeder canal of 1113 cubic metres per second (40000 cubic feet per second) carrying capacity and 38.38 km long, taking off from the head regulator on the right of the Farakka Barrage, and (d) Navigation works such as locks, lock channels, shelter basins, navigation lights and other infrastructure.

The Government of India, Ministry of Water Resources has extended the jurisdiction of the Farakka Barrage upto Rajmahal in the upstream (40 km from the Farakka Barrage) and upto Jalangi in the downstream (80 km from Farakka Barrage) for taking up the anti-erosion and bank protection works only. Accordingly, Farakka Barrage Project authority have started executing emergent anti-erosion works since the year 2005 along the bank of the river Ganga in some of the critical reaches in the extended portions.

(d) SARDAR SAROVAR CONSTRUCTION ADVISORY COMMITTEE

The Sardar Sarovar Construction Advisory Committee (SSCAC) located at Vadodara, was constituted in 1980 as per the directive of the Narmada Water Disputes Tribunal (NWDT), for scrutiny of estimates, technical features, design and to monitor the progress of the construction activity to ensure efficient, economical and timely execution of Unit-I (Dam and Appurtenant works) and Unit – III (Hydro-Power Complex) of the Sardar Sarovar Project (SSP). The Secretary, Ministry of Water Resources, is the Chairman of the Committee. Representatives from the departments like Irrigation, Power, Revenue, Welfare etc. concerned with the construction of the project of the four party States along with their counterparts from the Government of India and the Narmada Control Authority are Members of the Committee.

(e) BANSAGAR CONTROL BOARD

The Bansagar Control Board was constituted by the Central Government in consultation with the Governments of Madhya Pradesh, Bihar and Uttar Pradesh with a view to ensure efficient, economical and early execution of the Bansagar Dam on Sone river, including all connected works in Madhya Pradesh but excluding the canal systems. The headquarter of the Board is at Rewa (M.P.). The Union Minister of Water Resources is the Chairman of the Board. The day-to-day activities of the Board

are managed by an Executive Committee of the Board under the Chairmanship of Chairman, Central Water Commission. Funds for the project are provided by the beneficiary States of Madhya Pradesh, Uttar Pradesh and Bihar in the ratio of 2:1:1.

The revised estimated cost of the Dam Project is Rs. 1054.96 crore (at 1998 price level). All the Non Over Flow (NOF) blocks and both the key blocks on either sides have been completed up to top elevation RL 347.00m. All Spillway blocks have been raised to Crest Level (EL 326.40m) in June 2000. All the construction Sluices have been plugged. Spillway bridge and Piers of the dam had been fully completed. The Left and Right rock fill dam have been completed upto RL 347m i.e. TBL. All the six saddle dams have been fully completed. All the 18 Nos. Radial Crest have been erected and made operational. The reservoir was filled upto EL 339.00m (FRL: 341.50m) during 2006 monsoon.

(f) GANGA FLOOD CONTROL COMMISSION

Ganga Flood Control Commission with its headquarters at Patna, was established in 1972. It serves as the Secretariat and executive limb of Ganga Flood Control Board which is headed by Union Minister for Water Resources and has as its members, the Union Ministers for Finance, Railways, Surface Transport and Agriculture or their representatives, Union Minister of State for Water Resources, the Chief Ministers of the basin States or their representatives and Member, Planning Commission. The Commission is headed by a Chairman who is assisted by two full-time Members.

The main functions of the Commission include preparation and updating of a comprehensive plan for flood management, techno-economic appraisal of flood management schemes, assessment of adequacy of waterways under road and rail bridges, monitoring and performance evaluation of flood management schemes, and participation in international and national committees set up by the Government of India on Ganga basin States pertaining to the subject of flood management.

(g) UPPER YAMUNA RIVER BOARD

A Memorandum of Undertaking (MoU) was signed by the Chief Ministers of Himachal Pradesh, Haryana, Uttar Pradesh, Rajasthan and National Capital Territory of Delhi on 12th May 1994 regarding allocation of utilizable surface flow of Yamuna upto Okhla among the co-basin States. As per the provision in the MoU, the Upper Yamuna River Board (UYRB) with its headquarters in the National Capital Region was constituted. Upper Yamuna Review Committee (UYRC) was also constituted, for supervising the working of the UYRB to ensure implementation of the MoU regarding allocation of surface flow of Yamuna and to issue directions, as deemed necessary, for proper development, Uttarakhand has also been made Member of Upper Yamuna River Board and Upper Yamuna Review Committee.

In the UYRC meeting and a special getting held by the Hon'ble Minister (WR) on 12.04.06 and 20.12.06 respectively, an important issue in the early implementation of storage dams viz. Renuka, Kishau & Lakhwar Vyasi in Upper Yamuna Basin, was the co-basin States held differing views in the sharing of benefit and cost of these projects. In a meeting taken by Chairman, UYRB on 11th February, 2008 also, divergent views were expressed by the basin States. It was however decided to assign priority to construct these projects and further discussion on evolving the formula for sharing of costs and benefits would continue.

Government of India has included the three storage projects as National Projects, for which central assistance to be provided would be 90% of the project cost of

irrigation and drinking water components of the project as grant. The projects would be eligible for the central grant after techno-economic clearance of the Detailed Project Report by the Advisory Committee of the Ministry of Water Resources on Irrigation, Flood Control & Multipurpose Projects and investments clearance by Planning Commission.

During the 33rd meeting of UYRB held on 27.03.08 and a meeting held by Principal Adviser, Planning Commission, the issues affecting early implementation of the projects have been further discussed. Informal meetings by Chairman Central Water Commission with some of the individual co-basin States have also been held in the endeavour to ascertain the individual views of all co-basin States on sharing of cost and benefits of the three storage projects and resolve the issues in a formal meeting.

PUBLIC SECTOR UNDERTAKINGS

(a) WATER AND POWER CONSULTANCY SERVICES (INDIA) LTD.

- WAPCOS Limited is a "MINI RATNA" Public Sector Enterprise under the aegis of the Union Minister of Water Resources. Incorporated on June 26th, 1969 under the Companies Act. 1956, WAPCOS has been provided consultancy services in all facets of Water Resources, Power and Infrastructure Sectors in India and Abroad.
- 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.
- WAPCOS' spectrum of services covers a wide range of activities e.g. pre-feasibility studies, feasibility studies, simulation studies, diagnostic studies, socio-economic studies, master plans and regional development plans, field investigations, detailed engineering including designs, detailed specifications, tendering process, contract and construction management, commissioning and testing, operation & maintenance, quality assurance & management, software development and human resource development.
- WAPCOS has on date an authorized capital of Rs. 200 Lakh (Paid up Capital i.e. initial investment of Government Rs. 30 lakh and issue of Bonus Shares Rs. 170 lakh).
- The Growth of WAPCOS in Turnover, New Business and Gross Margin over the last few years is presented below :
- WAPCOS have successfully completed/on-going consultancy assignments abroad in 40 countries and is registered with various international funding agencies for participating in the funded projects 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) etc. Apart from India, WAPCOS is currently engaged in providing consultancy services in Afghanistan, Bhutan, Cambodia, Ethiopia, Eritrea, Laos, Lesotho, Mozambique, Rwanda, Sudan, Swaziland, Uganda, Zambia and Zimbabwe.

- WAPCOS has been rated as "Excellent" by the Department of Public Enterprises during the last five years in succession and has been awarded Prime Minister's "MOU Award for Excellence in Performance" for the year 2005-2006. The Department of Public Enterprises, Minister of Heavy Industries and Public Enterprises, Govt. of India have selected WAPCOS amongst the Top Ten Central Public Enterprises for this Award. The Company also received "MOU Excellence Certificate" for the year 2004-05. WAPCOS has received "EEPC All India Export Award" under the category of "Star Performer in 2005-2006 : Engineering Services: Large Enterprises" and "EEPC (Northern Region) Award" under the category of "Project Export/Constituency Services-Large Enterprises in 2004-05". WAPCOS bagged the Silver Trophy of "SCOPE Award for Excellence and outstanding contribution to the Public Sector Management-Small Public Enterprises Category"; "Enterprises Excellence Award" by Indian Institution of industrial Engineering for the year 2003-04. CMD, WAPCOS was bestowed "Bhartiya Shiromani Puraskar" and the Company was presented "Gold Medal" by Institute of Economic Studies for contribution made by WAPCOS in Nation Building.

((b) NATIONAL PROJECTS CONSTRUCTION CORPORATION LIMITED

National Projects Construction Corporation Limited (NPCC), a Government of India Enterprise under the aegis of Ministry of Water Resources was incorporated in 1957 with the objective to carry out infrastructure works and other related activities for development of the nation.

NPCC has executed varied nature of projects like Housing, Institutional Buildings, Commercial Complexes, Industrial Projects, Roads & Highways, Bridges and Flyovers, Silos, Irrigation & River Valley Projects, Dams & barrages, Hydel and Thermal Power Projects etc. in India & Abroad.

NPCC is an ISO 9001-2000 certified one of the leading engineering public sectors and has executed/executing various landmarks in the field of engineering. Some of the landmarks implemented/executed/under execution by NPCC are listed below :-

1. NTPC Township at Sipat in Chhattisgarh and Talcher in Orissa.
2. Engineering College at Ramgarh/Polytechnic Colleges at Pakur Bahragora, Bhaga and Gola in Jharkhand.
3. Lab & Administrative Building for Desert Medical Research Centre (DMRC) at Jodhpur/Auditorium for Patel Chest Institute at Delhi.
4. Lok-Nayal Jai Prakash Bhawan at Patna in Bihar.
5. Construction of Flyover at Noida in Uttar Pradesh.
6. Grain Silos Projects in Iraq.
7. Chukha Hydel Project, Bhutan.

8. Nahar-saad Canal Project, Iraq.
9. Construction of Vishakhapatnam Steel Plant in Andhra Pradesh/ Modernization of Rourkela Steel Plant in Orissa.
10. Assam Rifle Building works in all States of North East.
11. Construction of Maneribhali Hydro-electric Project, Uttarakhand.
12. Jobat Dam in Madhya Pradesh and Khuga Dam in Manipur.
13. Godavari Barrage in Andhra Pradesh.
14. Construction of PMGSY Roads in Bihar & Jharkhand.
15. Indo-Bangladesh Border Fencing & Road Works in Tripura, Mizoram, Assam & Meghalaya.

Presently, NPCC has 19 zones spread all over India and working in the most difficult terrain of North Eastern Region and playing active roll it development of the nation.

OTHER ORGANIZATIONS

(a) NARMADA CONTROL AUTHORITY

The Central Government framed the Narmada Water Scheme, which, among other things, constituted Narmada Control Authority and a Review Committee in 1980 for implementation of the decisions and directions of the Narmada Water Disputes Tribunal.

The Narmada Control Authority, a high powered inter-action body is headed by the Secretary, the Ministry of Water Resources as the Chairman with Secretaries of the Union Ministries of Power, Environment & Forests, Social Justice & Empowerment, Tribal Affairs, Chief Secretaries of the four party States, one Executive Member and the three full time Members appointed by the Central Government and four part-time Members in-charge of department of Irrigation/Power/State Electricity Boards appointed by the party States. The Review Committee of narmada Control Authority (RCNCA) headed by the Union Minister of Water Resources comprises of Union Minister for Environment & Forests and Chief Ministers of the party States as Members. The Secretary, Ministry of Water Resources, is the convener of the RCNCA. It may suo-moto on the application of any party state or Secretary to the Government of India, Ministry of Environment & Forests, review any decision of the Authority.

As per the decision taken by the NCA in its meeting on 8th March, 2006 for according permission to raise the height of the Sardar Dam, the Elevation of Block No. 22 to 50 have been subsequently raised to Elevation Level (EL) 121.92 metre. The Government of Gujarat has completed the raising of Sardar Sarovar Dam Spillway blocks upto EL 121.92 m. The construction of main canal carrying water from Sardar Sarovar Dam upto Rajasthan border is completed upto 357 kms length out of its total length of 458 kms in Gujarat. Stipulated date of completion of works in 357 km to 458 km and two major structures falling within 263 km to 357 Km is December 2008. Narmada Water has reached Rajasthan on 18.3.2008 by completing one modalities of major canal siphon works and bye-pass arrangement at khari canal siphon. Partial irrigation benefits are being realized by releasing Narmada water from the Sardar Sarovar Dam since it has been raised upto EL 121.92 m. Government of Gujarat has developed 2.52 lakh ha. of command area in Phase-I and 0.46 lakh ha. in Phase-II of Narmada Main Canal for deriving partial benefits. Drinking

water supply has also started in 8215 villages and 135 urban centres including the whole of Saurashtra and fully covered of Kutch region. All the 6 units of River Bed power House and 5 units of Canal Head Power House have been commissioned successfully and are in operational condition. The total hydro-power generated from the generating units already installed 4435.660 million units during the year 2007-08. These energy benefits are shared by the party States as per the provisions of NWDT Award.

(b) BETWA RIVER BOARD

The Betwa River Board was constituted by the Ministry of Water Resources for efficient, economically and early execution of the Rajghat Dam Project, a joint venture of Madhya Pradesh and Uttar Pradesh. The headquarter of the Board is at Jhansi (U.P.). The Union Minister for Water Resources is the Chairman of the Board. The activities of the Board are managed by the Executive Committee of the Board under the Chairmanship of Chairman, Central Water Commission. The funds for construction of the Rajghat Dam, Power House Projects and for meeting the expenses of the Office of the Board are borne by the States of Madhya Pradesh and Uttar Pradesh in equal proportions.

The Rajghat Dam and Rajghat Hydro Electric Projects are inter-State Projects of Madhya Pradesh and Uttar Pradesh. The estimated cost of the Rajghat Dam is Rs. 300.60 crore (at 2000 price level) and that of the Power House Rs. 139.74 crore (at 1997 price level). The Rajghat Dam is almost complete. All the three units of Rajghat Hydro-Electric Project have been synchronized during 1999 and the power generation is continuing in all units since then.

(c) TUNGABHADRA BOARD

The Tungabhadra Board was constituted for the completion operation and maintenance of the Tungabhadra Project. The Board is responsible for the common portion of the Tungabhadra Project. The Krishna Water Disputes Tribunal has made specific provision in the Award for the use of Tungabhadra water by the States of Karnataka and Andhra Pradesh. The responsibility for carrying out this specific provision relating to the use of Tungabhadra waters has been entrusted to the Tungabhadra Board by the Tribunal. The Board is regulating the water for irrigation, hydropower generation and other uses on the right bank.

The Board consists of a Chairman appointed by the Government of India, one Member from Government of India and two Members from concerned States each representing Andhra Pradesh and Karnataka. An Officer of Central Government appointed as the Secretary of the Board is the Chief Executive of the Board. Funds for the functioning of the Board are provided by the two State Governments.

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 whereat is carried out in accordance with the agreed working table. The power generated is shared between the States of Karnataka and Andhra Pradesh in the ratio of 20:80.

(d) NATIONAL INSTITUTE OF HYDROLOGY

The National Institute of Hydrology (NIH), functioning since 1978, has its headquarters at Roorkee (Uttarakhand). To carry out field related research, the NIH has four regional centres located at Belgaum, Jammu, Kakinada and Sagar and two centres for flood management studies at Guwahati and Patna.

The objectives of the Institute are : (a) to undertake, aid, promote and coordinate basic, applied and strategic research on all aspects of hydrology, contributing to sustainable water resources development in the country; (b) to act as a repository of knowledge and information, and dissemination of the same in the country; (c) to act as a center of excellence for transfer of technology, human resources development and institutional development in specialized areas of hydrology; (d) to conduct user defined, demand-driven research through consultancy in the field of hydrology and (e) to cooperate and collaborate with relevant national and international organizations in achieving the above objectives. To fulfill these objectives, the Institute has established world class laboratories in the area of nuclear applications of hydrology, water quality laboratory and remote sensing and GSI application laboratory.

The Institute is presently focusing studies and R&D on the following thrust areas; hydrology of extremes, impact of land use changes on water resources, ground water modeling and management, sustainable water systems management, surface water modeling and regional hydrology and environmental hydrology. The Institute is involved in a number of nationally important water resources projects including World Bank funded Hydrology Project.

The NIH is also hosting the secretariat of INCOH, which is also the nodal agency in India for the International Hydrology Programme of UNESCO. The Institute is participating under institutional strengthening and Vertical Extension Component of the Hydrology Project Phase II (HP-II) besides, acting as the nodal agency for the implementation of DSS (Planning) for Integrated Water Resources Development and Management.

(e) BRAHMAPUTRA BOARD

The Brahmaputra Board was constituted in December, 1981 for planning and implementation of measures for the management of floods and bank erosion in the Brahmaputra valley. The major activities of the Board are preparation of Master Plans, investigation of projects in the Brahmaputra and Barak basin, execution of schemes/projects and preparation of Detailed Project Reports in the North-Eastern Region. The Board has already completed Project Reports in the North-Eastern Region. The Board has already completed the Master Plan, Parts-I & II pertaining to Brahmaputra River (Main Stem) and Barak River and its tributaries. 36 Master Plans have been approved by the Government of India and have been sent to the States for implementation. Another 6 nos. have also been completed and approved by the Board. Other 15 nos. are under various stages of preparation by Brahmaputra Board. The Board has taken over the construction of Pagladiya Dam Project approved at an estimated cost of Rs. 542.90 crore. The construction of the project is held up due to non-completion of ZIRAT survey (Project Evaluation) by the Government of Assam. Efforts are being made with State Government of Assam to carry out the Zirat Survey.

The Board had also taken up execution of anti-erosion measures for protection of Majuli Island in Assam. It had also taken up other anti-erosion works like Avulsion of Brahmaputra at Dholla Hatighulli. Few drainage development schemes in the N.E. Region have also been taken up.

(f) NATIONAL WATER DEVELOPMENT AGENCY

The Ministry of Water Resources had formulated a National Perspective Plan (NPP) in August, 1980 for Water Resources Development by transferring water from water

surplus basins to water deficit basins/regions by Interlinking of Rivers. The NPP has two main components, i.e. the Himalayan Rivers Development Component and the Peninsular Rivers Development Component. The NPP envisages additional irrigation benefits of 35 million hectare, i.e., 25 million hectare from surplus water and 10 million hectare, i.e., 25 million hectare from surplus water and 10 million hectare by increased use of ground water which will be over and above the ultimate irrigation potential of about 140 million hectare from major, medium and minor irrigation projects and 34 million KW of hydropower, apart from the benefits of flood control, navigation, water supply, fisheries, salinity, pollution control, etc. The Himalayan Component of inter-basin water transfer proposals envisages benefits directly to the States of Uttar Pradesh, Haryana, Rajasthan, Gujarat, Assam, West Bengal, Bihar, Jharkhand and Orissa and enrich the peninsular Component from the surplus waters of Brahmaputra. The Peninsular Component envisages benefit to the States of Andhra Pradesh, Orissa, Karnataka, Tamilnadu, Puducherry, madhya Pradesh, Rajasthan, Maharashtra and Gujarat.

The National Water Development Agency (NWDA) was set up as a Society in 1982 to carry out surveys and investigations and to prepare feasibility reports of the links under the NPP. The NWDA carried out water balance studies of 137 basins/sub-basins and at 71 identified diversion points and top-sheet studies of 74 identified storages and 37 link alignments under NPP, NWDA has, after carrying out aforesaid detailed studies, identified 30 links, comprising of 16 links under Peninsular Components and 14 links under Himalayan Components for preparation of Feasibility Reports for effecting transfer of water. NWDA has completed feasibility reports of 16(14 under Peninsular and Indian portion of 2 under Himalayan component) water transfer links. Five links under Himalayan Component involve international dimensions; therefore, target for completion of feasibility report of such links cannot be given. One link under peninsular component falls entirely in Karnataka; as such concurrence of Karnataka is required. Feasibility Reports of remaining links are under progress.

In December 2002, MoWR with the approval of Hon'ble Prime Minister of India has set up a Task Force on Interlinking of Rivers (TF-ILR) to suggest modalities for arriving at speedy consensus amongst the States for sharing and transfer of surplus water to deficit areas, providing guidance on norms of appraisal of individual projects in preparation of resettlement plans. Task Force had submitted two Action Plans outlining the time schedules for the completion of the feasibility studies, detailed project report, estimated cost, implementation schedule, concrete benefits and advantages of the project, etc. and possible approaches for funding, cost recovery and execution of ILR programme.

The National Common Minimum Programme (NCMP) of the UPA Government envisaged that the Government would make a comprehensive assessment of the feasibility of linking the rivers of the country starting with the southern rivers in a fully consultative manner. After comprehensive assessment of feasibility of Interlinking of Rivers in the country, the Government decided that the Task Force on Interlinking of Rivers, which has submitted Action Plans I & II and completed its mandated task, may be wound up. Accordingly, the Task Force was set up in December, 2004. A Special Cell working under Ministry of Water Resources will look after the residual routine work of Task Force.

Further, the Government of India has constituted a Committee of Environmentalists, Social Scientists and other experts on ILR Project in December,

2004 to advise Government on Environmental, Social issues, etc., and to involve them in the consultation process. The committee has held five meetings so far.

The implementation of the inter-basin water transfer link schemes can be taken up in a phased manner depending on the priorities of the Government and availability of funds. But before this, certain other steps, viz., negotiations and agreements amongst the States involved in inter-basin transfer, preparation of Detailed Project Reports (DPRs), Techno-economic appraisal of DPRs and investment clearance of the schemes, funding arrangements and fixing of agencies for execution, etc., would be necessary.

The links namely (i) Ken-Betwal link (jj) Parbati-Kalisindh-Chambal link (iii) Godavari (Polavaram)— Krishna (Vijayawada) link (iv) Damanganga Pinjal link and (v) Par-Tapi-Narmada link have been identified as priority links for consensus building amongst concerned State for taking up preparation of Detailed Project Report (DPR).

The status of consensus among States on these links is given as under :-

KEN-BETWA LINK

A tripartite MoU was signed between the Union Minister of Water Resources, Chief Ministers of Government of Madhya Pradesh and Uttar Pradesh on 25th August, 2005 in the presence of Dr. Manmohan Singh, Hon'ble Prime Minister of India for preparation of DPR of Ken-Betwa link by Central Government. The works for paration of DPR have been started by NWDA, which is planned to be completed by end of December, 2008.

PARBATI-KALISINDH-CHAMBAL LINK

Government of Madhya Pradesh & Rajasthan have agreed in principle for preparation of DPR of Parbati-Kailisindh-Chambal link and informed that MoU in this regard is under consideration and shall be submitted to the Central Government shortly.

PAR-TAPI-NARMADA LINK AND DAMANGANGA-PINJAL LINK

The draft MoU for taking up their DPRs was sent to the concerned states of Gujarat and Maharashtra for their concurrence during April, 2007. The concurrence of the two states has been received. Further action for signing the MoU in this regard is being taken.

GODAVARI (POLAVARAM)—KRISHNA (VIJAYWADA) LINK

This link is being discussed with the concerned States in 'consensus Group'.

RIVER SYSTEM

The river systems of India can be classified into four groups viz., (i) Himalayan rivers, (ii) Deccan rivers, (iii) Coastal rivers and (iv) Rivers of the inland drainage basin. The Himalayan rivers are formed by melting snow and glaciers and therefore, continuously flow throughout the year. During the monsoon months, Himalayas receive very heavy rainfall and rivers swell, causing frequent floods. The Deccan rivers on the other hand are rainfed. Many of these are non-perennial. The Coastal Streams, especially on the West Coast are short in length and have limited catchment areas. Most of them are non-perennial. The streams of the inland drainage basin of western Rajasthan are few and far apart. Most of them are of an ephemeral character.

The main Himalayan river systems are those of the Indus and the Ganga-Brahmaputra-Meghna System. The Indus, which is one of the great rivers of the world, rises near Mansarover in Tibet and flows through India and thereafter through Pakistan and finally falls in the Arabian Sea near Karachi. Its important tributaries flowing in Indian Territory are the Sutlej (originating in Tibet), the Beas, the Ravi, the Chenab and the Jhelum. The Ganga-Brahmaputra-Meghna is another important system of which the principal subbasins are those of Bhagirathi and the Alaknanda, which join at Dev Prayag to form the Ganga. It traverses through Uttarakhand, Uttar Pradesh, Bihar and West Bengal. Below Rajmahal hills, the Bhagirathi, which used to be the main course in the past, takes off, while the Padma continues eastward and enters Bangladesh. The Yamuna, the Ramganga, the Ghaghra, the Gandak, the Kosi, the Mahananda and the Sone are the important tributaries of the Ganga. The Chambal and the Betwa are the important sub-tributaries, which join inside Bangladesh and continue to flow as the Padma or Ganga. The Brahmaputra rises in Tibet, where it is known as Tsangpo and runs a long distance till it crosses over into India in Arunachal Pradesh under the name of Dihang. Near Passighat, the Debang and Lohit join the river Brahmaputra and the combined river runs all along the Assam in a narrow valley. It crosses into Bangladesh downstream of Dhubri.

The principal tributaries of Brahmaputra in India are the Subansiri, the Jia Bhareli, the Dhansiri, the Puthimari, the Pagladiya and the Manas. The Brahmaputra in Bangladesh receives the flow of the Tista, etc., and finally falls into the Ganga. The Barak river, the Head Stream of the Meghna, rises in the hills in Manipur. The important tributaries of the river are the Makku, the Trang, the Tuivai, the Jiri, the Sonai, the Rukni, the Katakhal, the Dhaleswari, the Langachini, the Maduva and the Jaitnga. The Barak continues in Bangladesh till the combined Ganga-Brahmaputra join it near Bhairab Bazar.

In the Deccan region, most of the major river systems flowing generally in east direction fall into the Bay of Bengal. The major east flowing rivers are the Godavari, the Krishna, the Cauvery, the Mahanadi etc. the Narmada and the Tapti are major West flowing rivers.

The Godavari in the southern Peninsula is the second largest river basin covering 10 per cent of the area of India. Next to it is the Krishna basin in the region, while the Mahanadi is the third largest basin. The basin of the Narmada in the uplands of the Deccan, flowing to the Arabian Sea, and of the Kaveri in the south, falling into the Bay of Bengal are about the same size, though with different character and shape.

There are numerous coastal rivers, which are comparatively small. While only handful of such rivers drain into the sea near the delta of east coast, there are as many as 600 such rivers on the West Coast.

A few rivers in Rajasthan do not drain into the sea. They drain into the salt lakes and get lost in the sand with no outlet to sea. Besides these, there are the desert rivers, which flow for some distance and are lost in the desert. These are the Luni, the Machhu, the Rupen, the Saraswati, the Banas, the Ghaggar and others.

The River system of India can also be described in terms of river basins. The entire country has been divided into twenty river basins/group of river basins comprising twelve major basins and eight composite river basins. The twelve major river basins are : Indus, Ganga-Brahmaputra-Meghna, Godavari, Krishna, Cauvery, Mahanadi, Pennar, Brahmani-Baitarani, Sabarmati, Mahi, Narmada and Tapi. Each of these basins has a drainage area exceeding 20000 sq. km.

The eight composite river basins combining suitably together all the other remaining medium (drainage area of 2000 to 20000 sq. km.) and small river systems (drainage area less than 2000 sq. km.) for the purpose of planning and management are : (1) Subernarekha-combining Subernarekha and other small rivers between Subernarekha and Baitarani, (2) East flowing rivers between Mahanadi and Pennar; (3) East flowing rivers between Pennar and Kanyakumari; (4) Area of Inland Drainage in Rajasthan Desert; (5) West flowing rivers of Kutch and Saurashtra including Luni; (6) West flowing rivers from Tapi to Tadri; (7) West flowing rivers from Tadri to Kanyakumari and (8) Minor rivers draining into Myanmar (Burma) and Bangladesh.